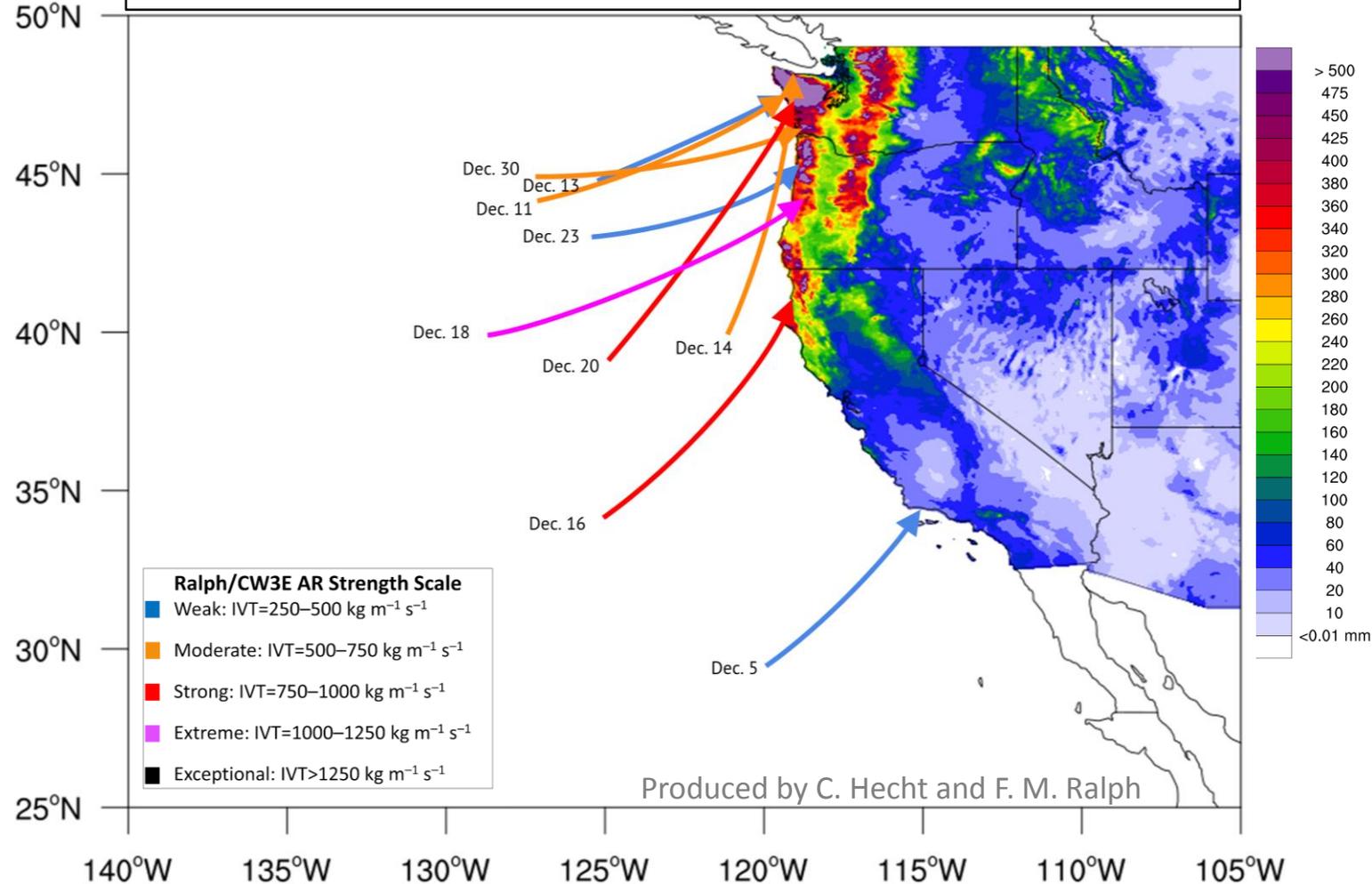


Water Year 2019: December Atmospheric Rivers

AR Strength	AR Count
Weak	3
Moderate	3
Strong	2
Extreme	1
Exceptional	0

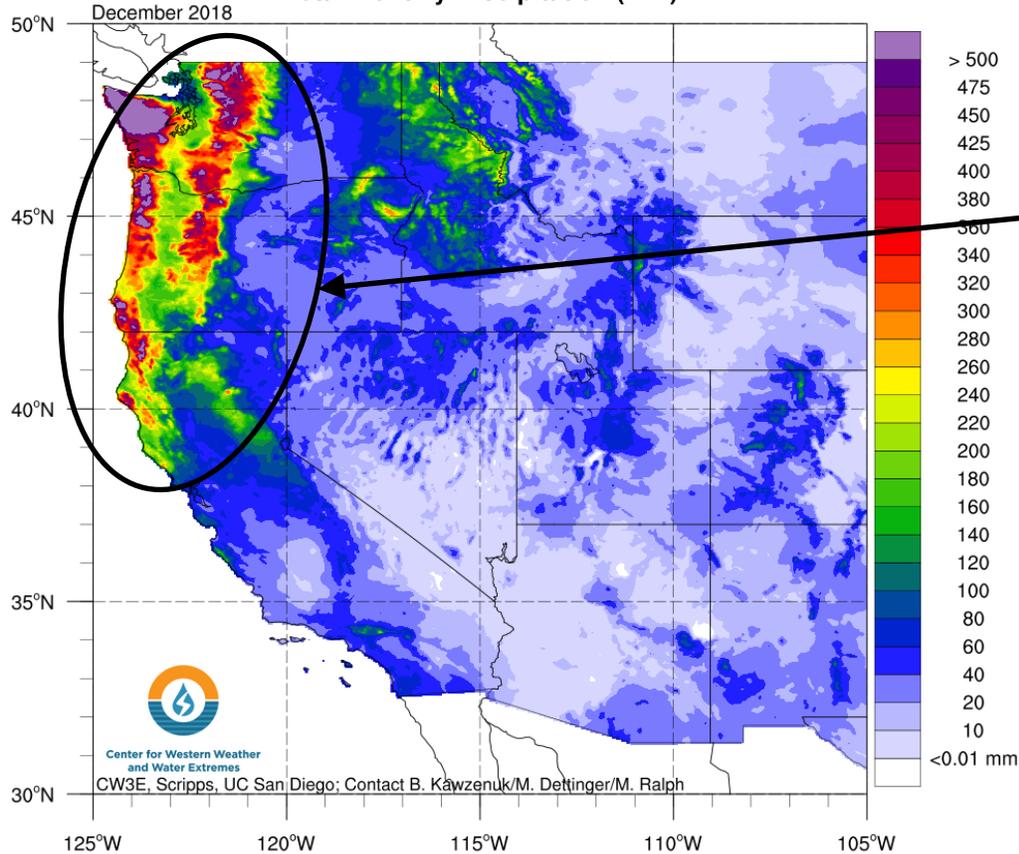
Regions Impacted by Each AR	
State/Region	AR Conditions
Washington	8
Oregon	8
Northern CA	7
Central CA	2
Southern CA	2

- **Nine** atmospheric rivers made landfall over the U.S. West Coast during December 2018 (Third Month of WY 2019)



December 2018 Precipitation

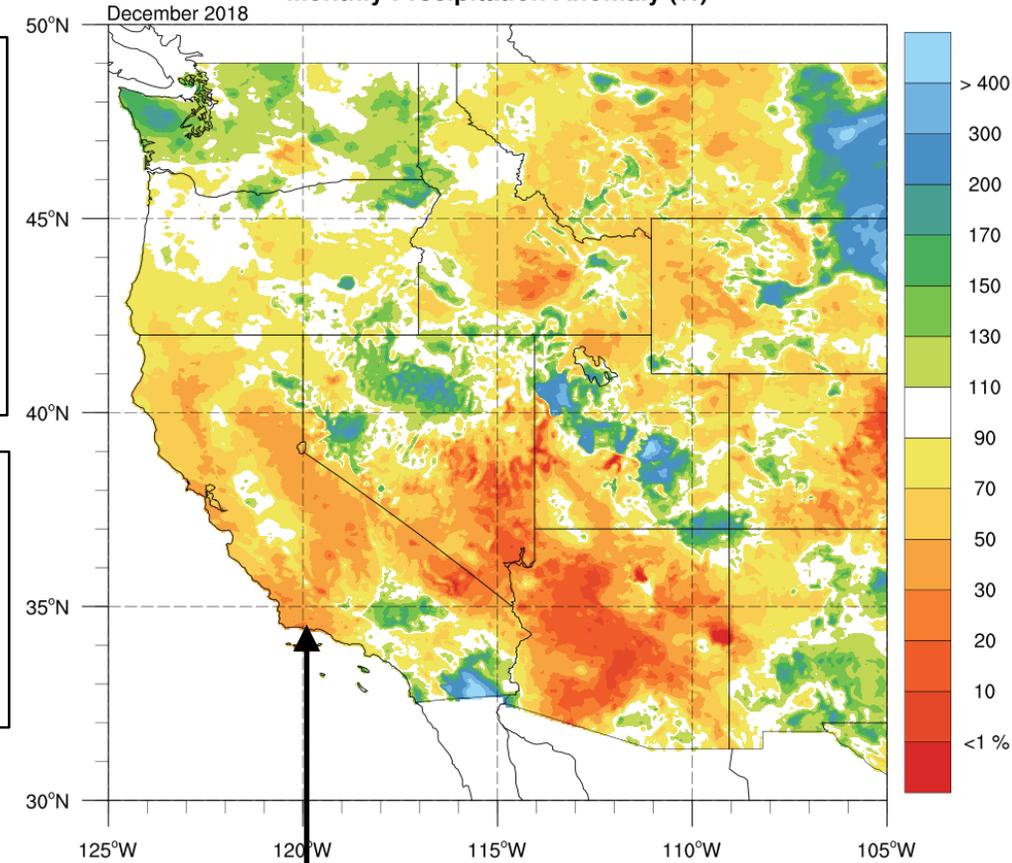
Total Monthly Precipitation (mm)



- The 9 total landfalling ARs contributed to >400 mm over portions of the Coastal, Olympic, and Cascade Mts. of the Pacific Northwest and Northern CA

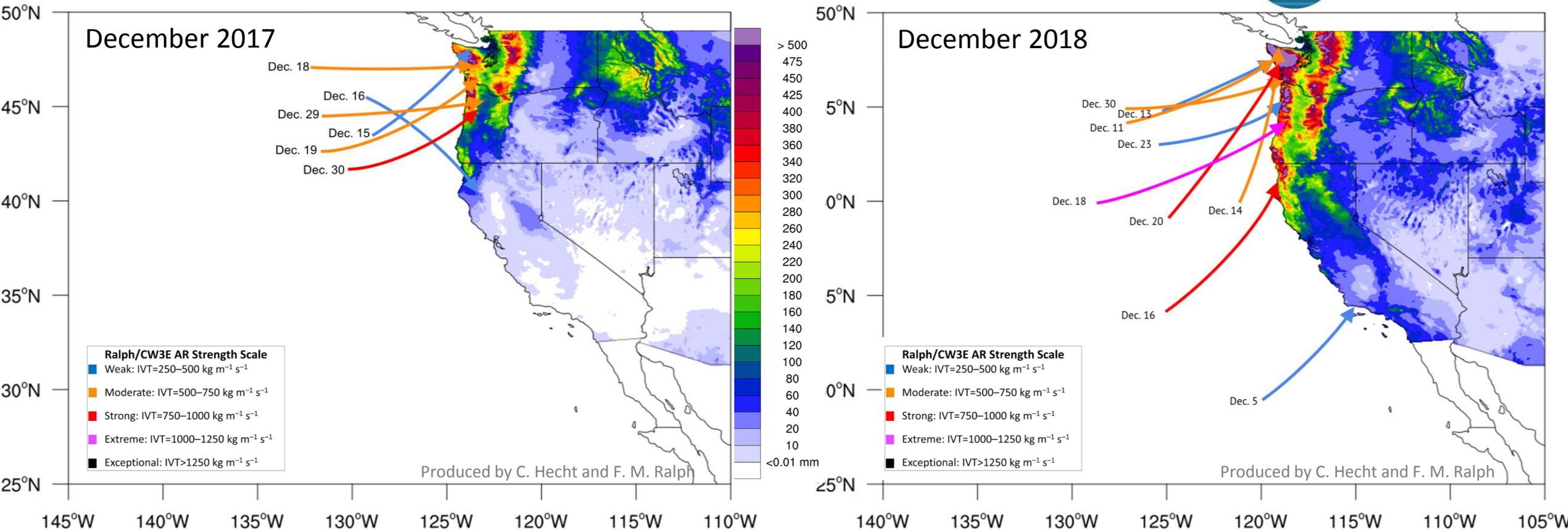
- Parts of Northern CA received 200–350 mm, while southern California received 40–150 mm

Monthly Precipitation Anomaly (%)



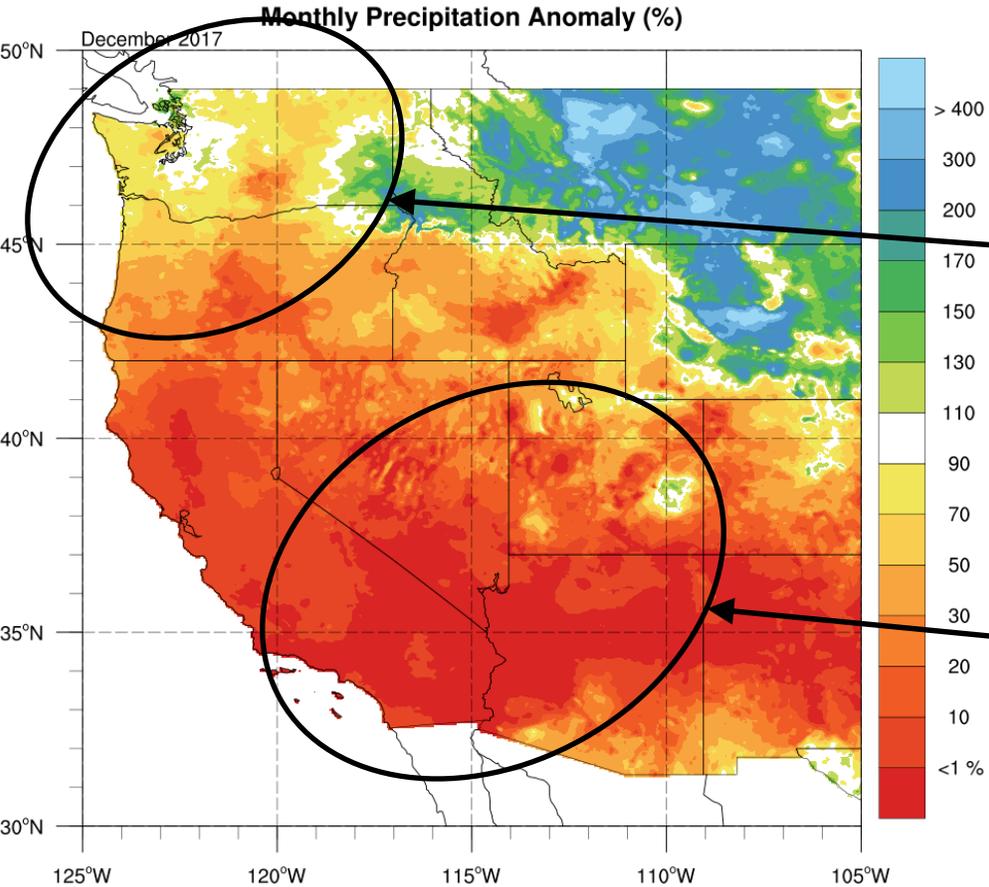
- The high amounts of precipitation over the Pacific Northwest resulted in normal or above normal monthly precipitation during Dec. 2018
- Most of California, with the exception of parts of Southern CA and the Central Valley, experienced below normal monthly precipitation during December 2018

December 2018 Compared to December 2017



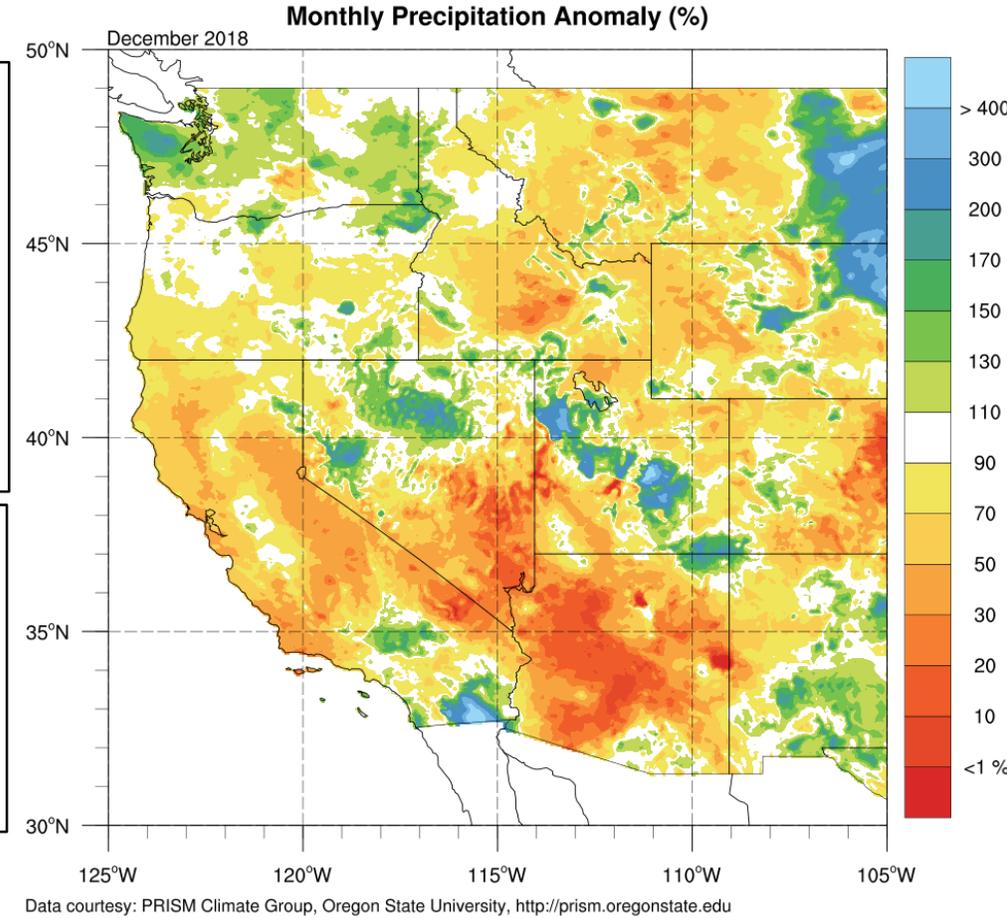
- December 2017 experienced three fewer landfalling ARs compared to November 2018
- December 2017 also only had 1 strong AR and no extreme, whereas December 2018 had 2 strong and 1 extreme AR
- The ARs during Dec. '17 were all strongest over the PNW/NorCal and a majority of ARs exhibited a westerly orientation where Dec. '18 saw a couple ARs that were strongest over CA and a majority had a southwesterly orientation (more favorable for upslope over the Sierra)
- These factors resulted in higher precipitation accumulations over much of the U.S. West Coast during December 2018

December 2018 Compared to December 2017



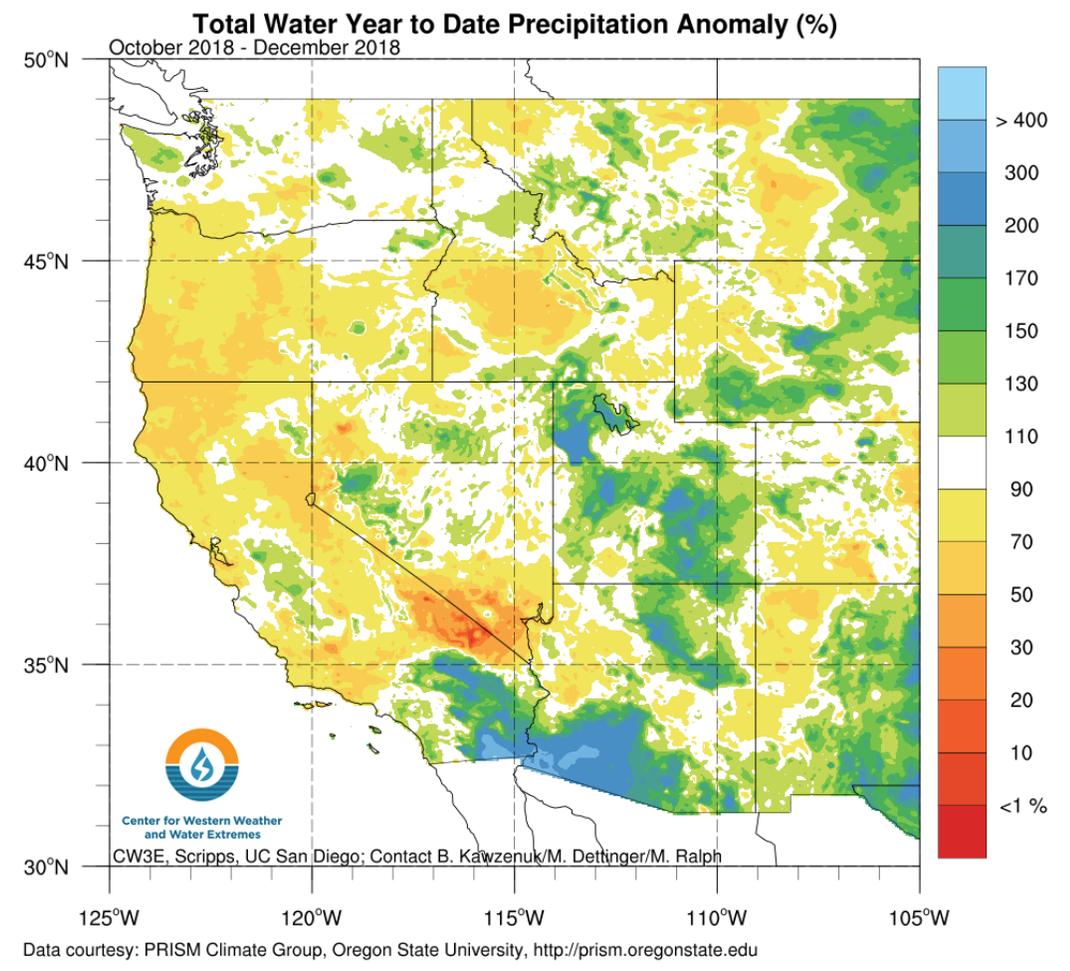
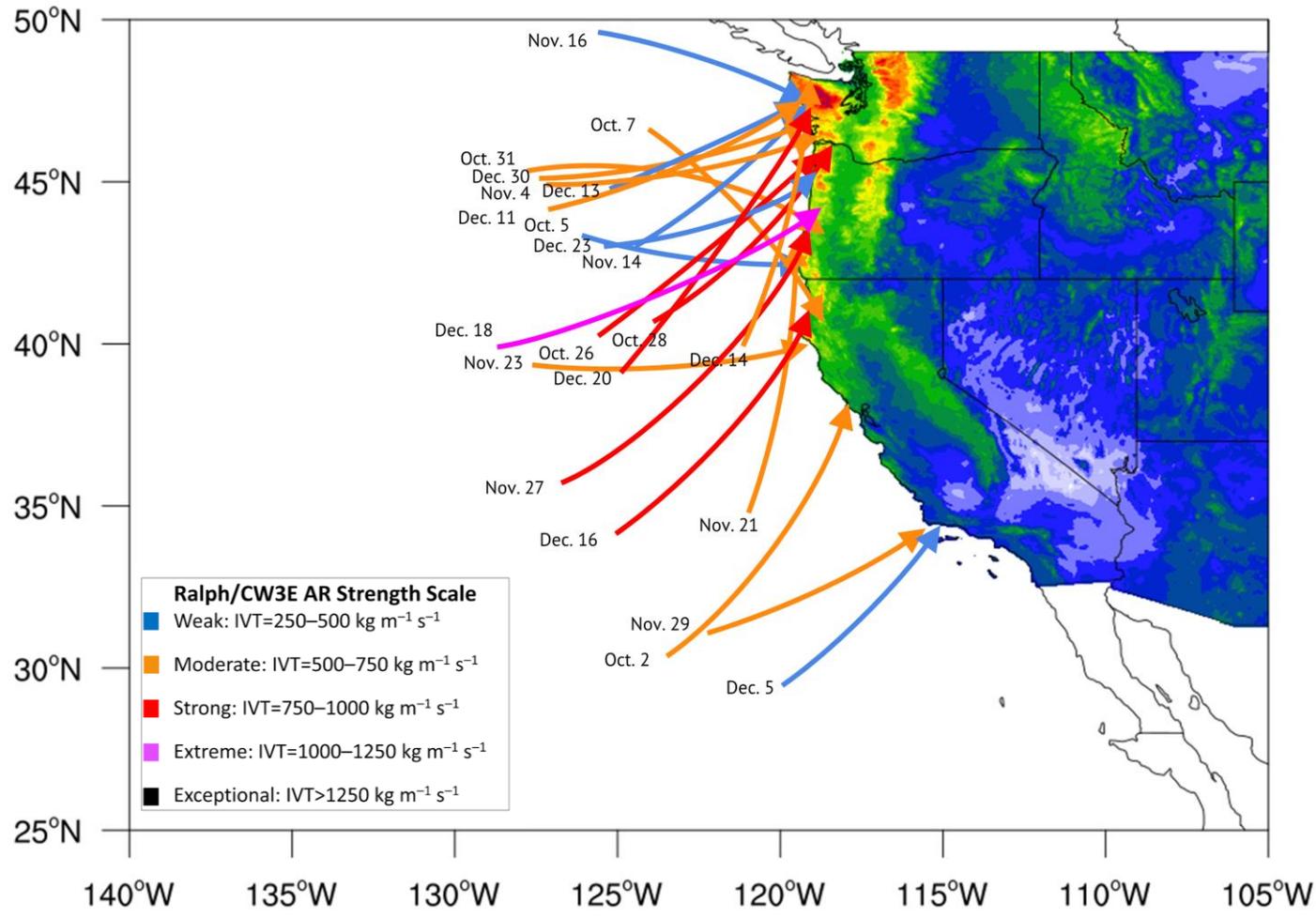
- During December 2017, the only locations along the West Coast that experienced normal or slightly above normal monthly precipitation were in WA

- Southern California, Southern Nevada, and much of Arizona experienced <1% of the normal December precipitation



- When comparing this December to last December, this December (2018) was not as far below normal as last December (2017)
- Much of Washington and Northern Oregon were at or slightly above normal during this December (2018)
- Portions of SoCal experienced above normal monthly precipitation this December (2018), where last December was <1% of normal

Water Year to Date Summary (Oct. through Dec.)



- The 9 ARs that made landfall during November 2018 brings the Water Year total to 22 (6 Weak, 10 Moderate, 5 Strong, and 1 Extreme)

- The total number that made landfall through November 2017 was 19 (5 Weak, 5 Moderate, 7 Strong, and 2 Extreme)

- Through December 2018, a majority of the U.S. West Coast has received below normal precipitation to date
- Most of Washington, the southern Central Valley, and Southern California has received near or above normal precipitation