

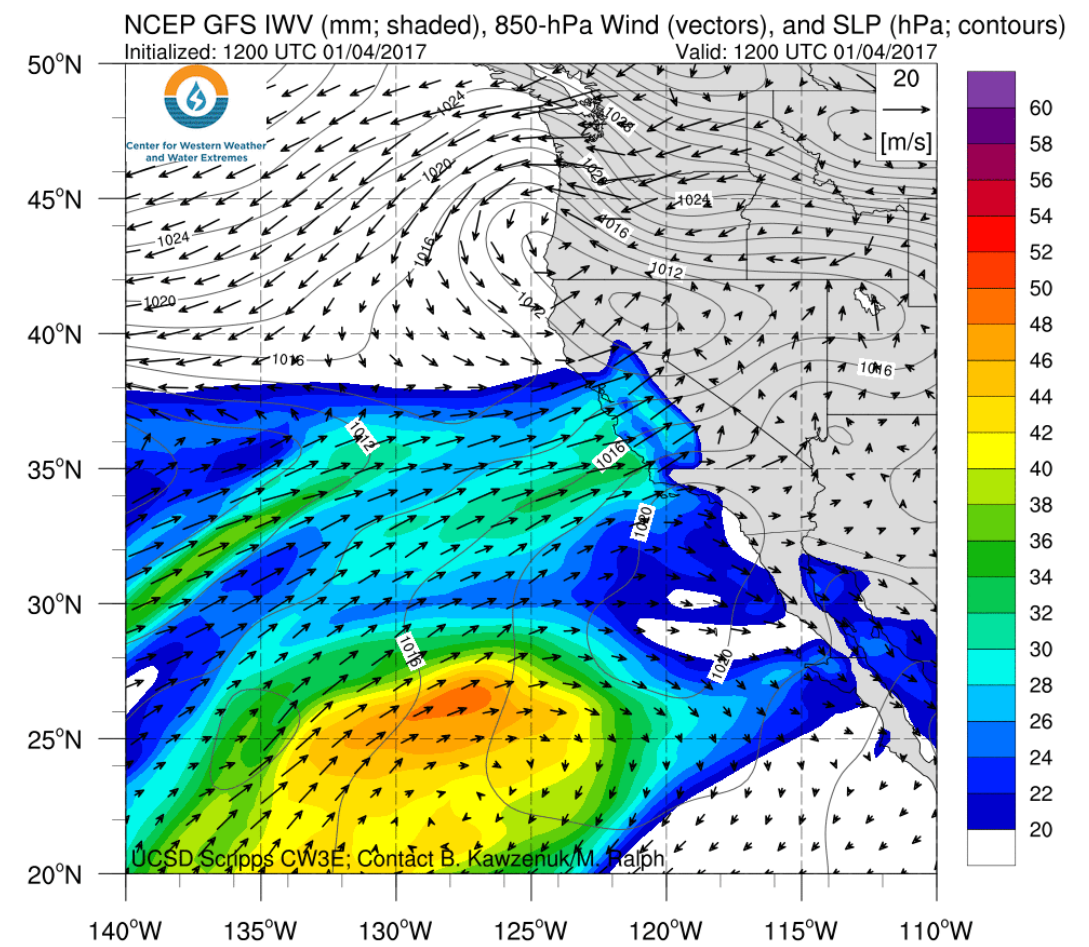
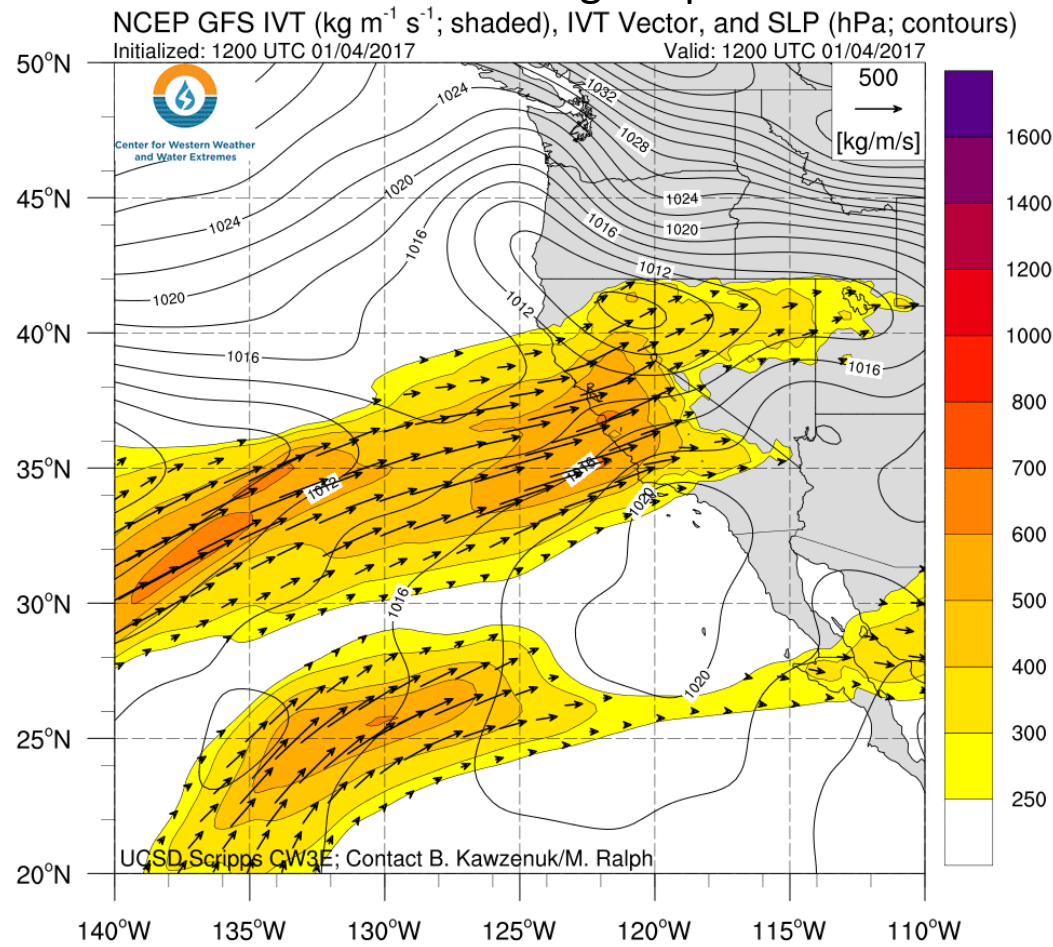
# CW3E Atmospheric River Update – Outlook



Center for Western Weather  
and Water Extremes  
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AT UC SAN DIEGO

## Strong AR forecast to impact California this weekend

- A strong AR with IVT as high as  $1000 \text{ kg m}^{-1} \text{ s}^{-1}$  is forecast make landfall over the West Coast this Weekend
- Precipitation from an AR currently impacting CA combined with the precipitation from AR this weekend are producing 7-day precipitation forecasts as high as 20 inches in the higher elevations of the Sierra Nevada Mts.
- The hydrologic impacts associated with an event of this magnitude could be numerous and several rivers are already forecast to rise above flood stage in portions of northern/central California and western Nevada



# AR Outlook: 4–10 January 2017

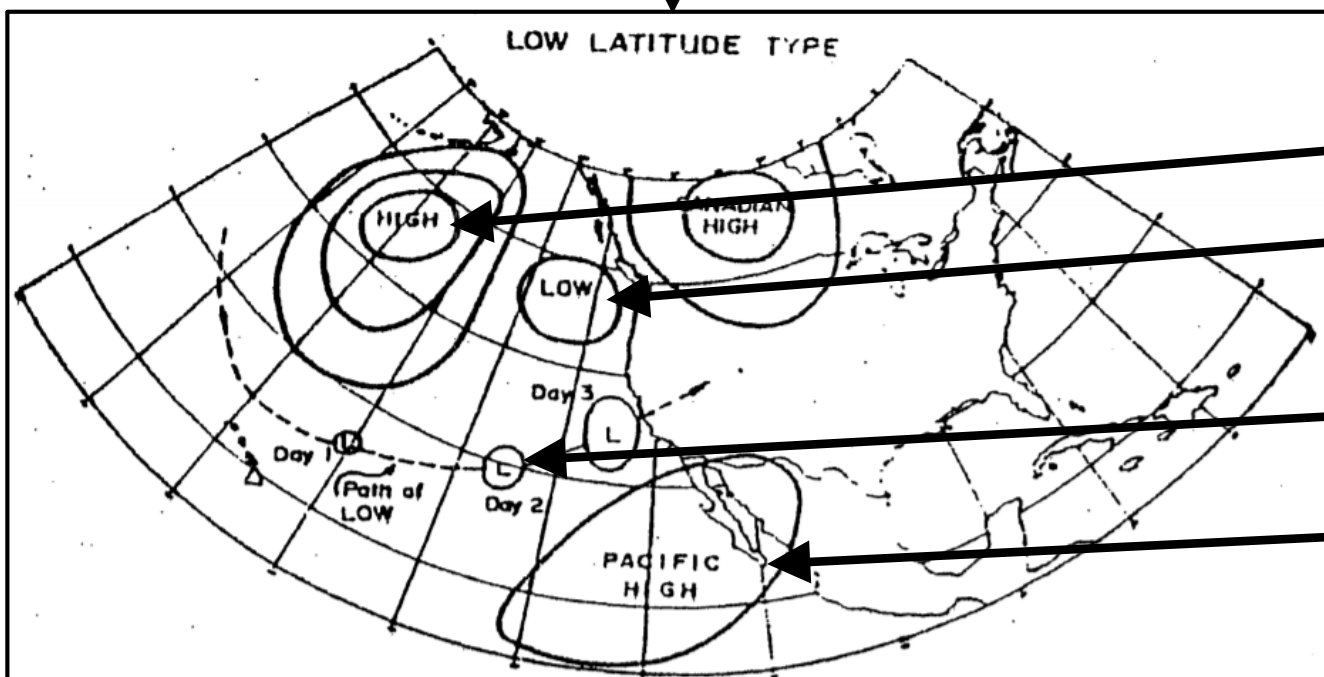
For California DWR's  
AR Program



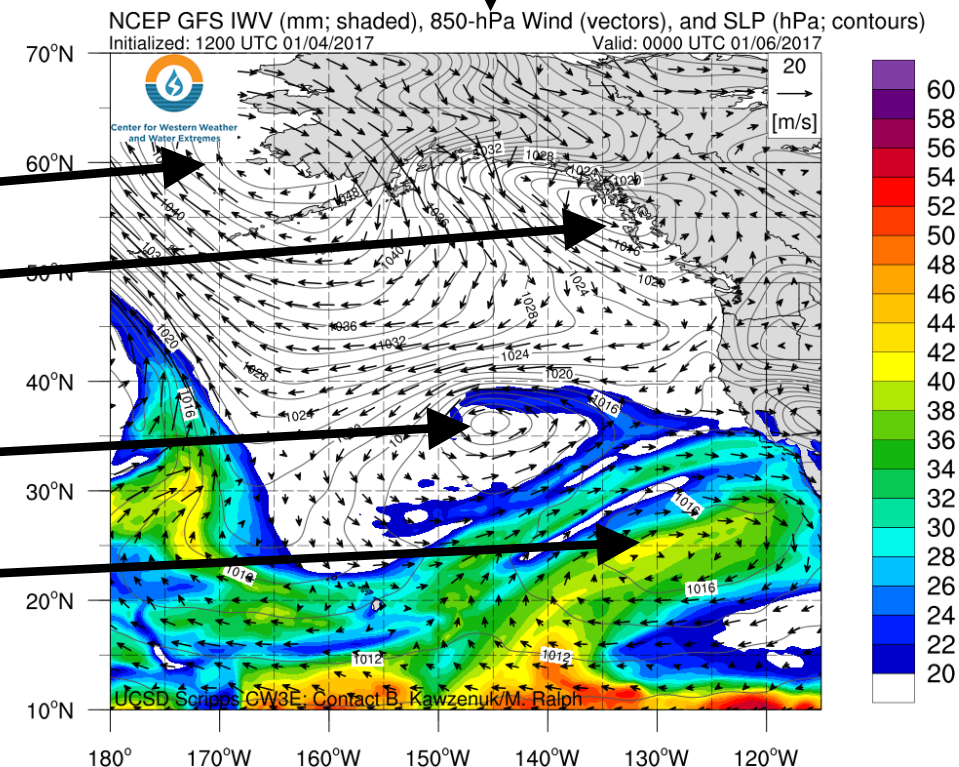
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Past studies have highlighted the weather patterns that are most conducive to extreme precipitation and flooding in Central California

The forecast atmospheric conditions for this weekends AR are very similar to a schematic that was developed by Strobin and Reynolds in 1995



Schematic from Strobin and Reynolds 1995 Figure 1





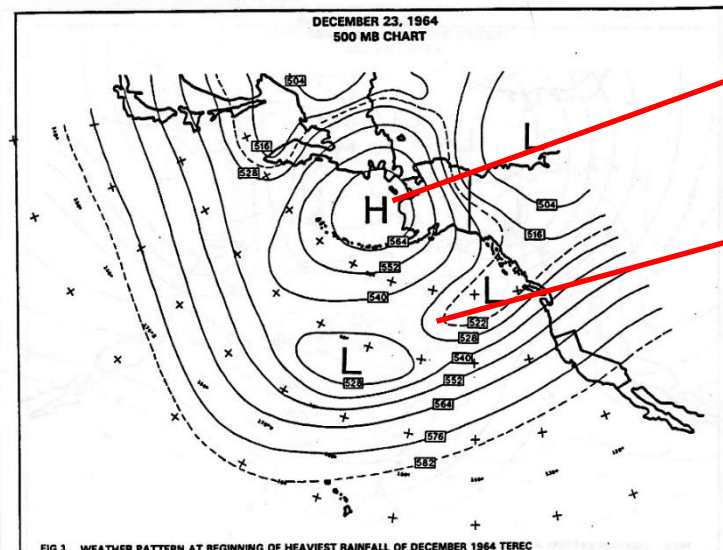
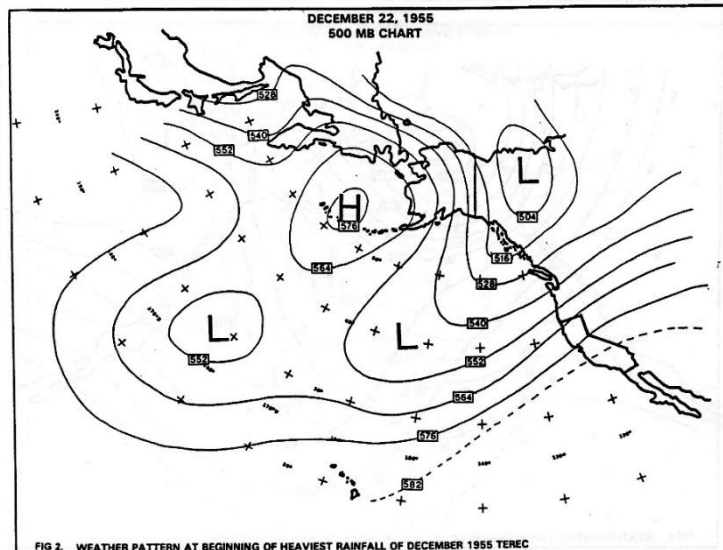
# AR Outlook: 4–10 January 2017

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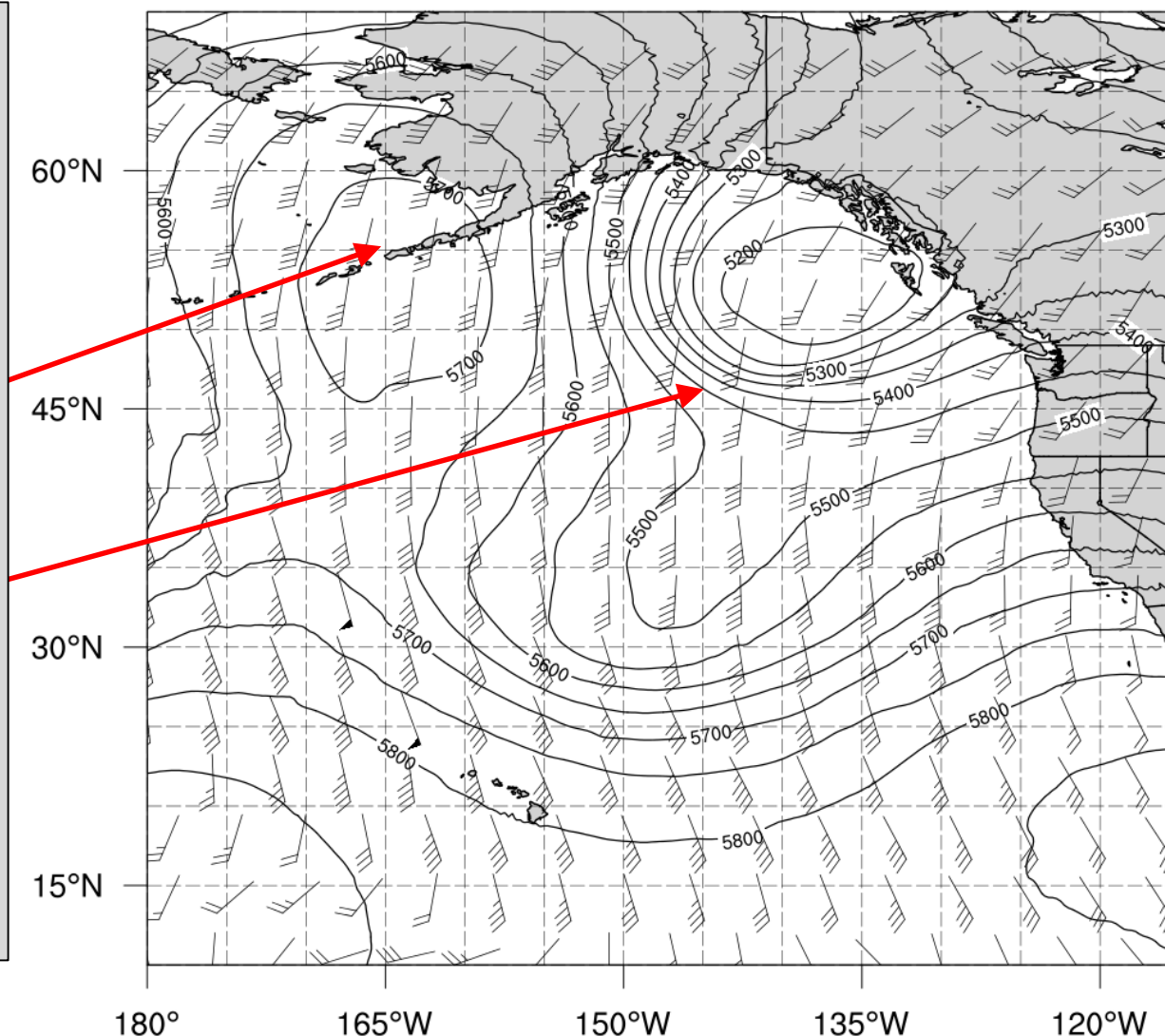


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On the left is the large scale weather patterns that produced some of the most damaging flooding in northern California. Dec '55 and Dec '64. On the right is the forecast 500-hPa pattern for Monday morning 9 January 2016. This matches the low latitude storm track identified by Weaver back in 1962 as producing significant hydrologic impact events



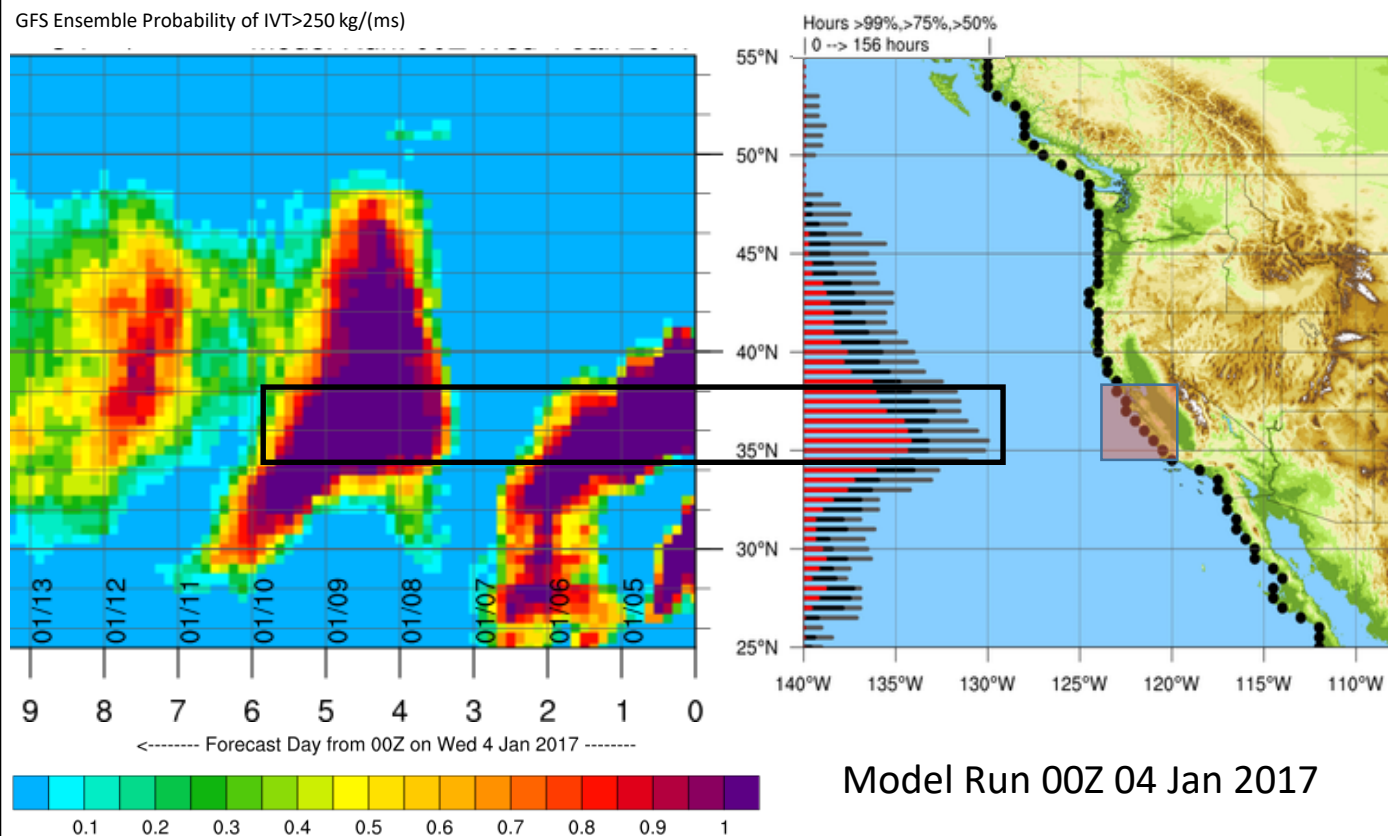
# AR Outlook: 4–10 January 2017

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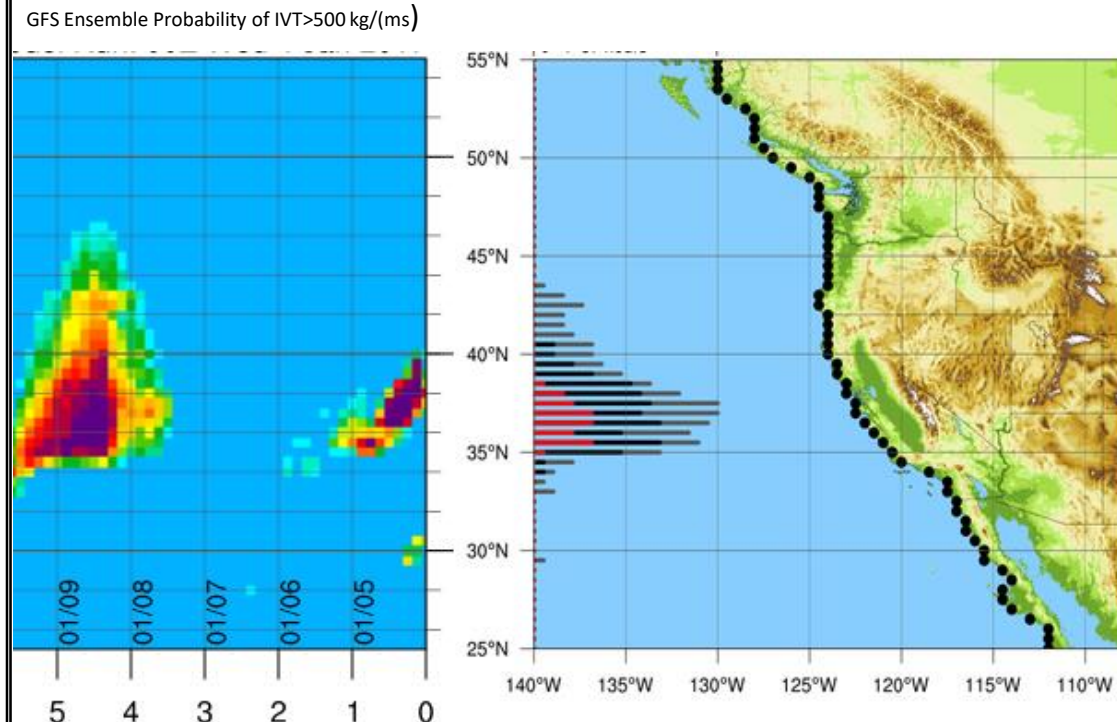


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## Odds of at least a **WEAK** AR making landfall



## Odds of a **MODERATE-STRENGTH** AR making landfall



- The current AR is expected to last until ~00Z on 6 Jan while the second AR could bring ~48-hrs over portions north/central CA
- The chances of moderate strength ( $IVT > 500 \text{ kg m}^{-1} \text{ s}^{-1}$ ) conditions over central CA this weekend are high and could last ~24-hrs

Summary by C. Hecht 1 PM PT Wed 4 Jan. 2017



# AR Outlook: 4–10 January 2017

For California DWR's AR Program

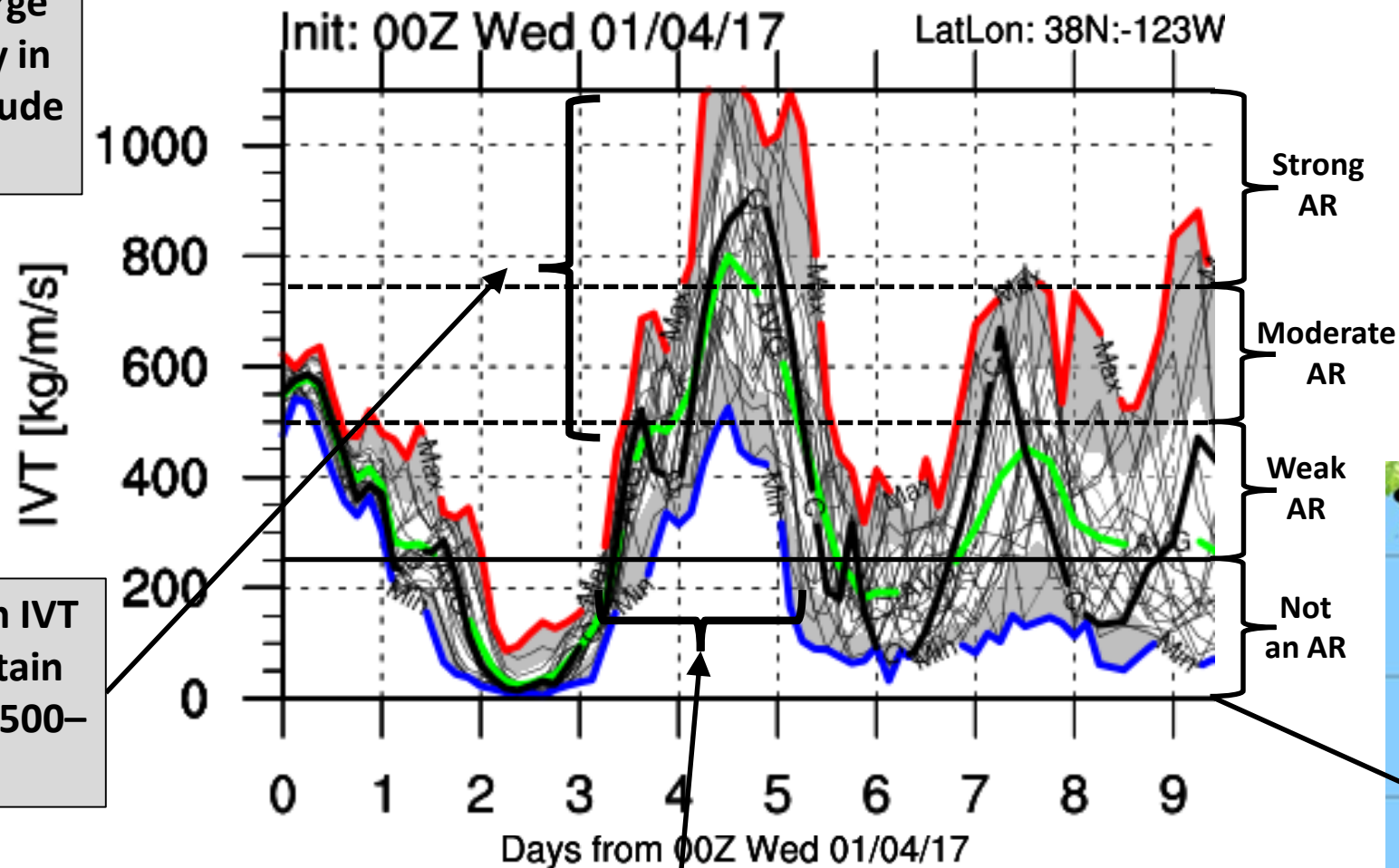


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There is currently a large amount of uncertainty in forecasts of AR magnitude and duration

Forecasts of maximum IVT magnitude are uncertain by ~25% ranging from 500–1000  $\text{kg m}^{-1} \text{s}^{-1}$

AR conditions ( $\text{IVT} > 250 \text{ kg m}^{-1} \text{s}^{-1}$ ) are forecast to last as short as 36-h but could last several days due to another AR that is forecast to make landfall in the extended forecast (6–9 Days)



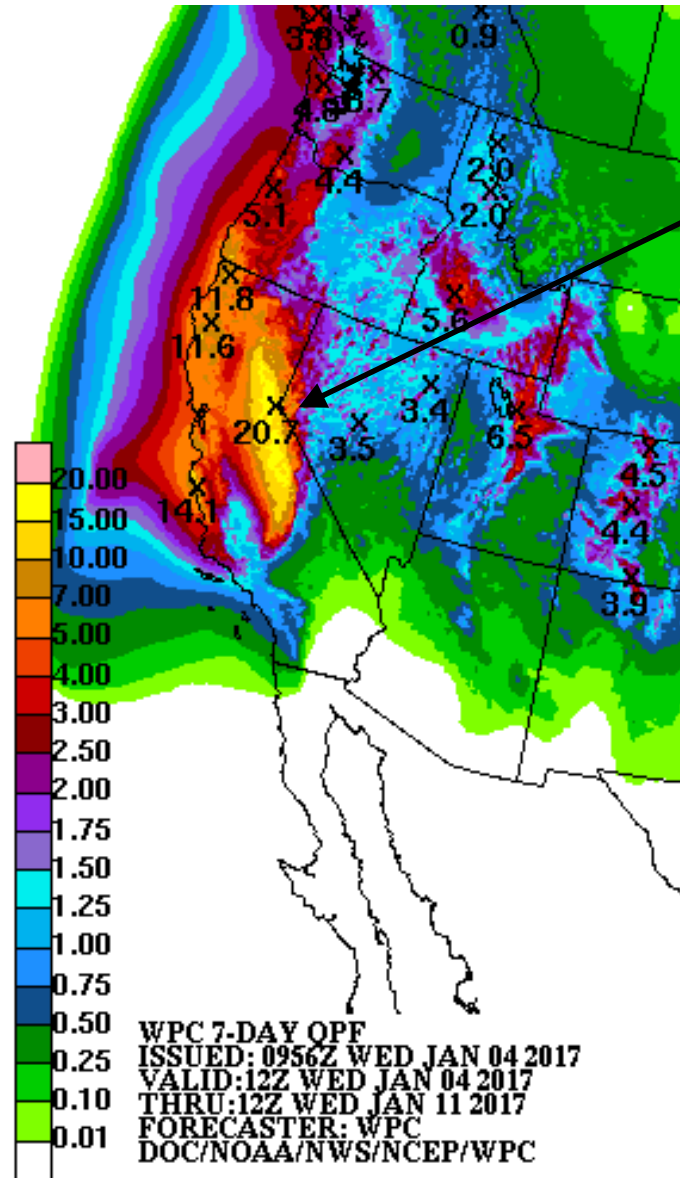
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# AR Outlook: 4–10 January 2017



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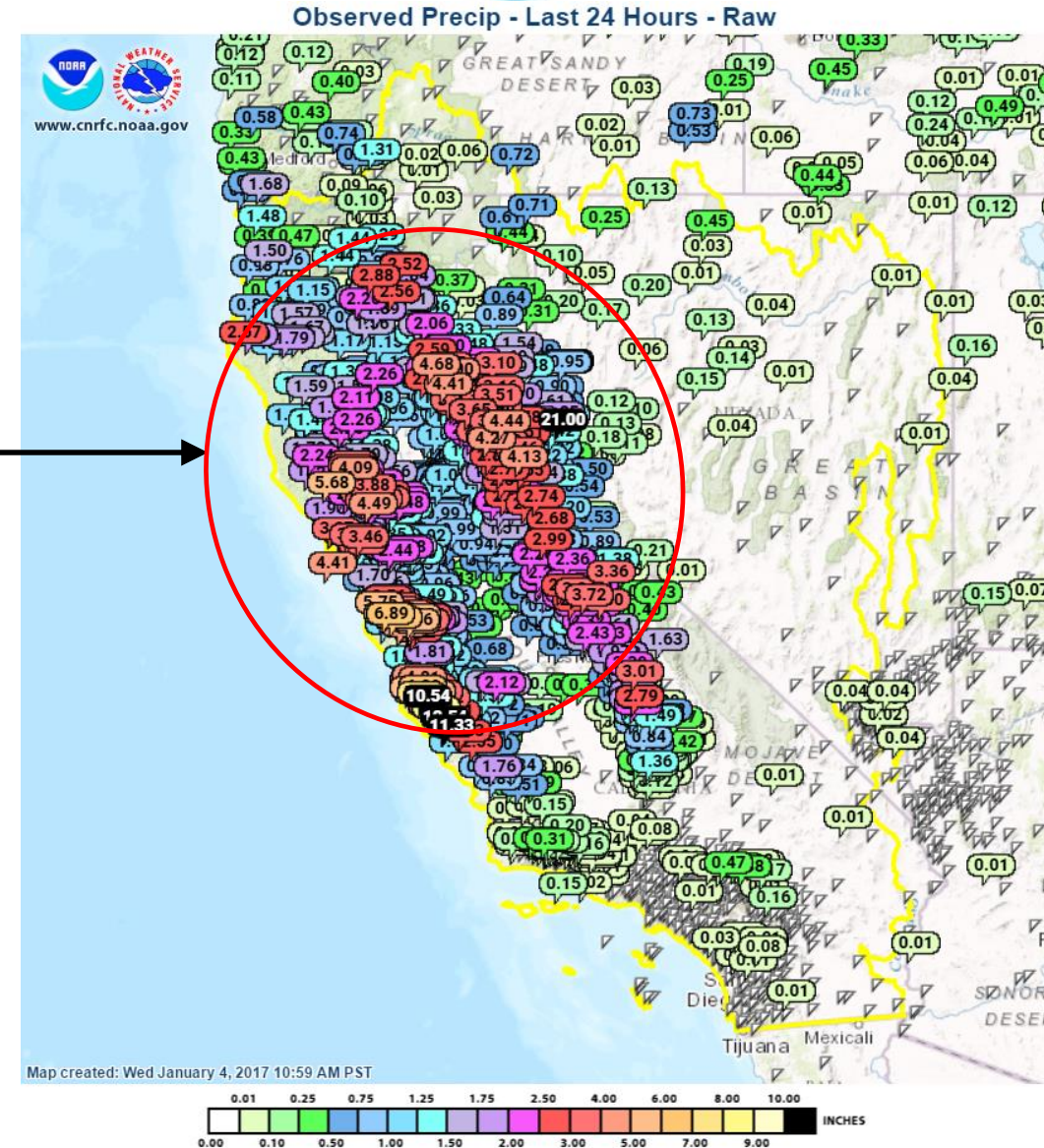
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7-day precipitation forecasts range from ~11 inches at lower elevations to 20.7 inches over the high elevations of the Sierra Nevada Mts.

The forecast precipitation combined with 4–5 inches of precipitation that has fallen the last 24-h will prime conditions to potentially produce high impacts in Northern California

For Official NOAA-NWS  
Precipitation Forecasts see  
<http://www.wpc.ncep.noaa.gov/qpf/qpf2.shtml>



Summary by C. Hecht 1 PM PT Wed 4 Jan. 2017



# AR Outlook: 4–10 January 2017

For California DWR's AR Program



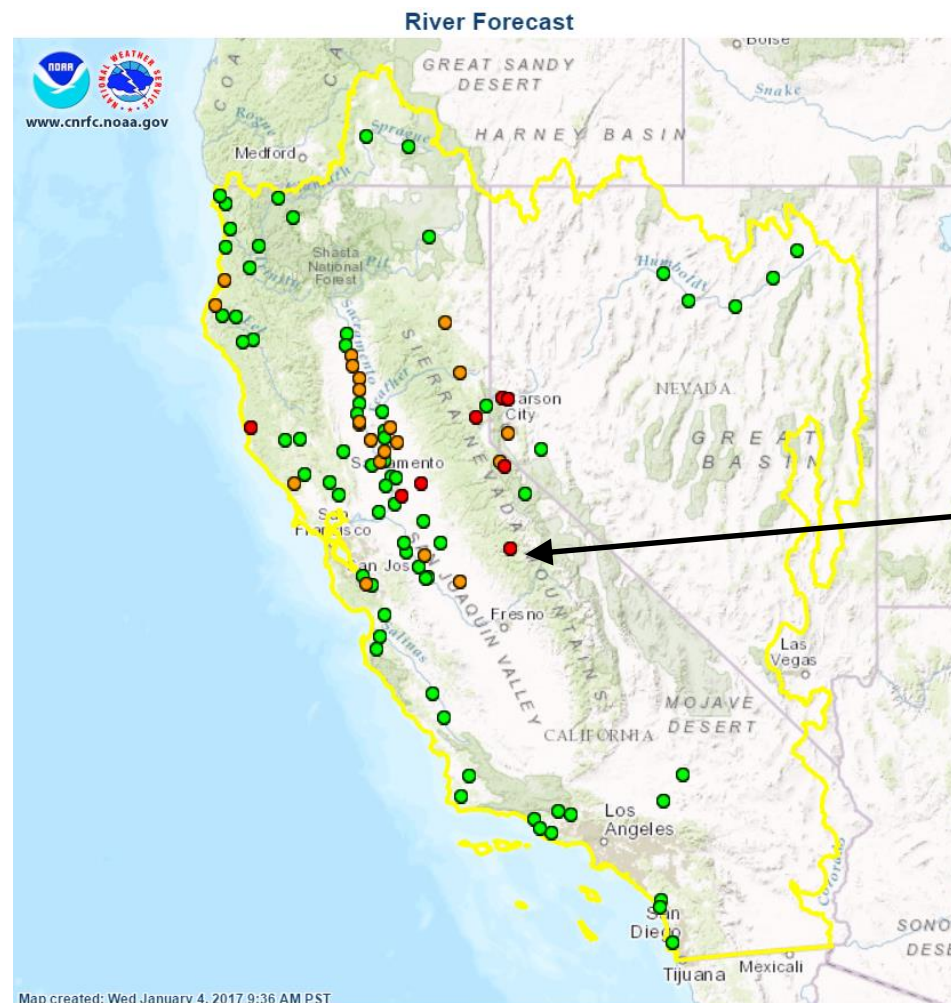
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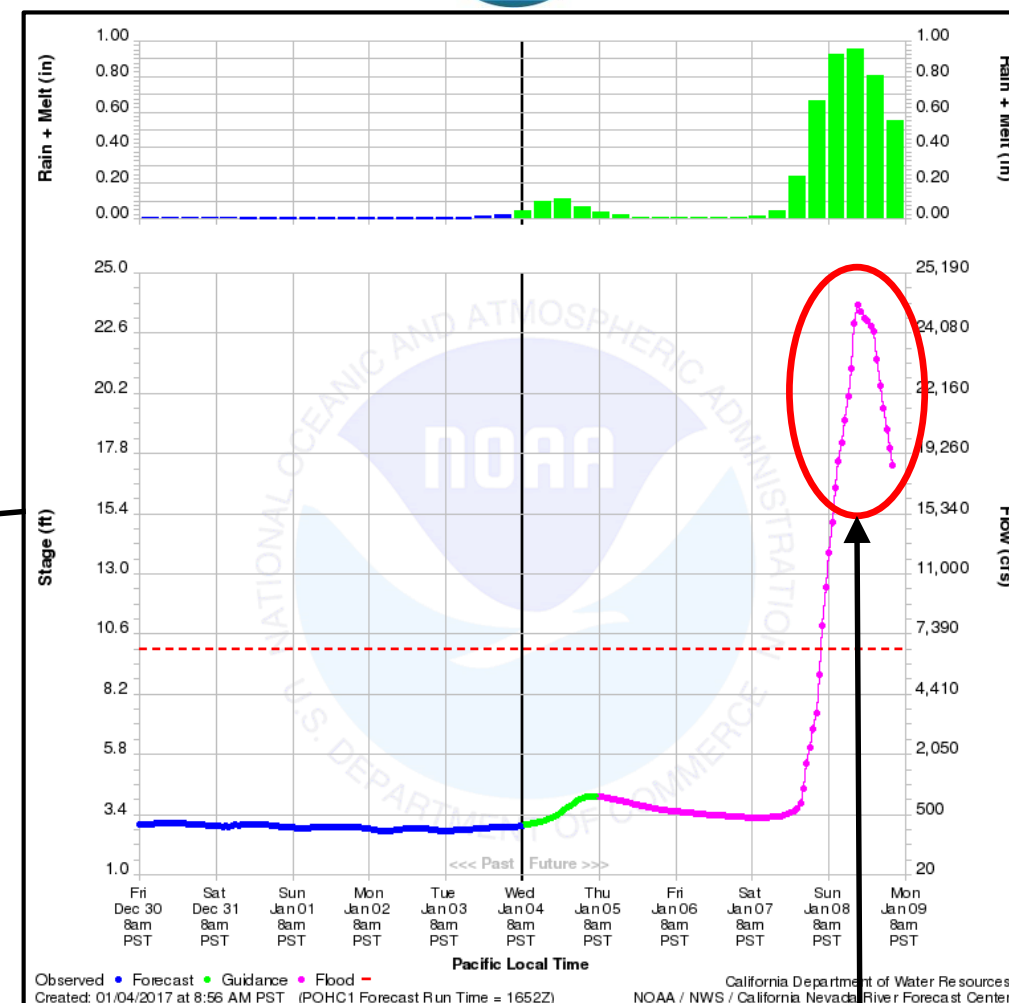
21 river gages are  
currently forecast to rise  
above monitor stage  
(orange)

An additional 8 river gages  
are forecast to rise above  
flood stage in  
north/central CA and  
western NV (red)

For official NOAA-NWS  
CNRFC Streamflow  
Forecasts see  
[http://cnrfc.noaa.gov/rfc\\_guidance.php](http://cnrfc.noaa.gov/rfc_guidance.php)



○ No Monitor or Flood Stage Available  
● 69 Normal Conditions  
● 21 Above Monitor Stage  
● 8 Above Flood Stage  
● 0 Above Danger Stage  
The number inside each circle above represents the number of gages with forecast conditions inside that category.



The Merced River in Yosemite at Pohono Bridge is forecast to rise to 23.7 feet, which is 13.7 feet above flood stage. The record stage for this gage is 23.45 feet in 1997 and caused **\$178 Million** of damage to Yosemite Valley

# AR Outlook: 4–10 January 2017

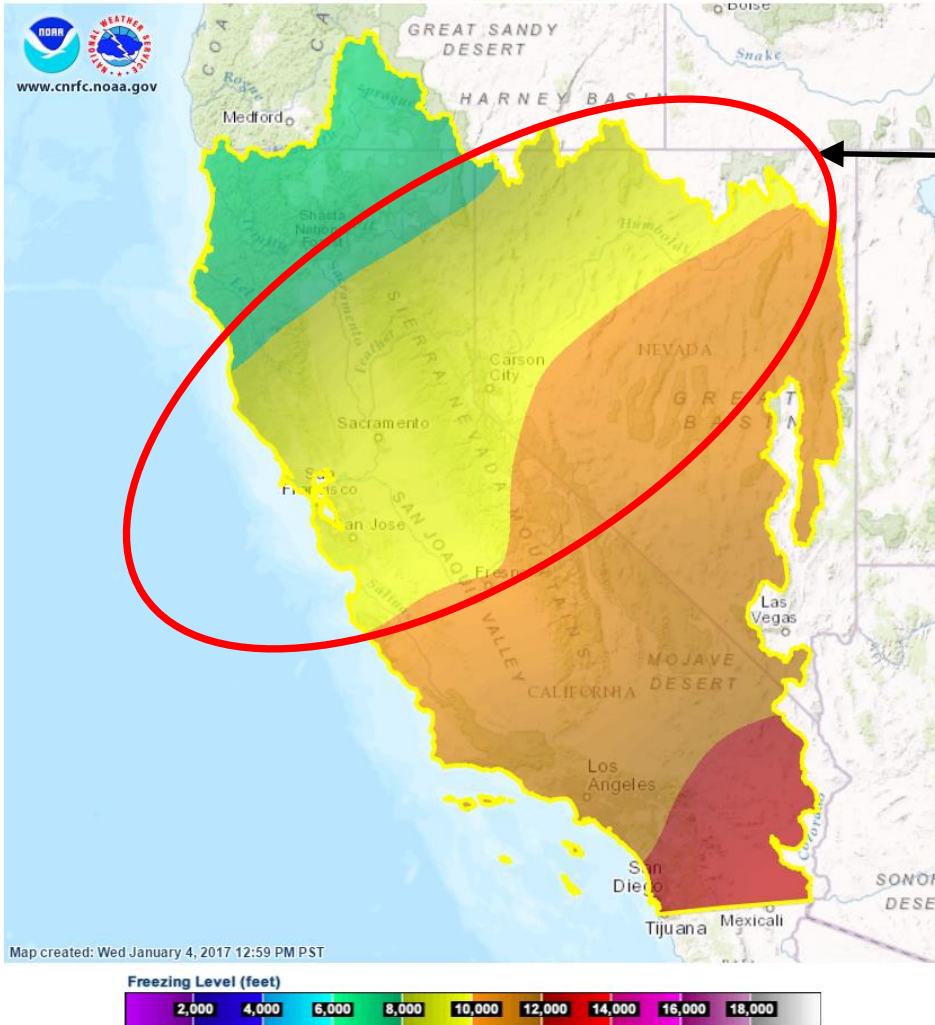
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## Points: Observed Freezing Levels

Areal: Sun Jan 08 04 PM PST (09/00Z)

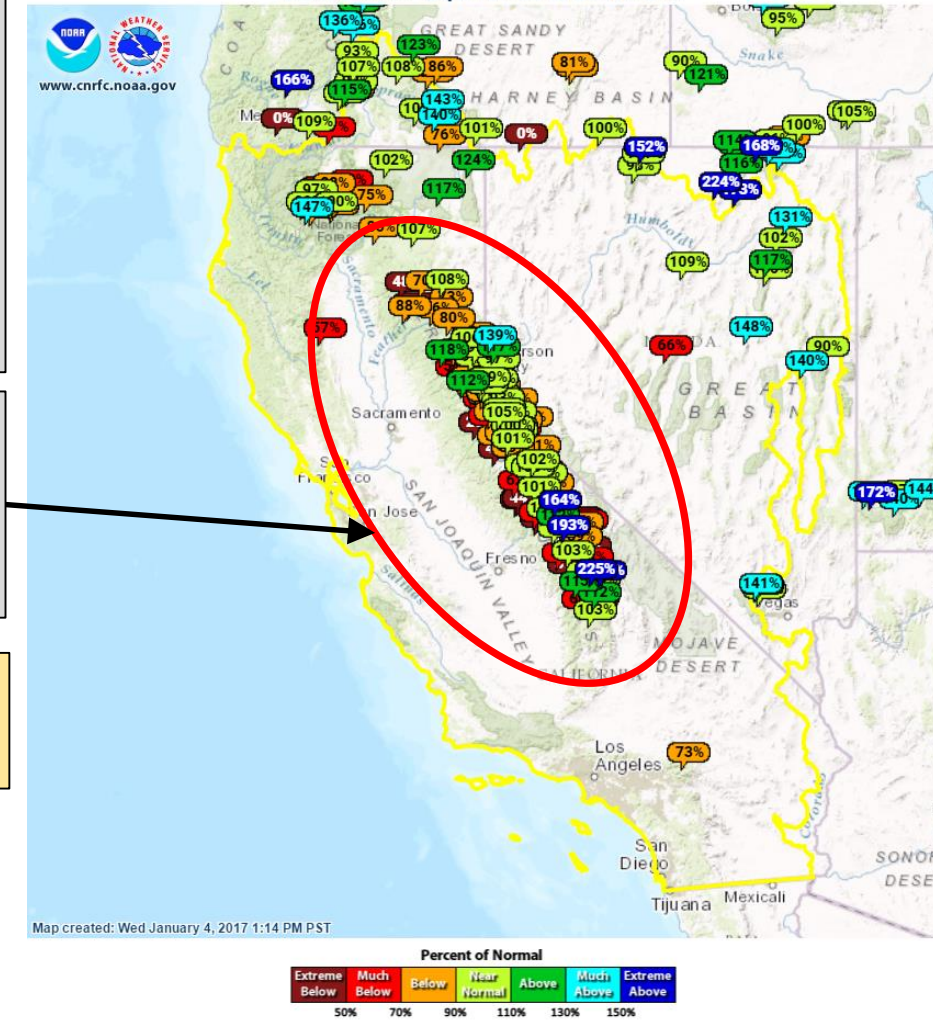


Freezing levels in the Central CA during the landfall of the AR are forecast to range from 8,000–10,000 feet, which could contribute more snowfall to the high elevations of the Sierra Nevada Mnts

Several locations in the Sierra Nevada Mts. are already above 100% of the normal snow water equivalent for this date

For official NOAA-NWS CNRFC Snow Data see [cnrfc.noaa.gov](http://cnrfc.noaa.gov)

## Snow Water Equivalent % of Normal



Summary by C. Hecht 1 PM PT Wed 4 Jan. 2017





## Summary of Discussion from the National Weather Service in the San Francisco Bay Area/Monterey

- Starting on Saturday another atmospheric will bring widespread rainfall to our region.
- AR conditions ( $\text{IVT} > 250 \text{ kg m}^{-1} \text{ s}^{-1}$ ) beginning late Saturday are forecast to last as short as 36-h but could last several days due to another AR that is forecast to make landfall in the extended forecast (6–9 Days)
- IVT values possibly above an  $1000 \text{ kg/m/s}$  will be along our coast for over 24 hours.
- Similar to last night, gusty south to southeast winds can also be expected. 924 MB speeds are forecast to again be around 50 KTs.
- Unless there is a major deviation from the current suite of models, we will likely have many hydrological impacts. Please see the California Nevada River Forecast website for more information on streamflow forecasts (

For point specific forecasts and information on watches and warnings visit [www.weather.gov](http://www.weather.gov)