

CW3E Atmospheric River Outlook

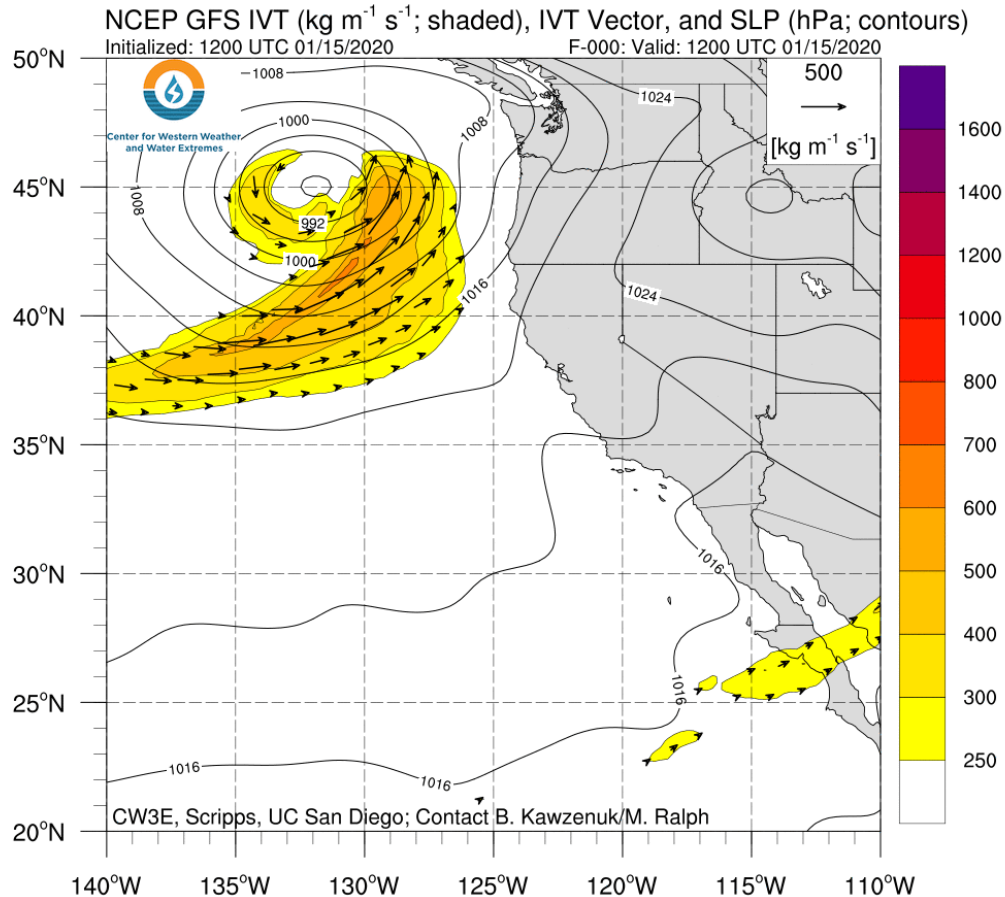
For California DWR's AR Program



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A weak atmospheric river is forecast to make landfall over coastal Oregon today

- The weak AR is predicted to bring AR 1 conditions to several locations along the Washington and Oregon Coasts
- The AR is forecast to weaken and propagate southward impacting Northern California Wednesday evening into Thursday
- While the moisture content associated with this storm is forecast to be low, cold temperatures and low freezing level elevations are forecast to combine to bring as much as 3 feet of snow to locations in the Coastal and Sierra Nevada Mountains



Winter Storm Warning

Valid 6 PM Wednesday January 15th – 6 AM Friday January 17th, 2020

⚠ Impacts

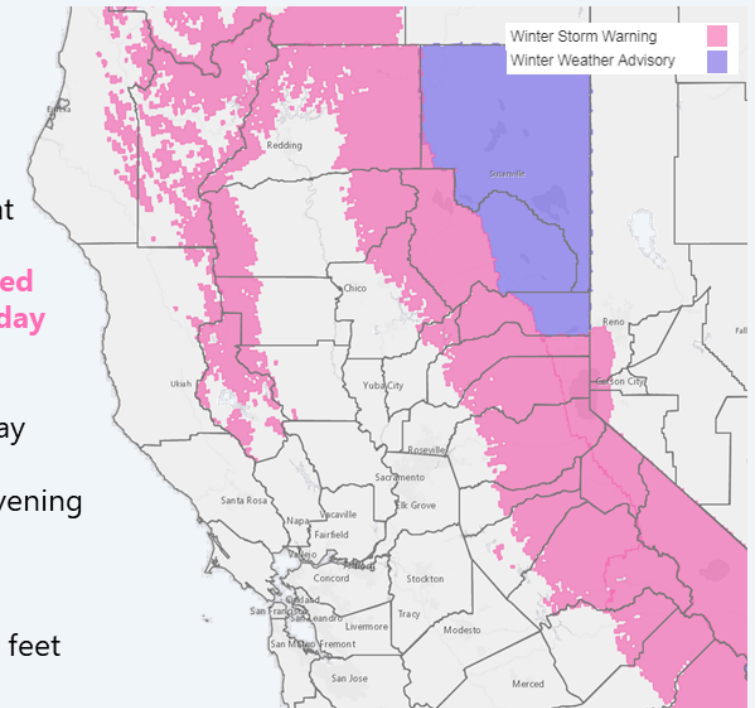
- Major travel delays
- Chain controls and road closures likely
- Near white out conditions at times
- **Travel is highly discouraged Wednesday night - Thursday**

🕒 Timing

- Coastal Range: Wednesday evening – Thursday
- Elsewhere: Wednesday evening – Friday morning

❄ Forecast

- 1-2 feet above 2000-3000 feet
- Locally up to 3 feet



NWS Sacramento

Issued: January 14, 2020

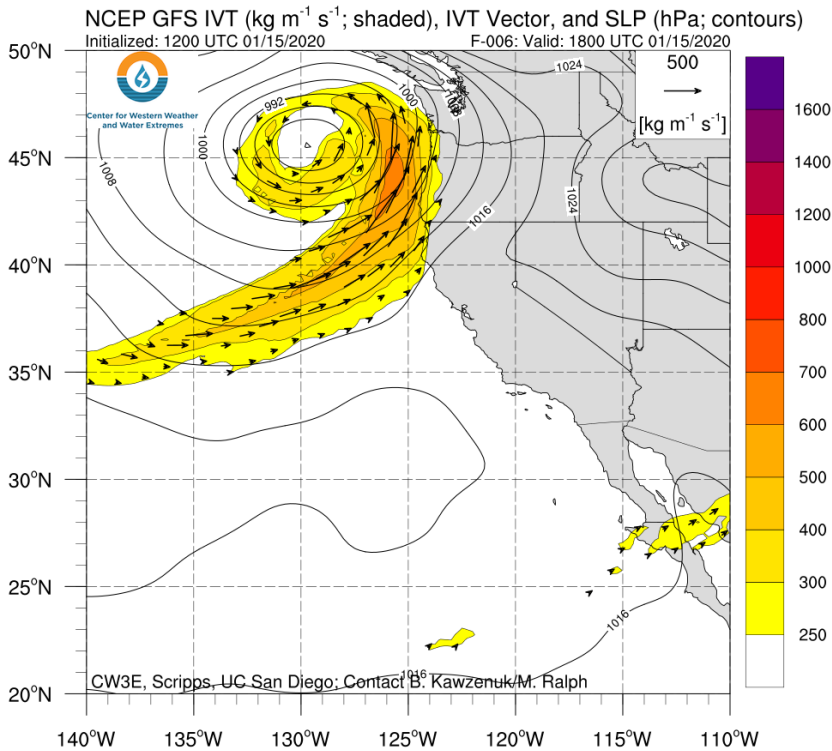
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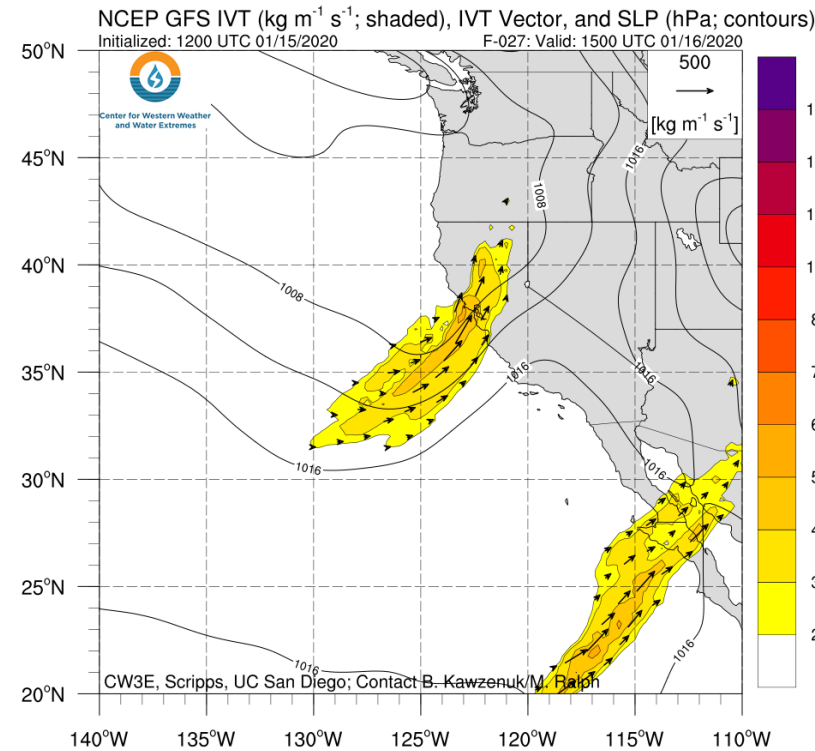
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NCEP GFS IVT & SLP Valid 18Z 15 Jan. 2020



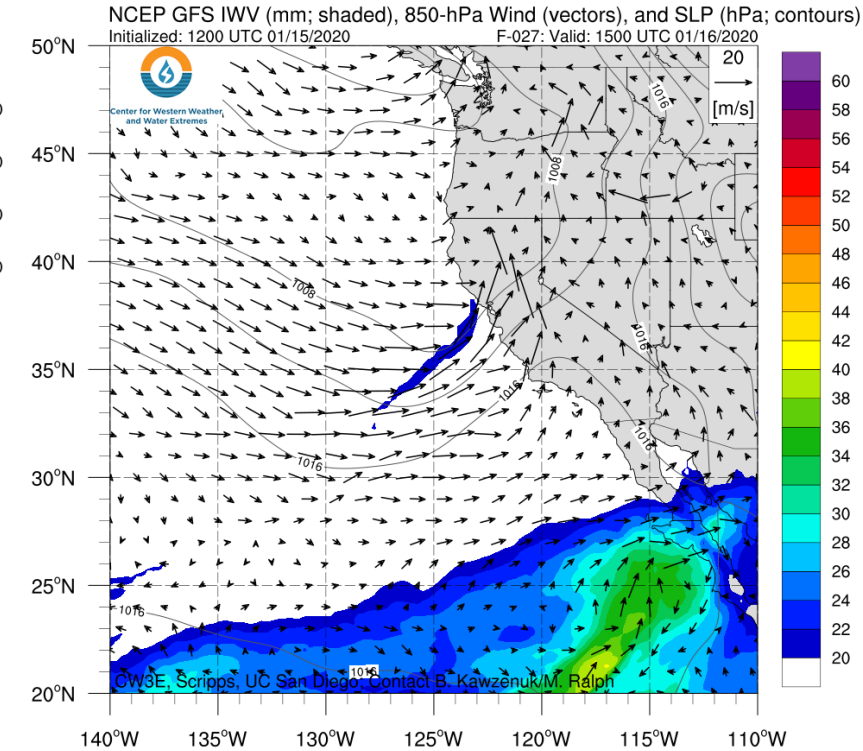
The system is forecast to make
landfall over Coastal Oregon as a
weak atmospheric river at ~18
UTC 15 January 2020

NCEP GFS IVT & SLP Valid 15Z 16 Jan. 2020



As the system evolves, it is
forecast to weaken, propagate
southward down the coast, and
bring enhanced moisture
transport to Northern CA by
tomorrow morning

NCEP GFS IWV & SLP Valid 15Z 16 Jan. 2020



While this system is forecast to be
associated with enhanced IVT
($>250 \text{ kg m}^{-1} \text{ s}^{-1}$), the moisture
content within the enhanced IVT
is forecast to be low (majority <20
mm)

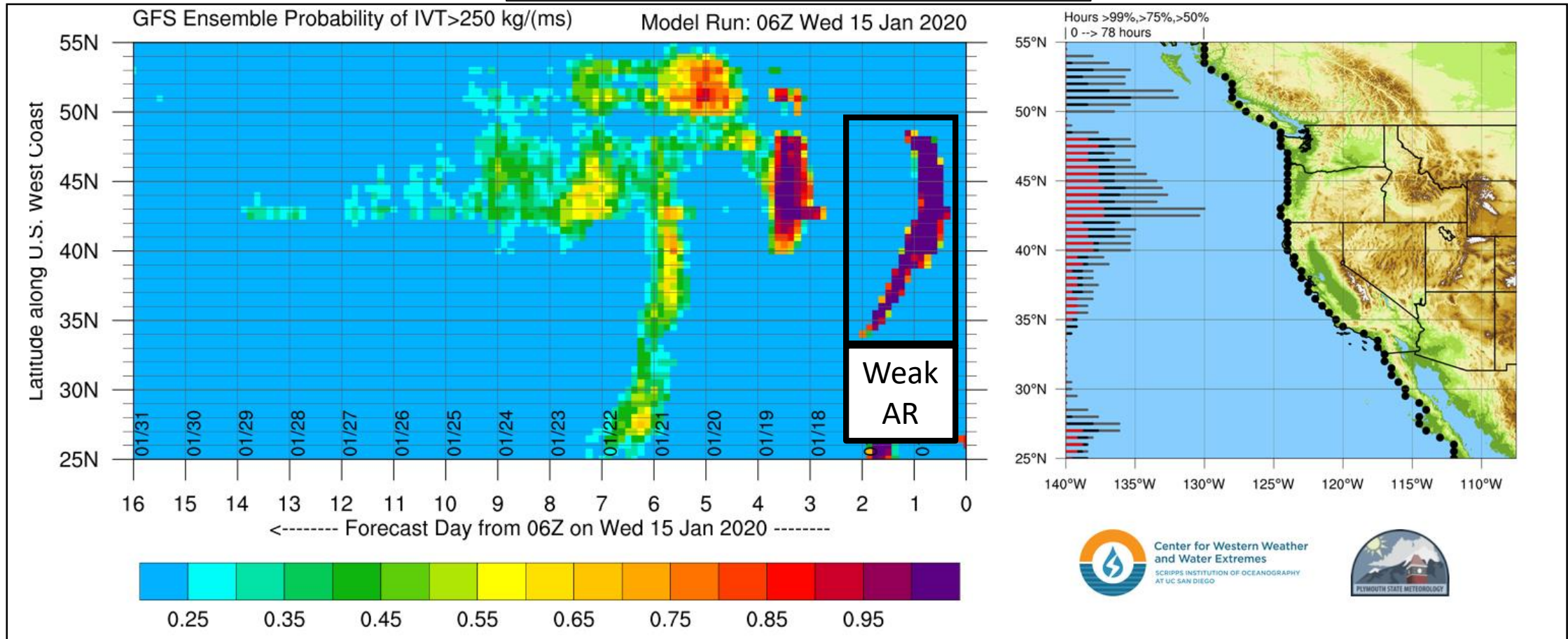
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Probability of AR Conditions Along Coast



- There is a high probability (>95% of GEFS ensemble members) of weak AR conditions associated with the AR over WA, OR, and Northern to Central CA
- There is the potential for additional AR activity between day three and four and again between days five and seven
- The activity between days three and four are primarily forecast to impact WA, OR, and far Northern CA
- AR condition uncertainty associated with the activity past day five is currently high (<65% of ensemble members)

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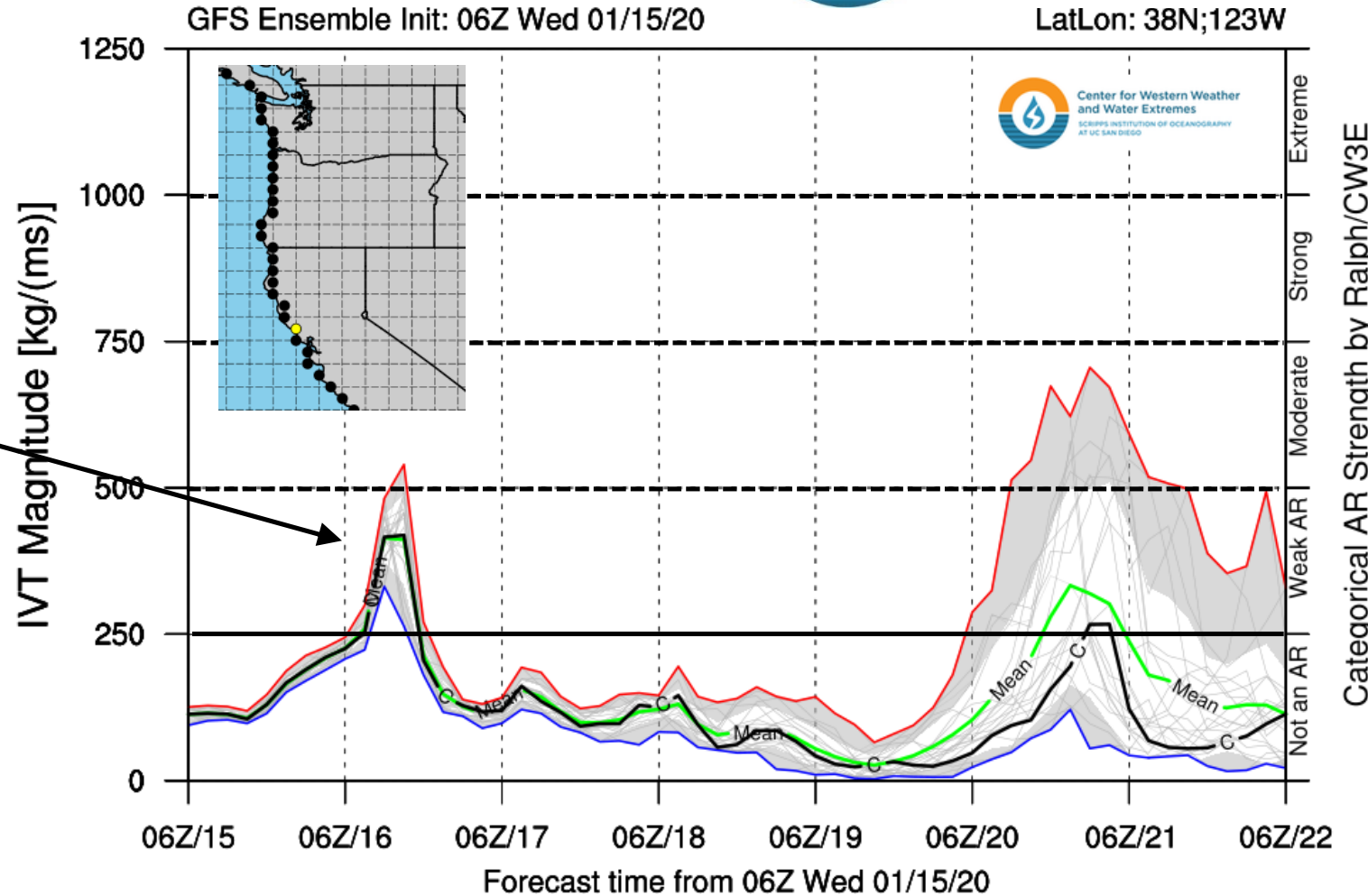
There is currently high confidence that coastal Sonoma County California will receive a short burst of AR conditions ($IVT > 250 \text{ kg m}^{-1} \text{ s}^{-1}$)

Magnitude of potential AR Northern California

- Maximum predicted IVT $\sim 510 \text{ kg m}^{-1} \text{ s}^{-1}$
- Mean IVT $\sim 400 \text{ kg m}^{-1} \text{ s}^{-1}$
- Minimum IVT $\sim 300 \text{ kg m}^{-1} \text{ s}^{-1}$

Forecast duration of AR conditions

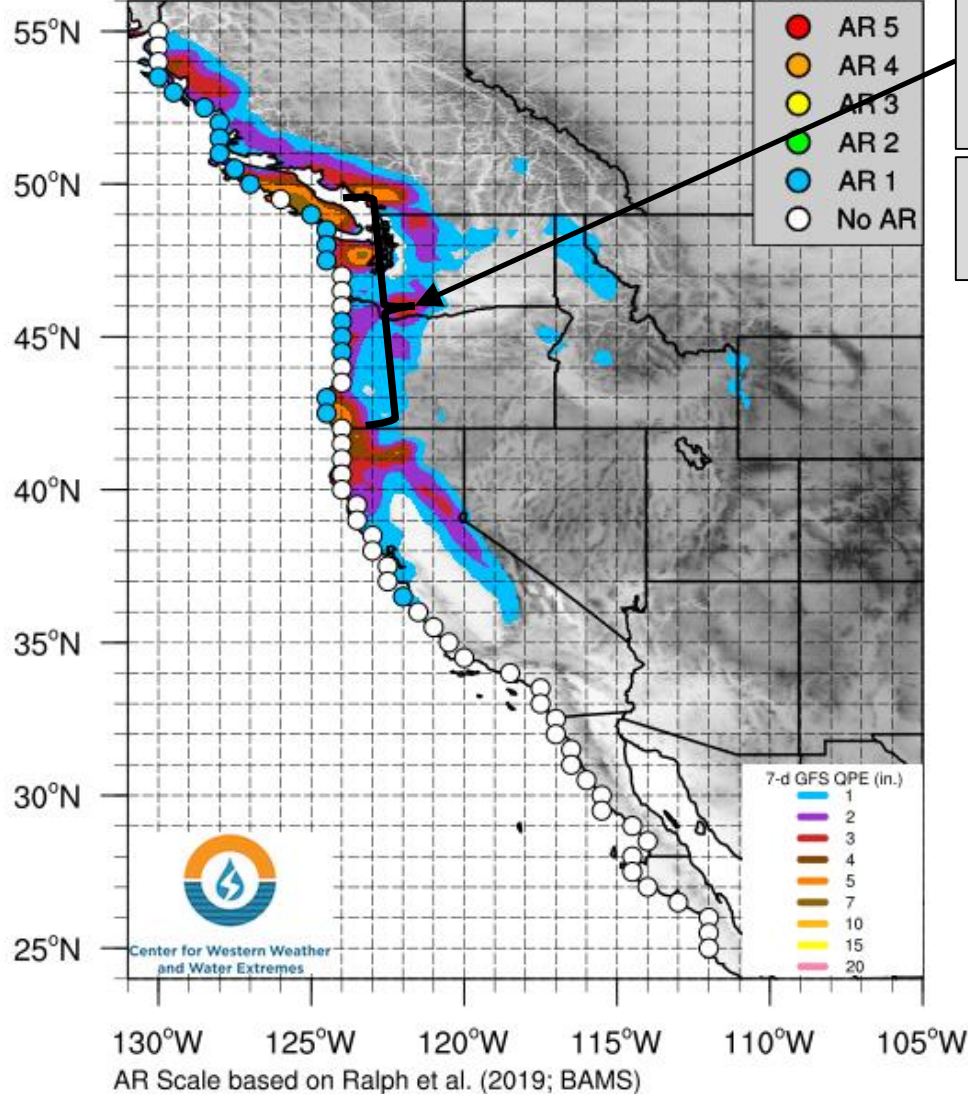
- Weak 9 hours \pm 3
- Moderate 3 hours \pm 3



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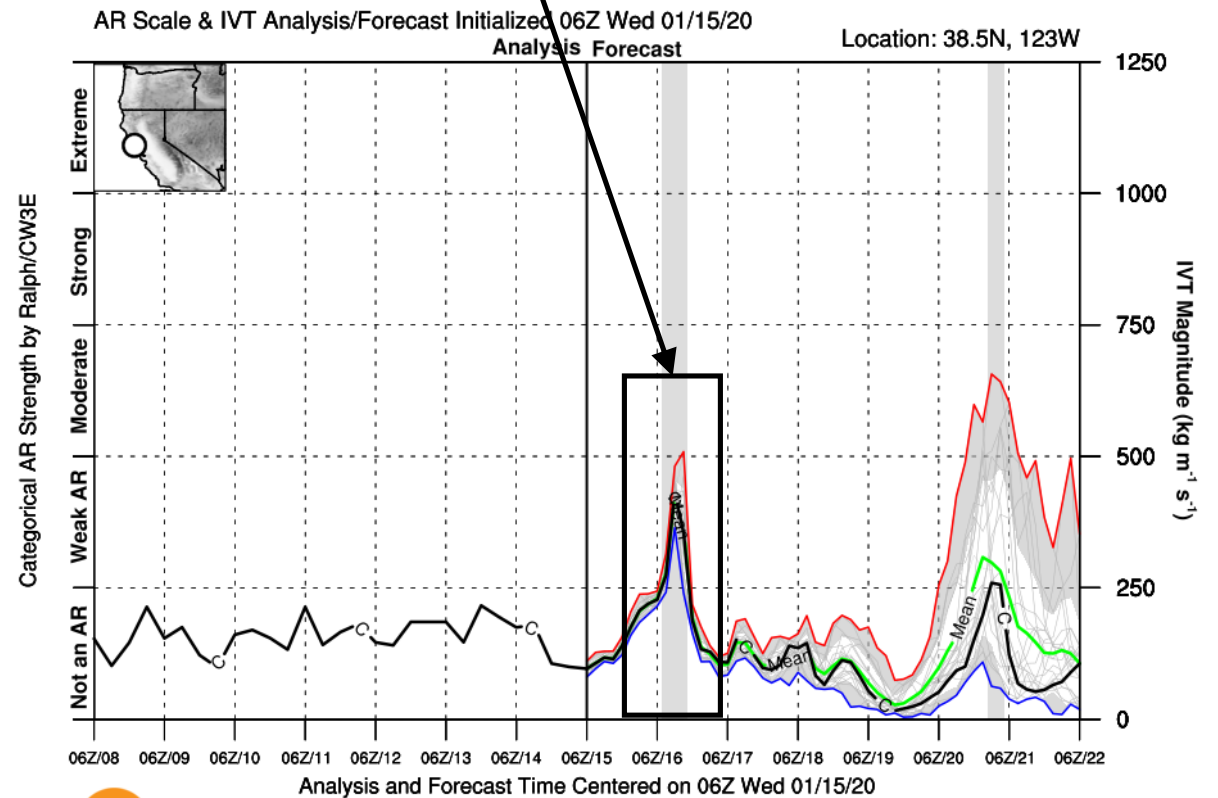
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GEFS Control AR Scale and GFS 7-day QPF
Forecast valid: 06Z 01/15/20 - 06Z 01/22/2020



The GEFS suggests that numerous coastal locations from Washington to Oregon could receive AR1 conditions based on the recently developed AR Scale from Ralph et al. (2019)

Due to the fast moving and weakening system over Northern CA, the overall duration of IVT >250 kg m⁻¹ s⁻¹ is forecast to be too short to result in AR 1 conditions



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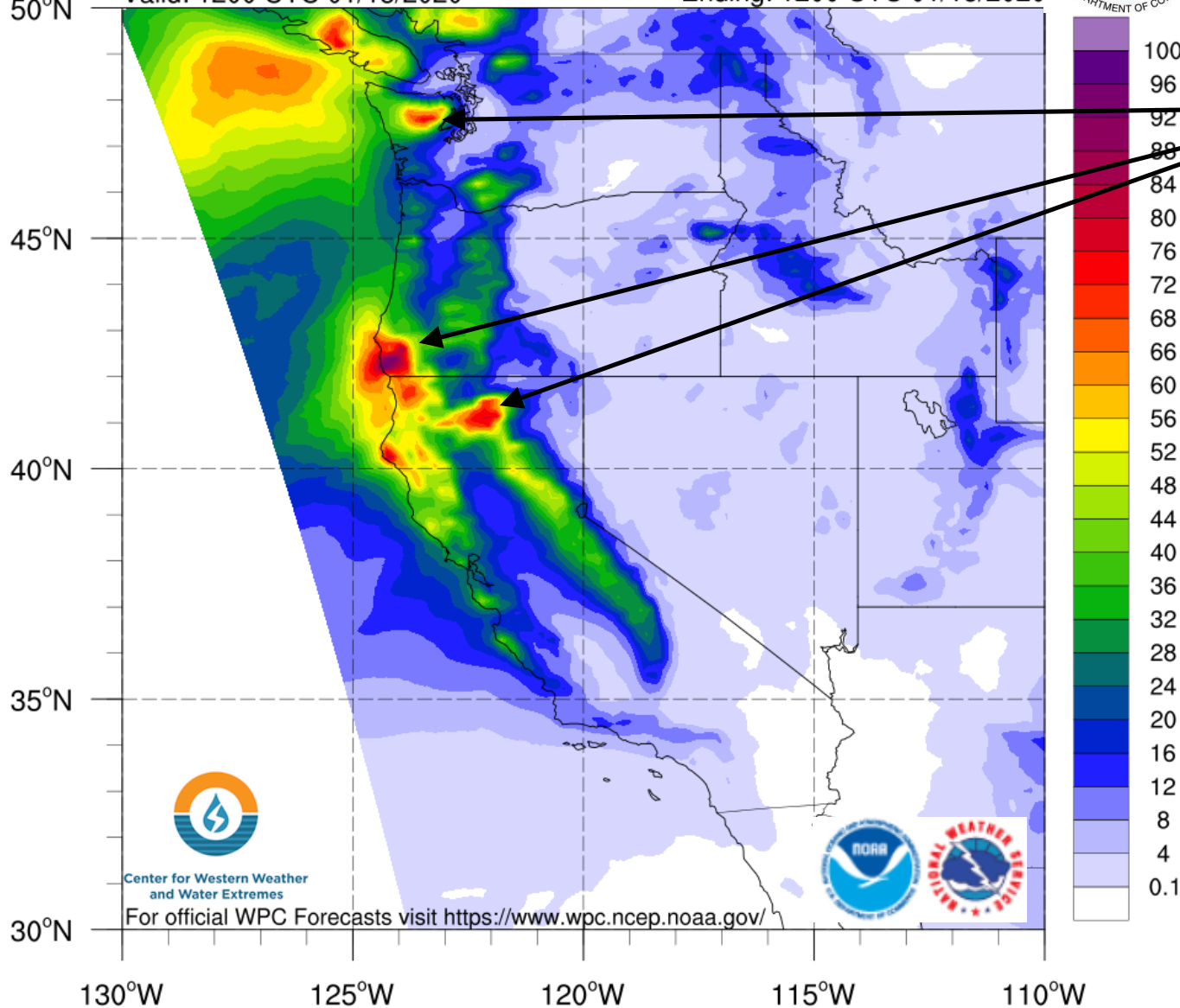


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WPC 3-day Precipitation Forecast (mm)

Valid: 1200 UTC 01/15/2020

Ending: 1200 UTC 01/18/2020



The NOAA WPC is currently forecasting >2.5 inches of precipitation over the Olympic, Coastal, and Trinity Alps/Mount Shasta during the next 3 days

The Coastal Mountains in Southern OR and far Northern CA are forecast to receive the highest amount of precipitation, with accumulations greater than 3.5

Other high elevations in Northern CA, OR and WA are forecast to receive 0.5 to 1.5 inches of precipitation

Due to the relatively low moisture content associated with this event, a majority of the lower elevations are forecast to receive <0.75

Center for Western Weather and Water Extremes
For official WPC Forecasts visit <https://www.wpc.ncep.noaa.gov/>

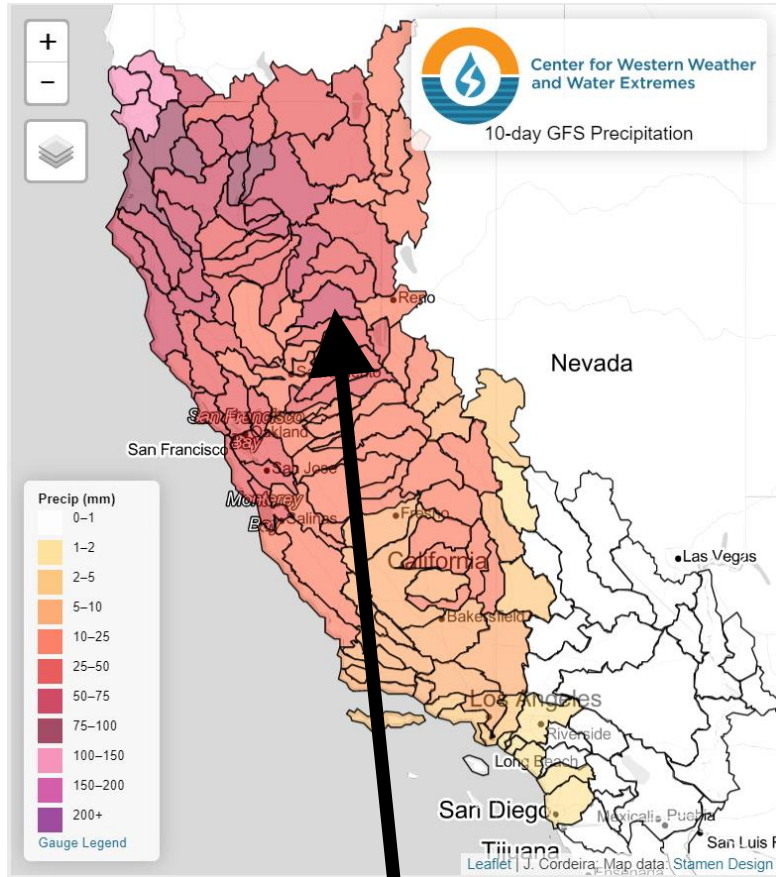


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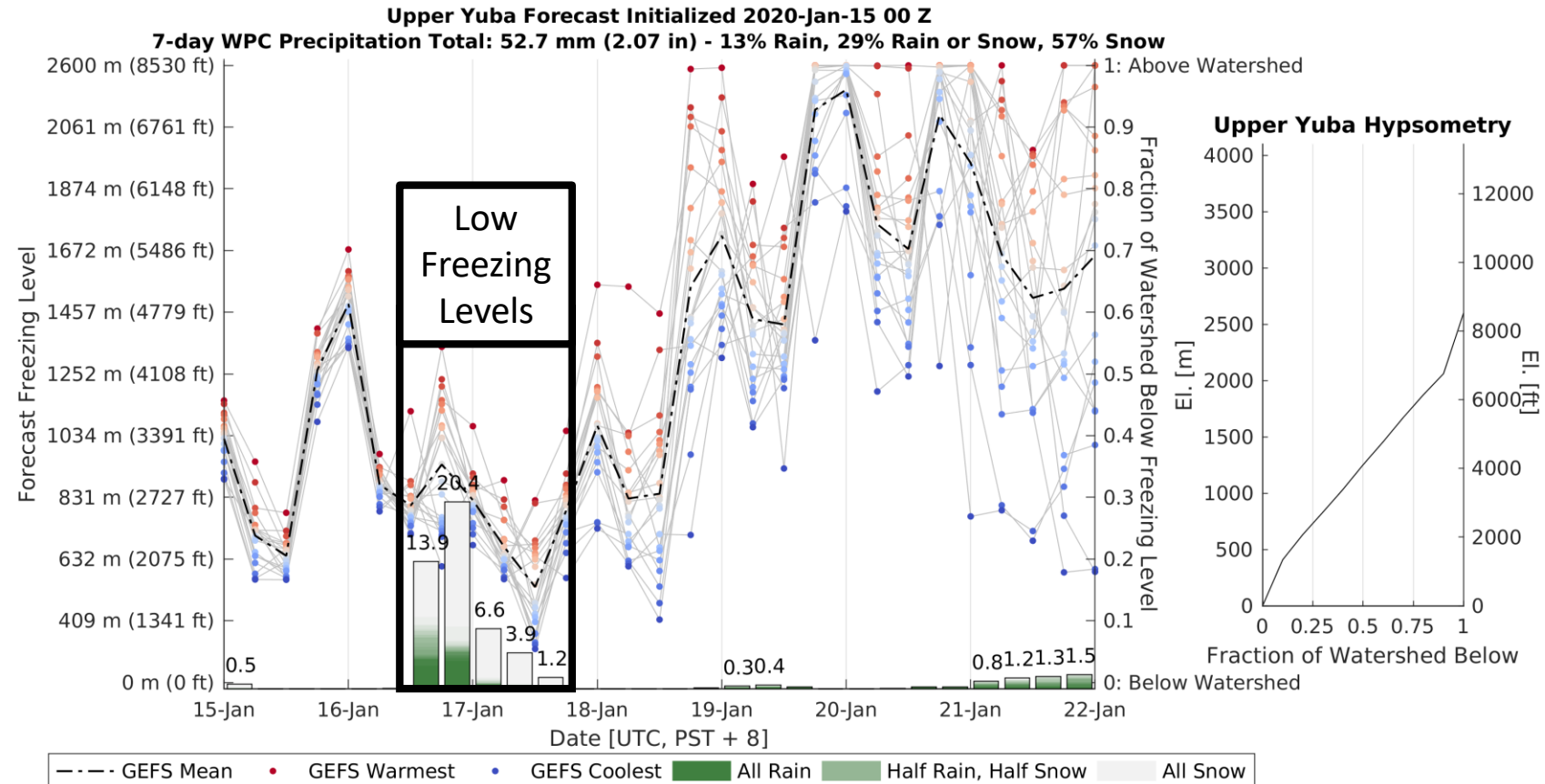
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The Upper Yuba Watershed in the Northern Sierra is forecast by the GFS to receive >30 mm of mean areal (watershed average) precipitation associated with this event



The GEFS is suggesting that freezing levels over the Upper Yuba Watershed during the majority of precipitation will be below 4,000 feet which would suggest that more than half of the watershed could receive snow during the event

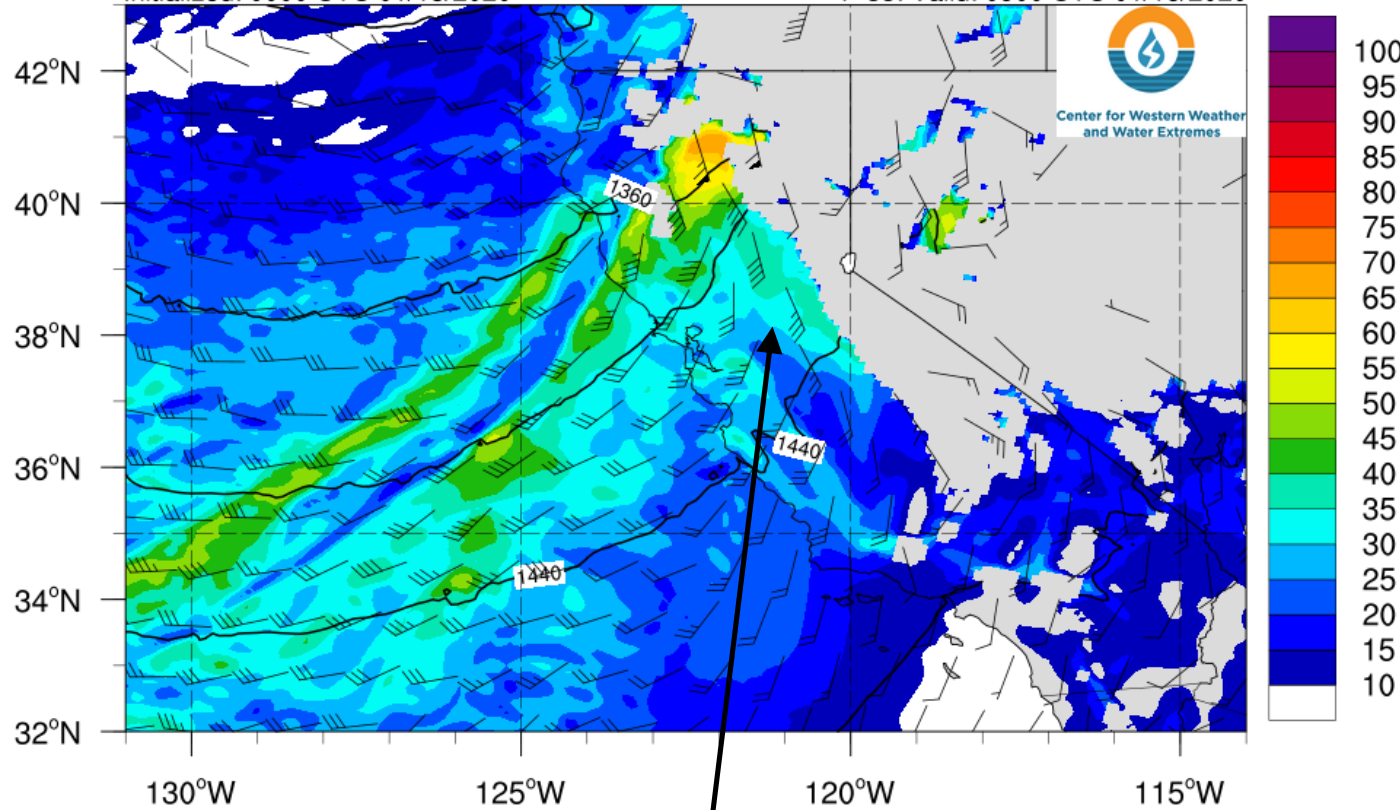
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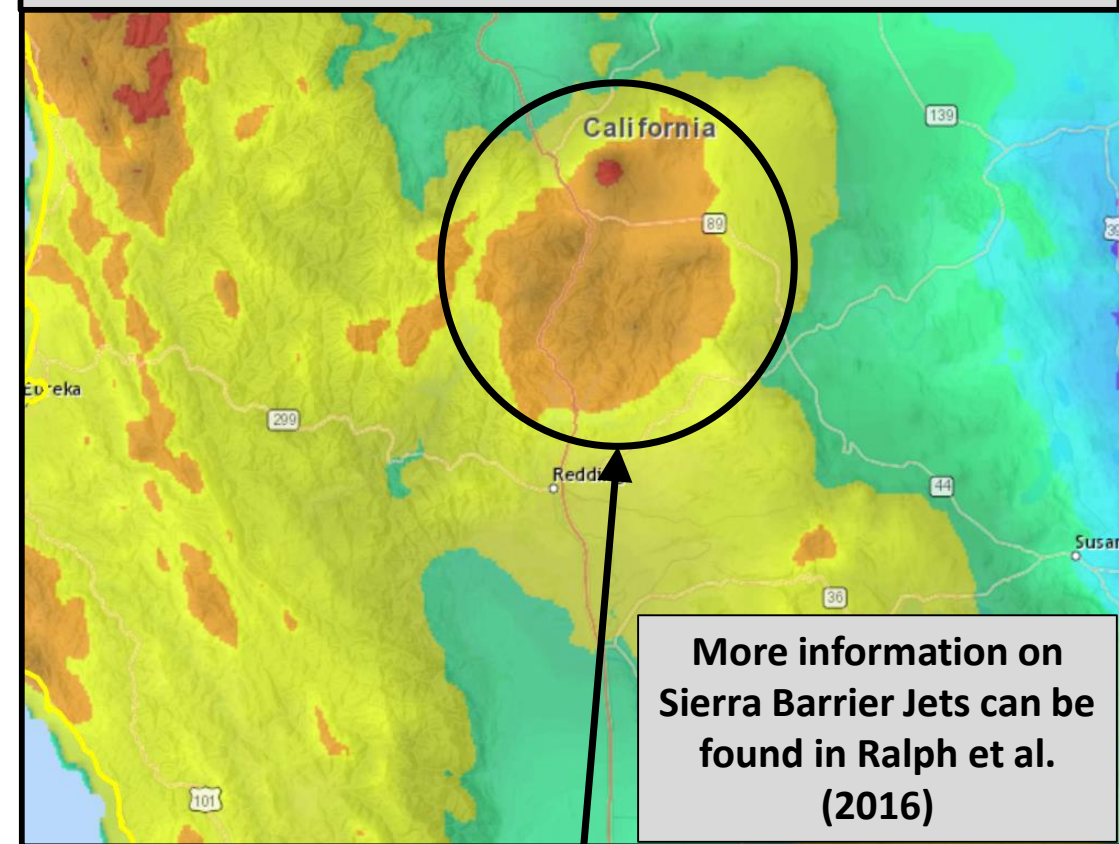
West-WRF 3km 850-hPa Winds (knots) and Height (gpm)
Initialized: 0000 UTC 01/15/2020 F-33: Valid: 0900 UTC 01/16/2020



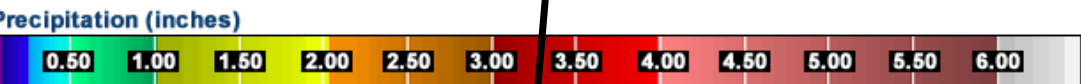
The CW3E in-house West-WRF model is currently forecasting conditions that may be favorable for the development of a Sierra Barrier Jet at ~9Z on 16 Jan. with 850-hPa wind speeds exceeding 45 kts. in the Sierra Foothills

This southerly barrier jet may enhance upslope moisture flux over the Trinity Alps and Mount Shasta

CNRFC 72-hour Precipitation Accumulation Ending 12Z 18 January 2020



More information on Sierra Barrier Jets can be found in Ralph et al. (2016)



Mt. Shasta and its foothills are forecast to receive locally higher precipitation of 2 to 3.25 inches

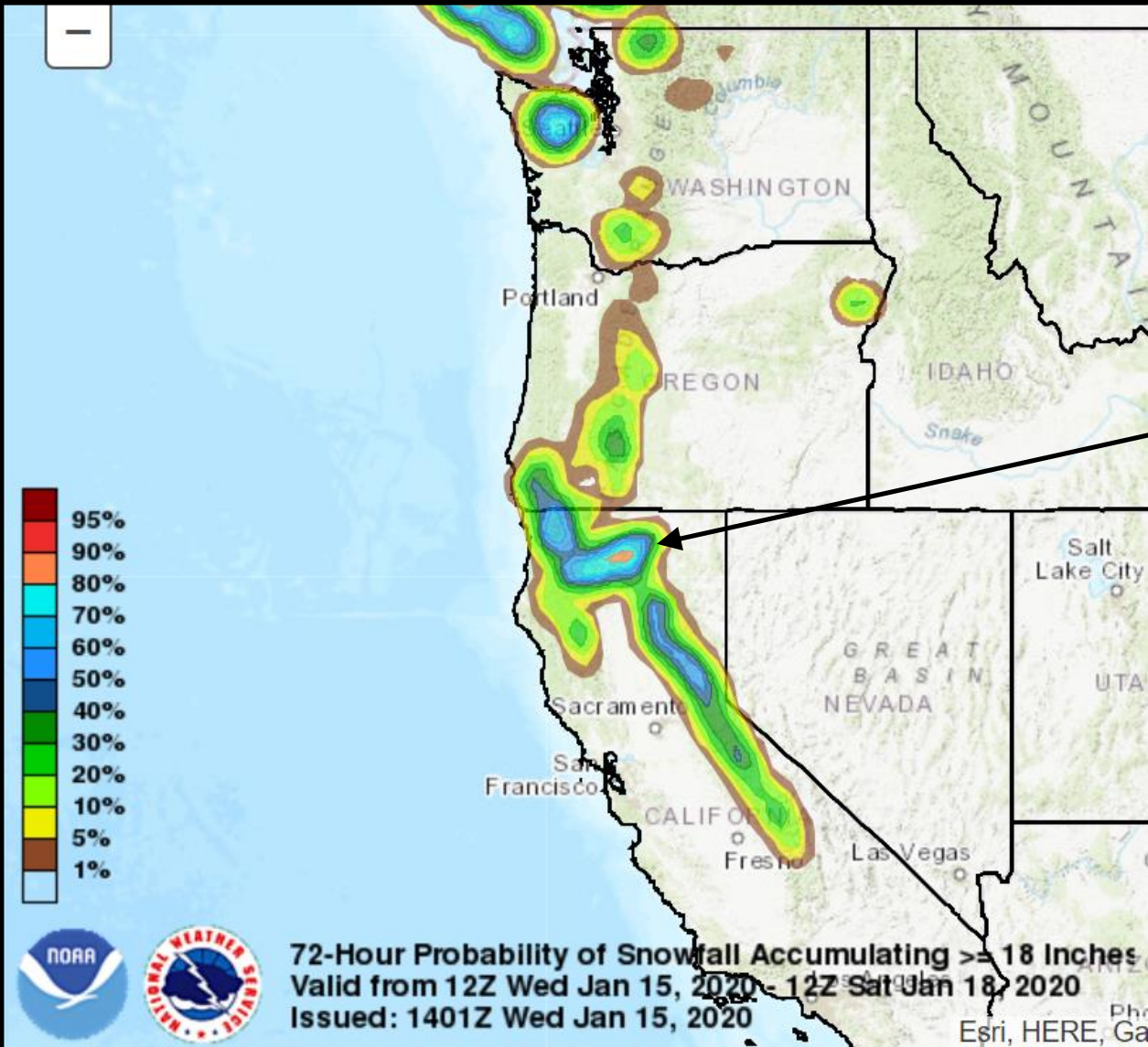
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WPC 72-hour Probability of Exceeding 18 inches of Snow
Valid Ending: 12Z 18 January



The NOAA Weather Prediction Center is currently predicting a high probability (>70%) of >18 inches of snowfall over the high elevations of the Sierra Nevada, Coastal, and Olympic Mountains during the next 72-hour period

Mount Shasta, where the forecast Sierra Barrier Jet could potentially enhance upslope moisture flux, currently has the largest probability (>80%) of >18 inches of snow

