CW3E Post Event Summary: 16–22 Oct 2019

Center for Western Weather and Water Extremes
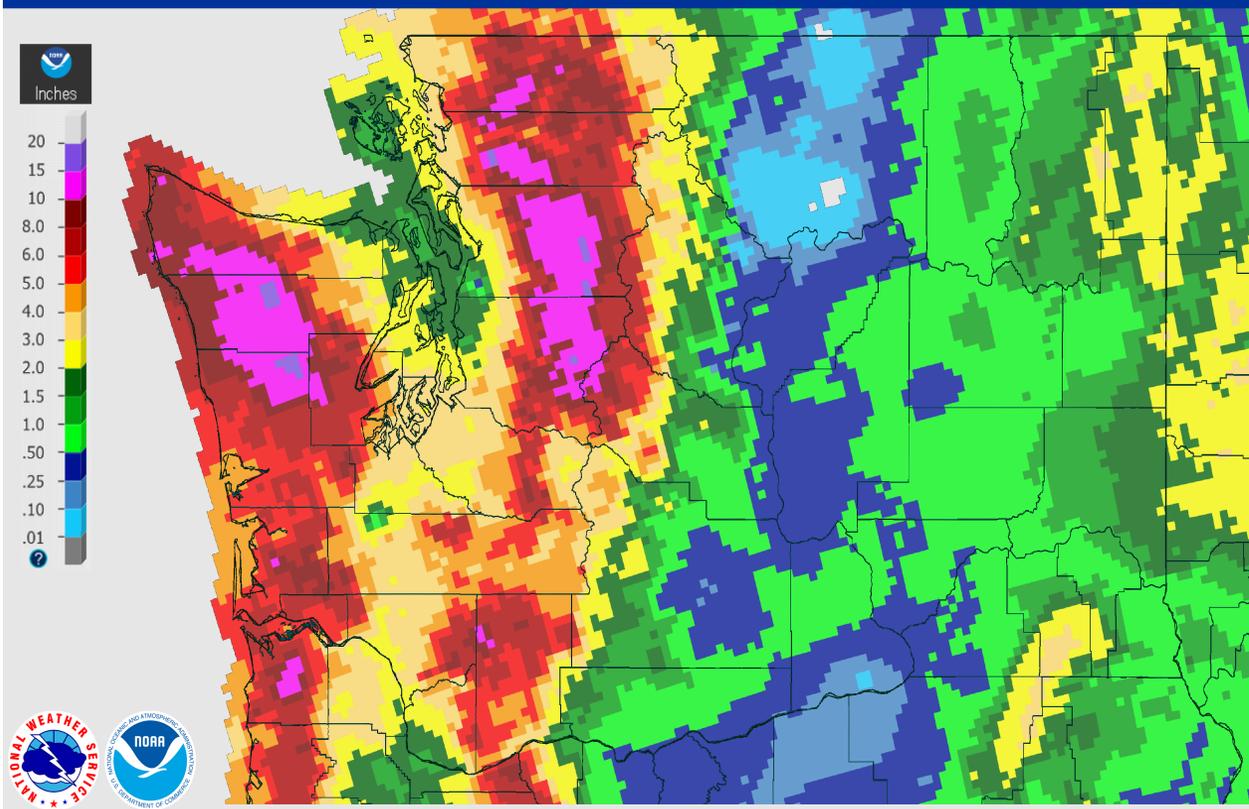SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO

Unsettled weather pattern produces an extended period of heavy precipitation over the Pacific Northwest

- Excessive precipitation in western Washington and northwestern Oregon during 16-22 October was associated with a series of storms and landfalling ARs
- NWS Stage IV data suggests that more than 10 inches of precipitation fell over much of the Olympic Mountains and North Cascades
- The last episode of heavy precipitation on 21–22 Oct triggered flooding along the Snoqualmie and Snohomish Rivers

Source: NOAA | NWS | Advanced Hydrologic Prediction Service, https://water.weather.gov/
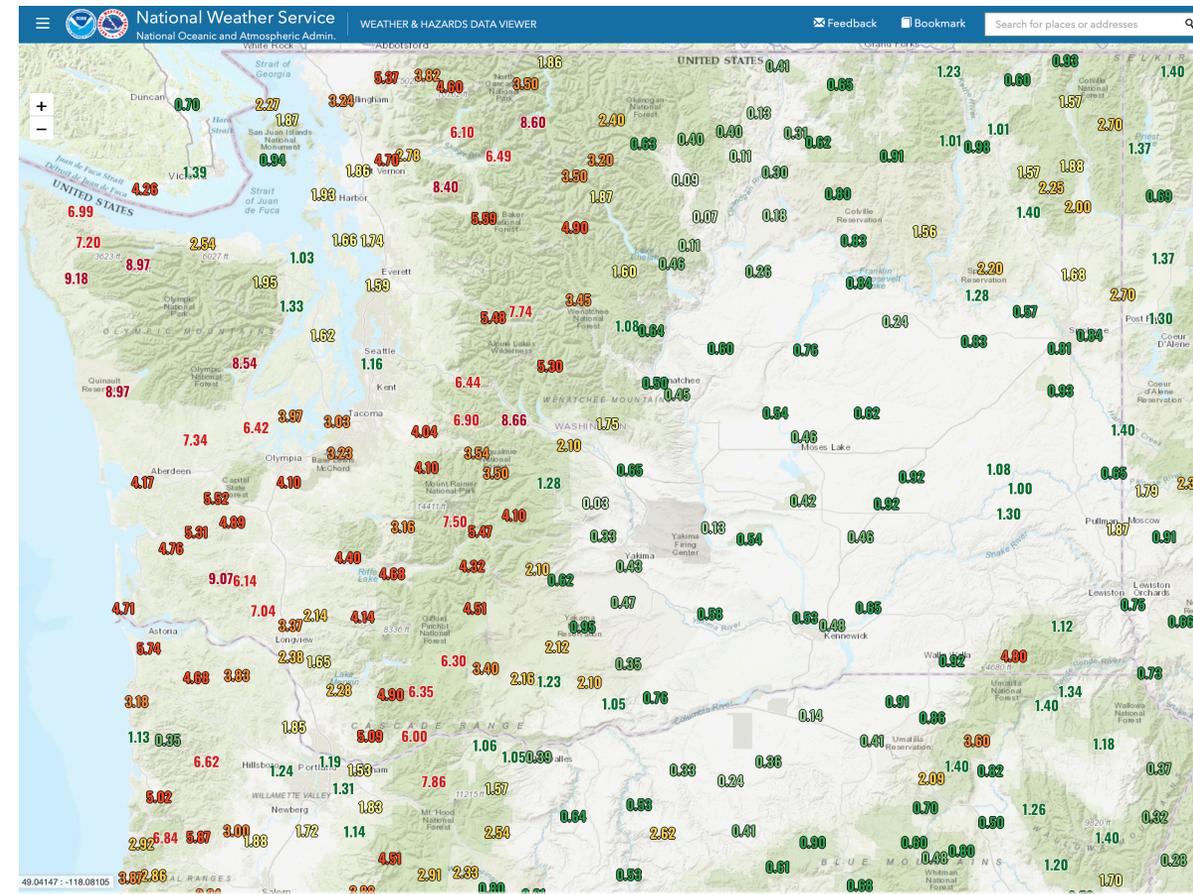
Source: NOAA | NWS Western Regional Headquarters, https://www.weather.gov/wrh

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- Heavy precipitation in northwestern Oregon occurred primarily before 20 Oct, and was associated with a decaying cold front
- The episode of heavy precipitation in the Olympic Mountains and North Cascades on 21–22 Oct was associated with a strong landfalling AR (maximum IVT > 750 kg m^{-1} s^{-1})
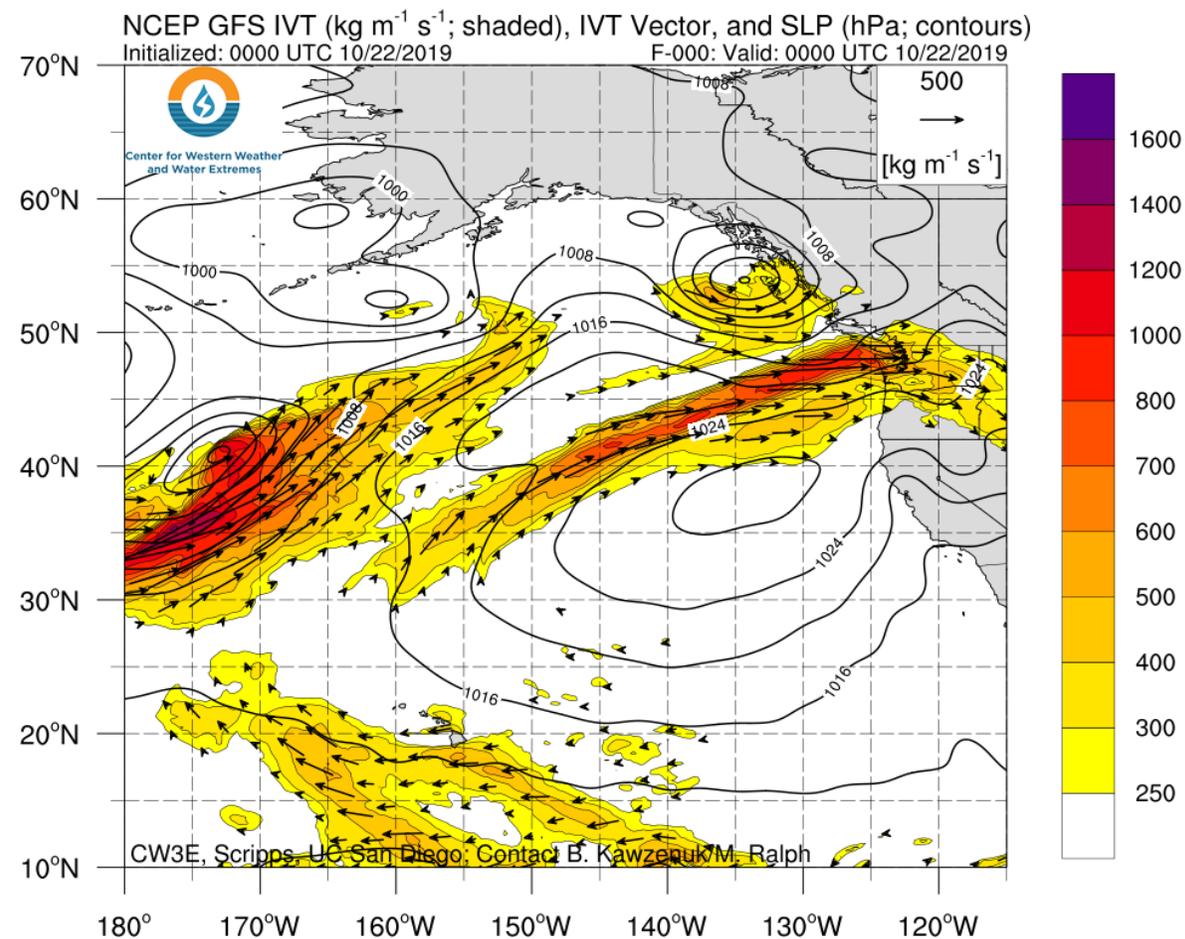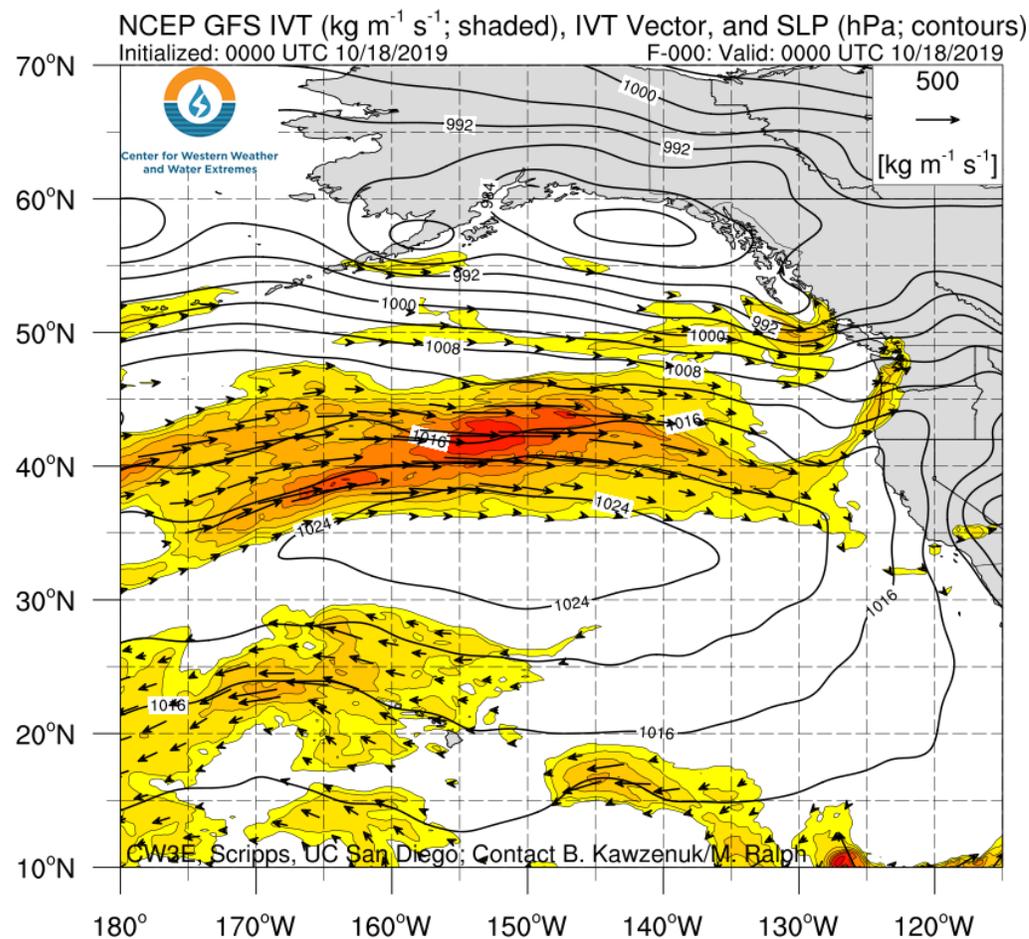
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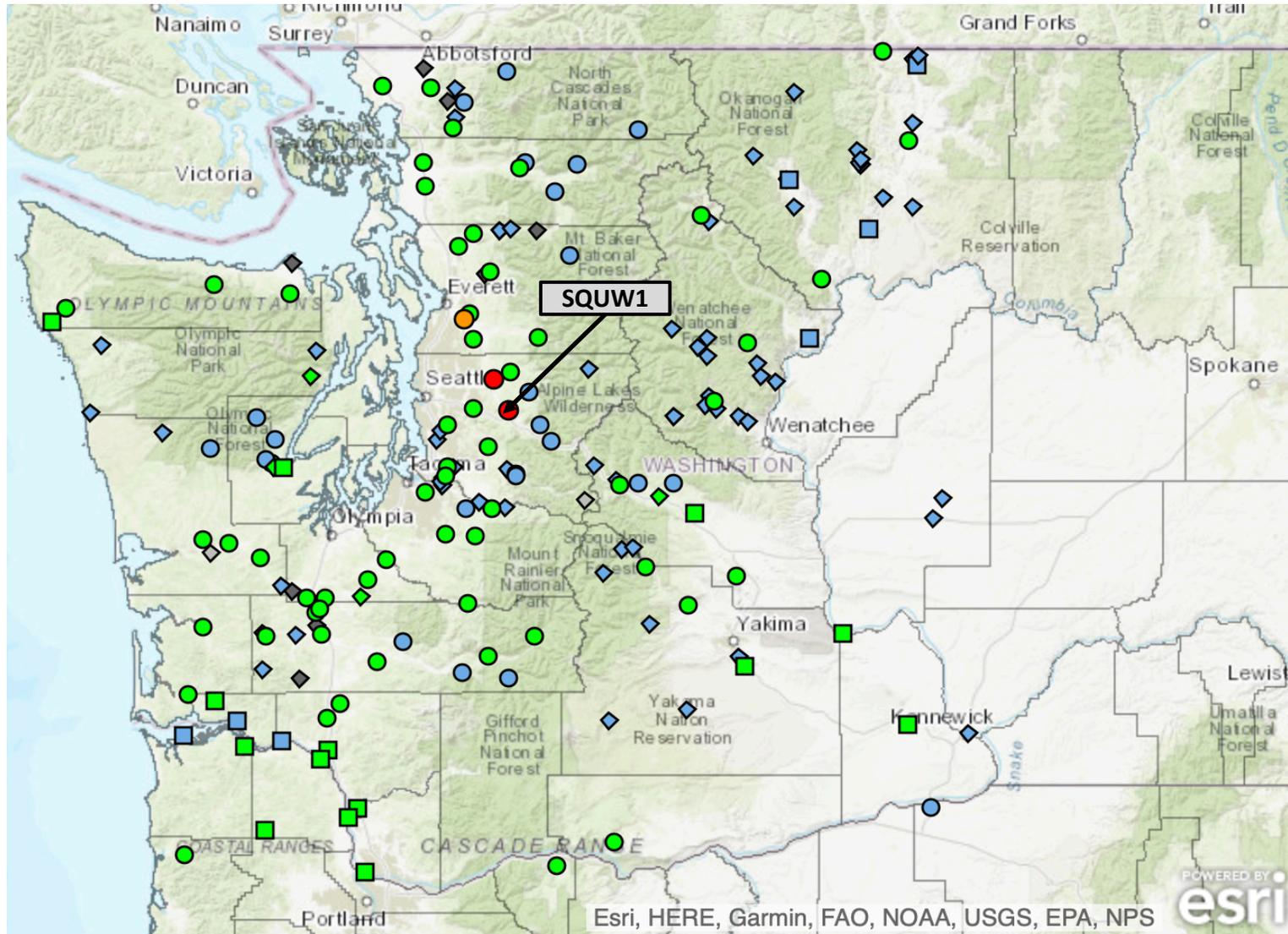
Heavy precipitation between 1200 UTC (5 AM PDT) 21 Oct and 1200 UTC 22 Oct resulted in river flooding in King and Snohomish Counties. The Snoqualmie River near Snoqualmie Falls (SQUW1) reached major flood stage during the morning of 22 Oct. Peak discharge (45,106 ft^3 s^{-1}) and stage (17.85 ft) were observed at 8:50 AM PDT.


Source: NOAA | NWS | Northwest River Forecast Center, https://www.nwrfc.noaa.gov/

Source: NOAA | NWS | Advanced Hydrologic Prediction Service, https://water.weather.gov/

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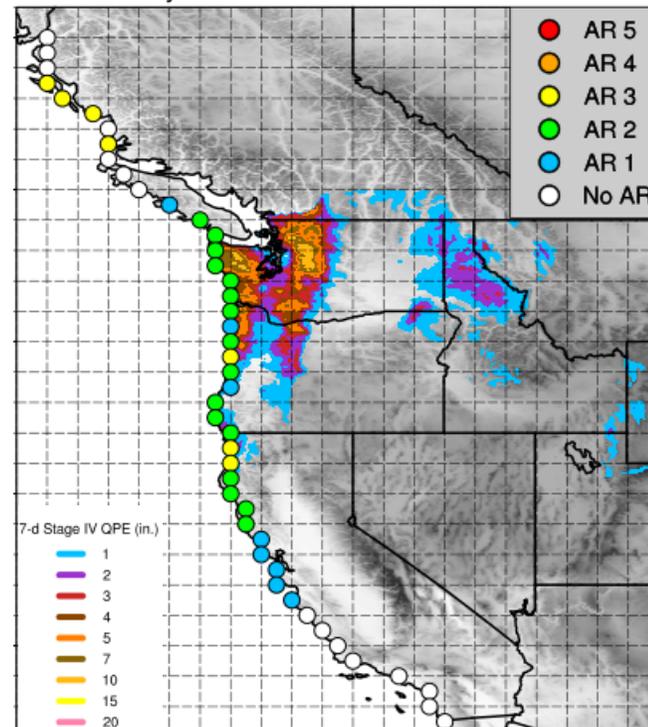SCRIPPS INSTITUTION OF OCEANOGRAPHY AT UC SAN DIEGO
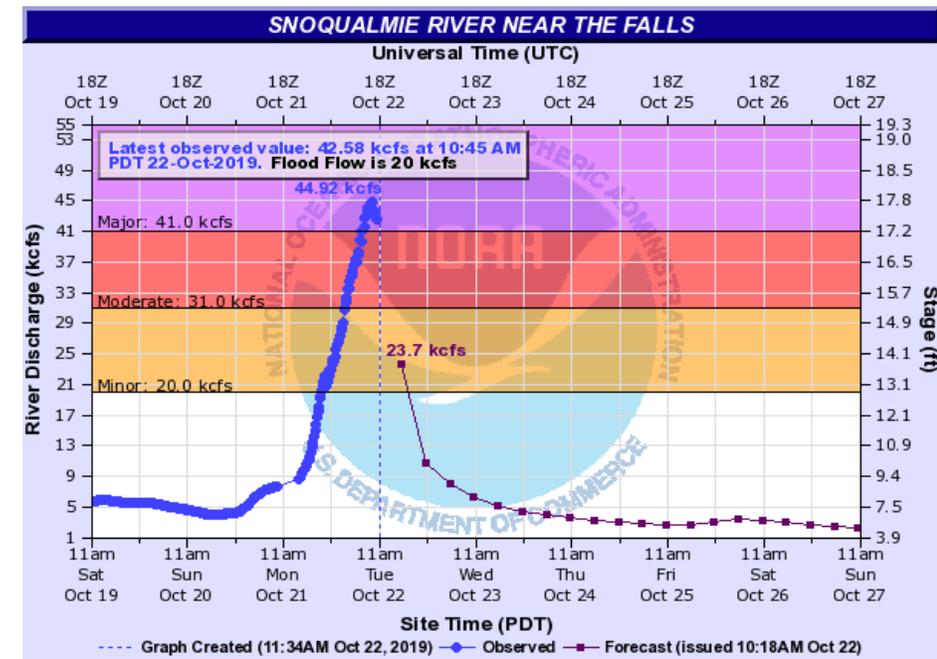
- Forecast and observed maximum AR scale were very similar for the 7-day period ending 1200 UTC (5 AM PDT) 22 Oct
- NWS 7-day QPF captured the spatial pattern of precipitation quite well, but significantly overestimated precipitation amounts over the Oregon and southern Washington Cascades, and significantly underestimated precipitation amounts over the Olympic Peninsula, the North Cascades, southwestern Washington, and extreme northwestern Oregon
- Despite experiencing AR 2/3 conditions, northwestern California received less precipitation due to weak dynamical forcing for ascent and low-level winds that were somewhat unfavorable for orographic lift
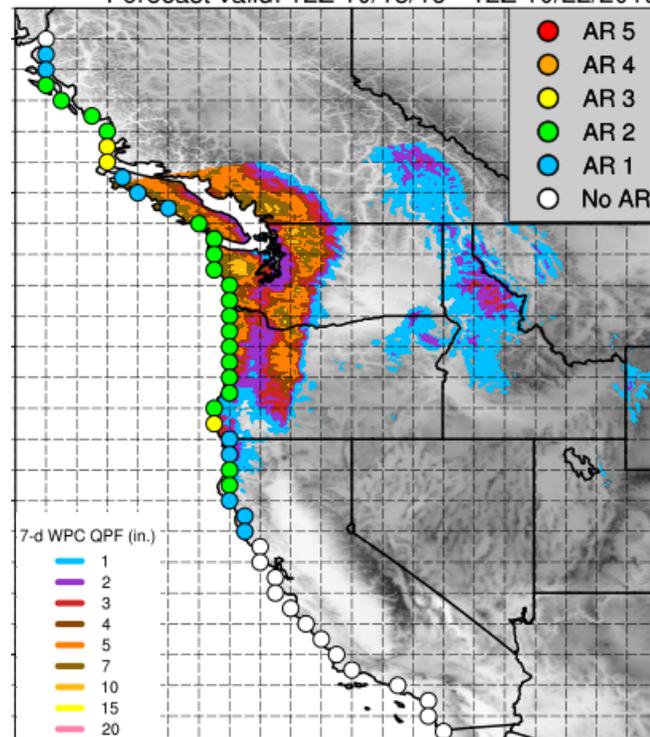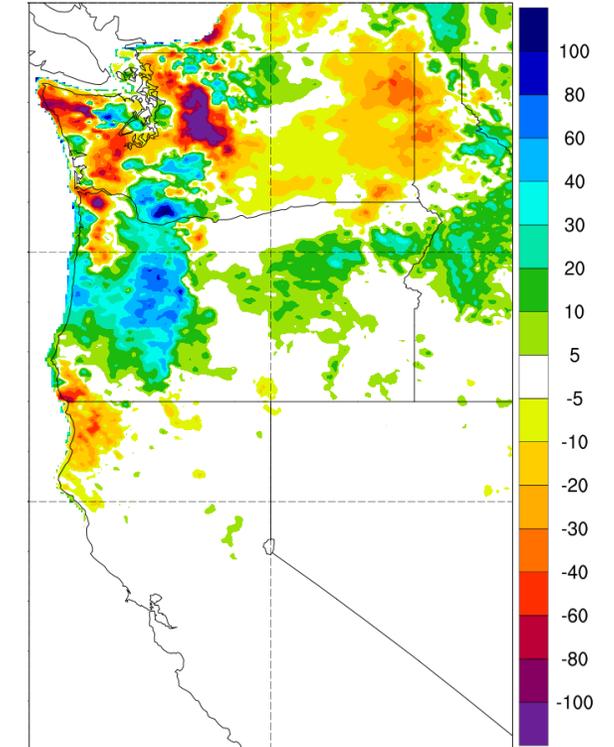
- When the previous AR outlook was issued (17 Oct), the GEFS control member suggested the possibility of AR 4 conditions near the Washington–Oregon border
- The observed landfalling AR was characterized by weaker IVT and a much shorter duration
- The GEFS ensemble mean outperformed the control member in terms of forecast IVT