

CW3E Post Event Summary: 16–22 Oct 2019



Center for Western Weather
and Water Extremes

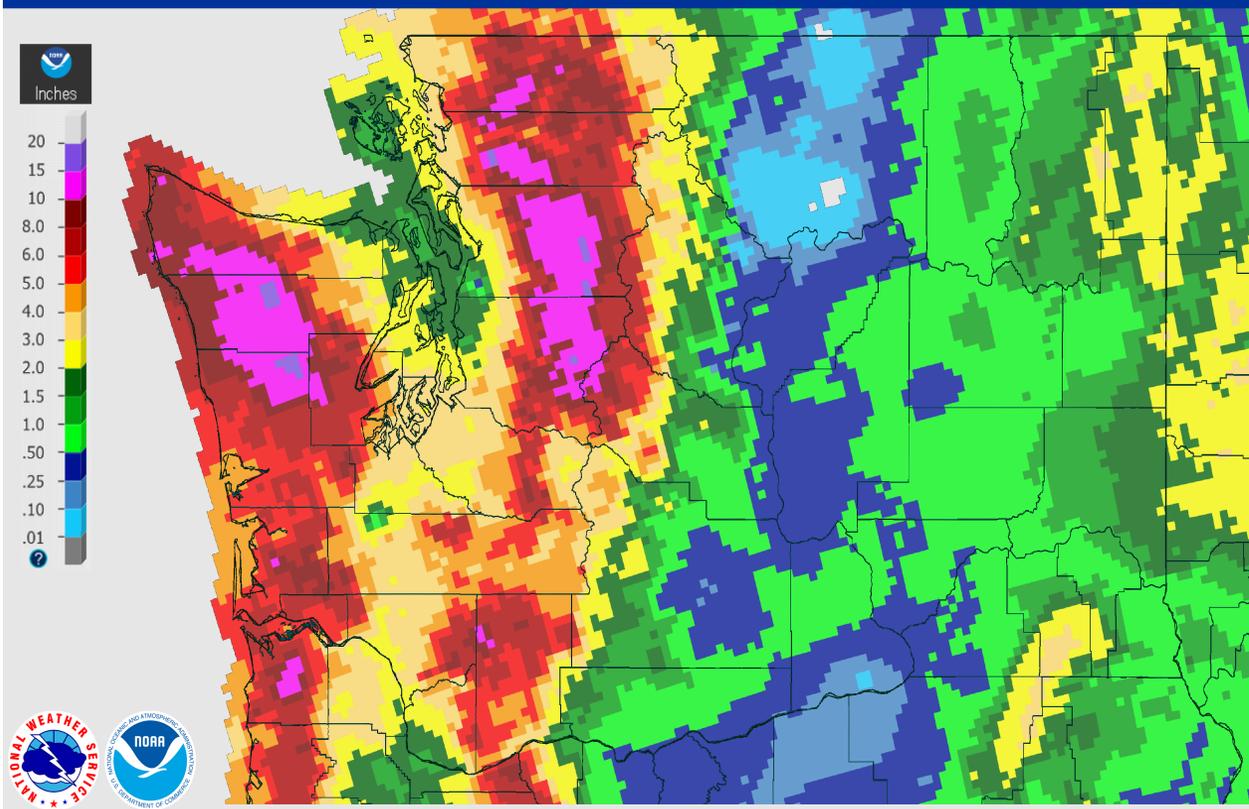
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AT UC SAN DIEGO

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

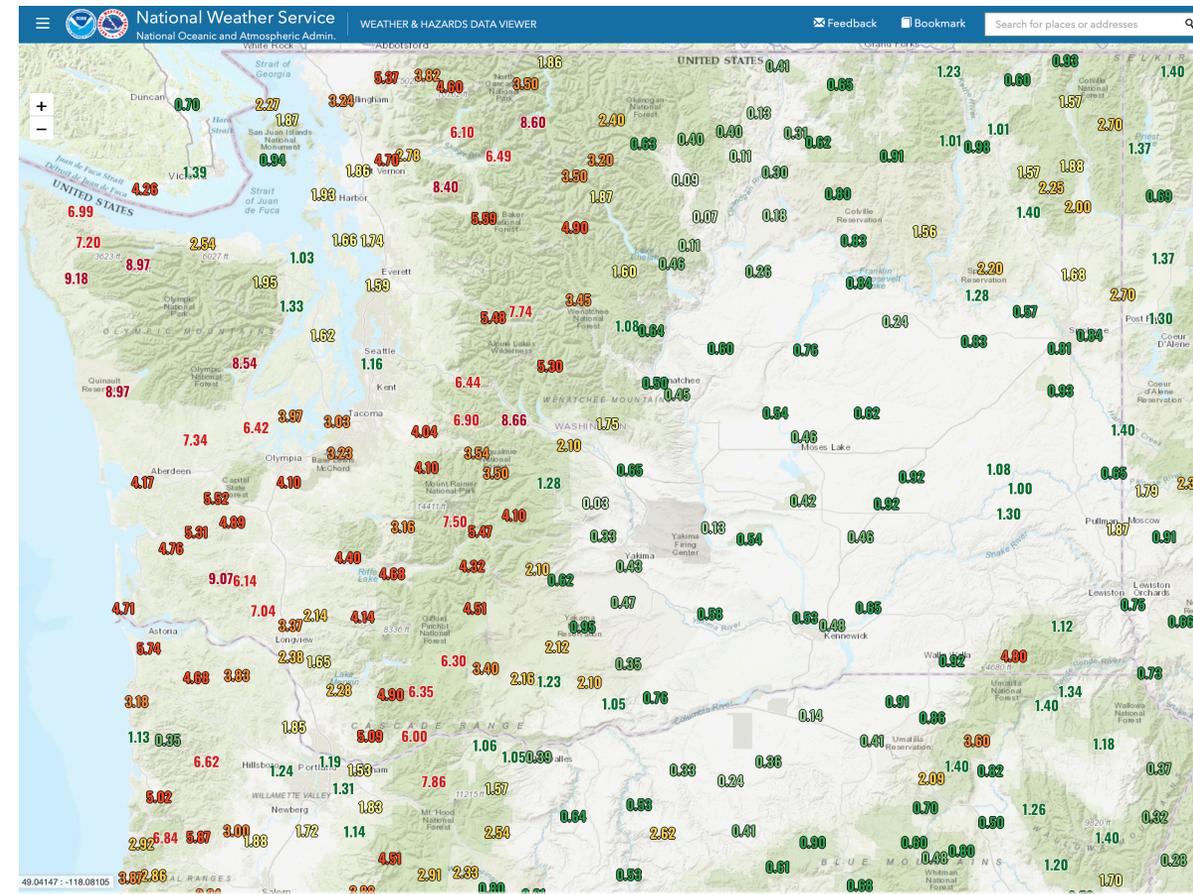
- Excessive precipitation in western Washington and northwestern Oregon during 16-22 October was associated with a series of storms and landfalling ARs
- NWS Stage IV data suggests that more than 10 inches of precipitation fell over much of the Olympic Mountains and North Cascades
- The last episode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

October 22, 2019 7-Day Observed Precipitation

Created on: October 22, 2019 - 18:57 UTC
Valid on: October 22, 2019 12:00 UTC



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



Source: NOAA | NWS Western Regional Headquarters, <https://www.weather.gov/wrh>

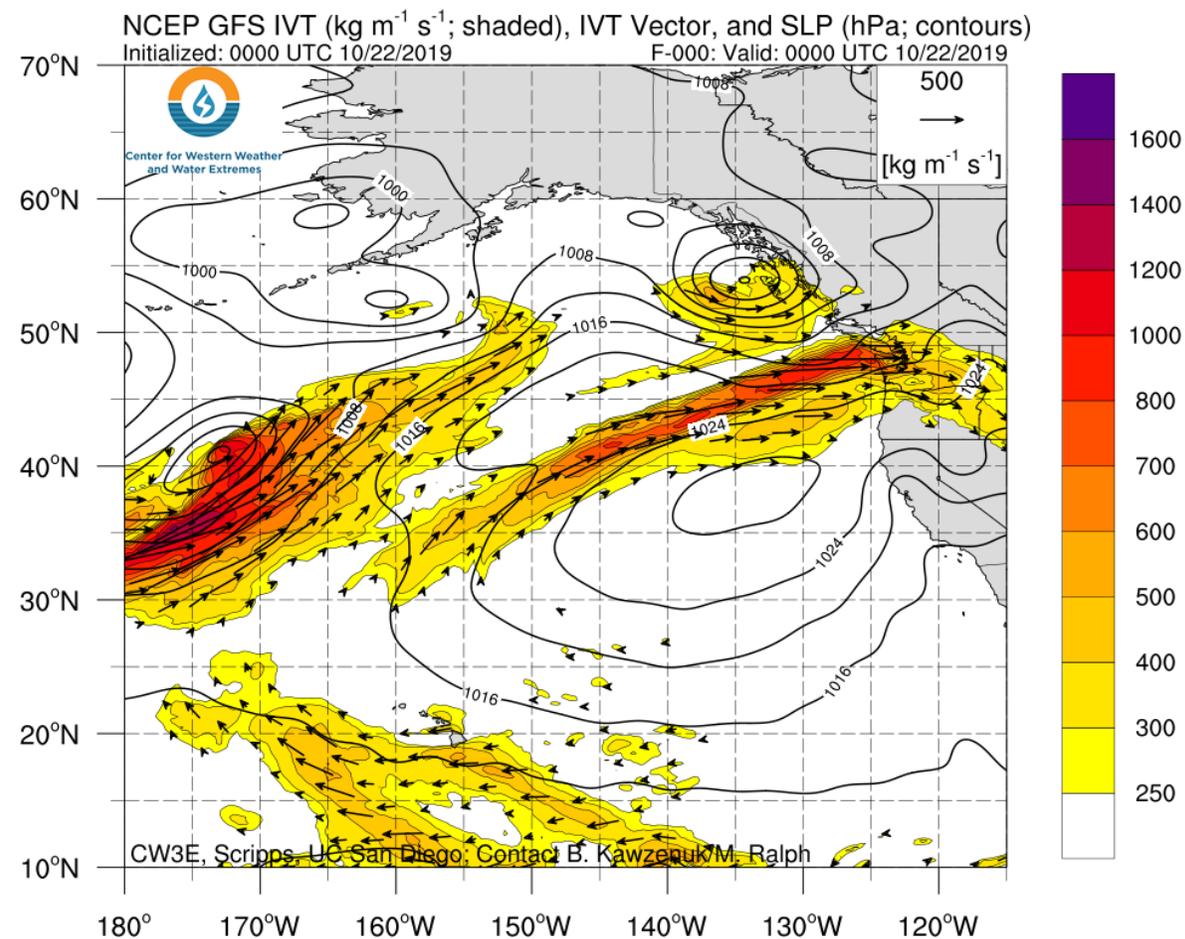
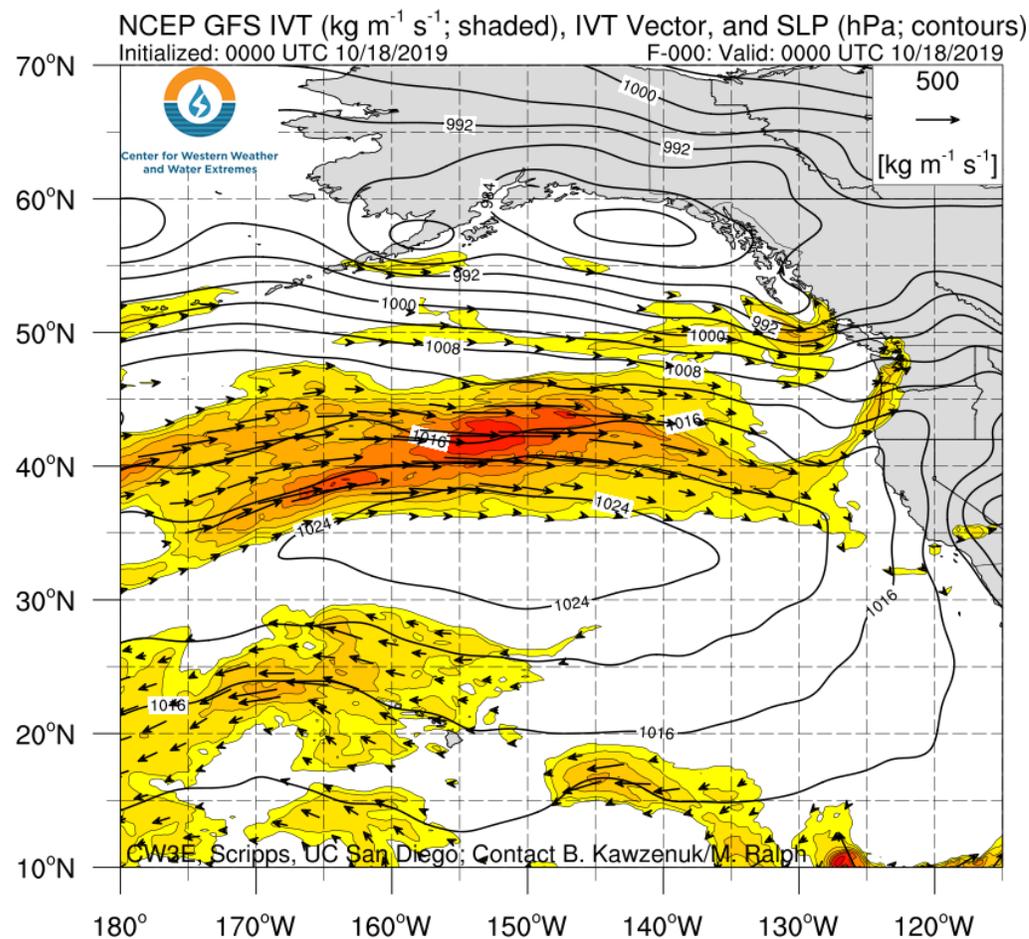
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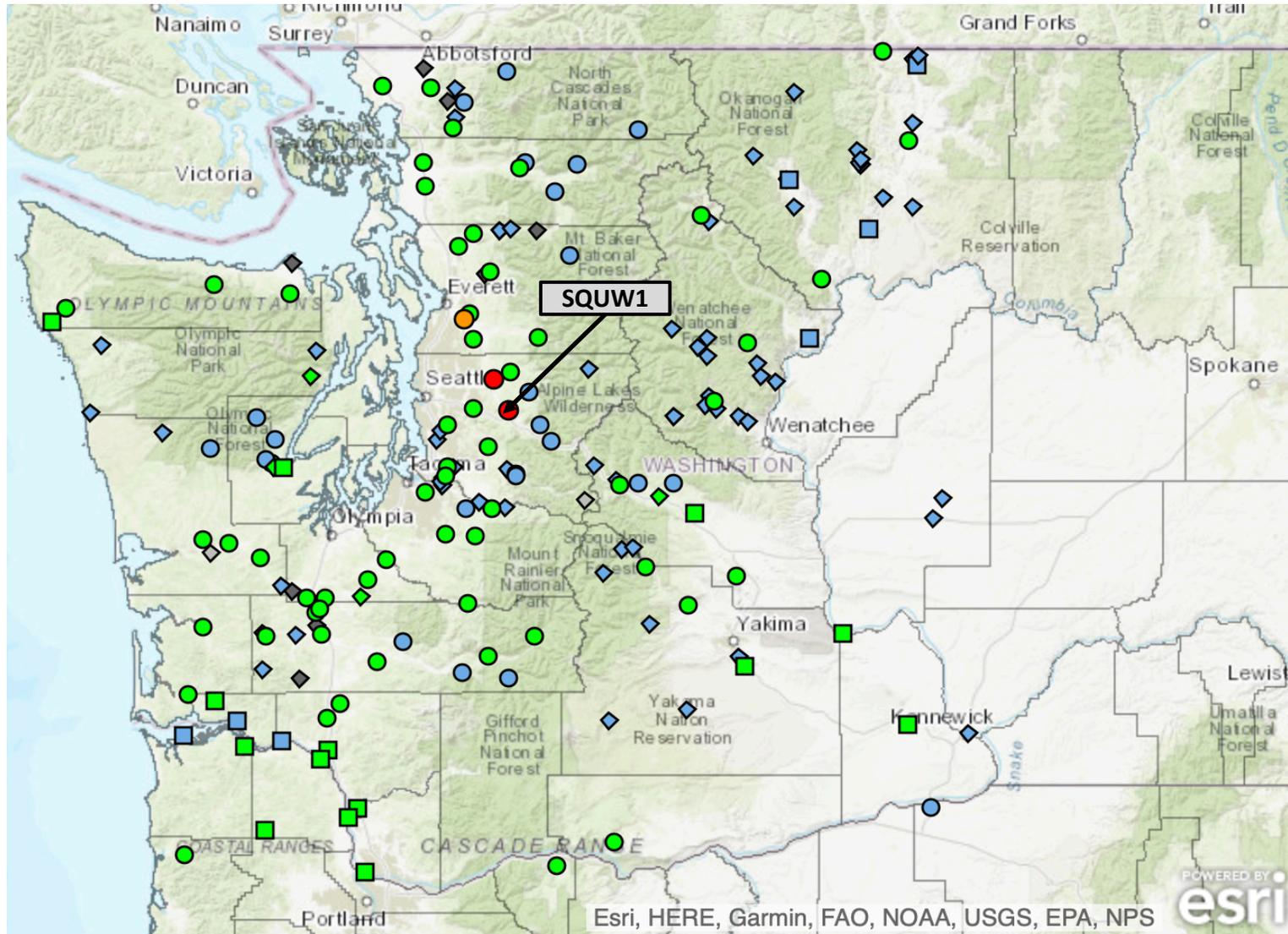
- Heavy precipitation in northwestern Oregon occurred primarily before 20 Oct, and was associated with a decaying cold front
- The episode of heavy precipitation in the Olympic Mountains and North Cascades on 21–22 Oct was associated with a strong landfalling AR (maximum IVT > 750 $\text{kg m}^{-1} \text{s}^{-1}$)



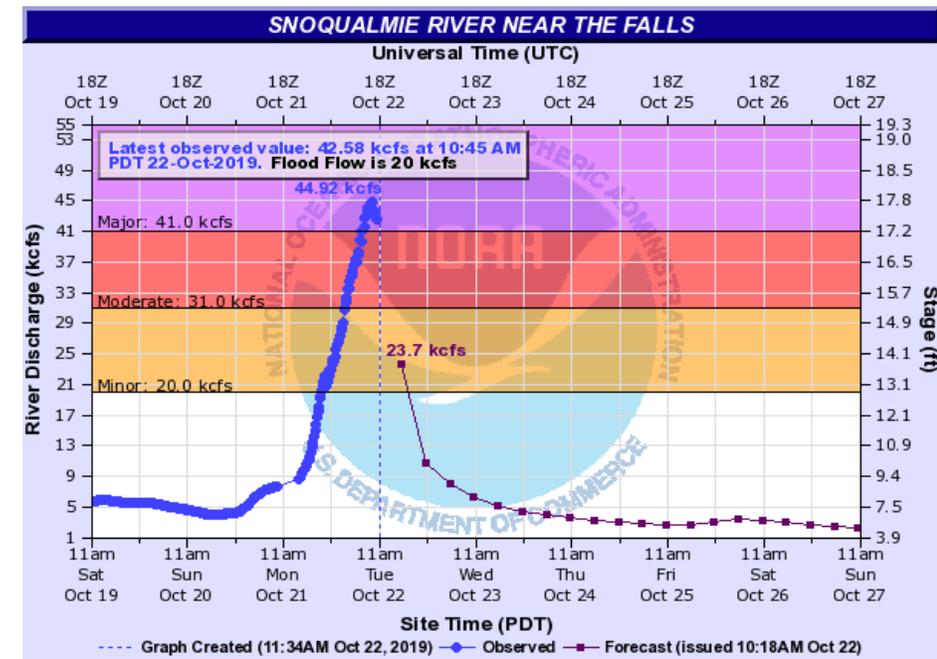
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Heavy precipitation between 1200 UTC (5 AM PDT) 21 Oct and 1200 UTC 22 Oct resulted in river flooding in King and Snohomish Counties. The Snoqualmie River near Snoqualmie Falls (SQUW1) reached major flood stage during the morning of 22 Oct. Peak discharge ($45,106 \text{ ft}^3 \text{ s}^{-1}$) and stage (17.85 ft) were observed at 8:50 AM PDT.

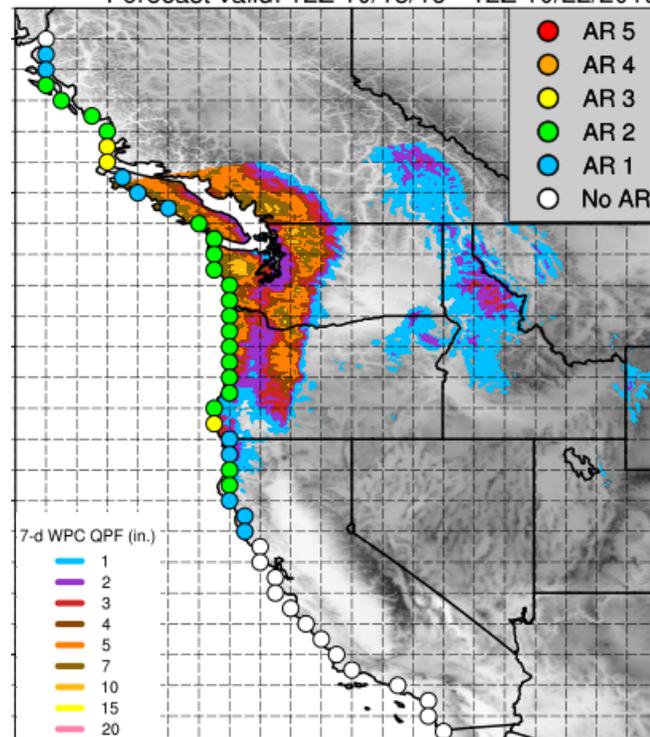


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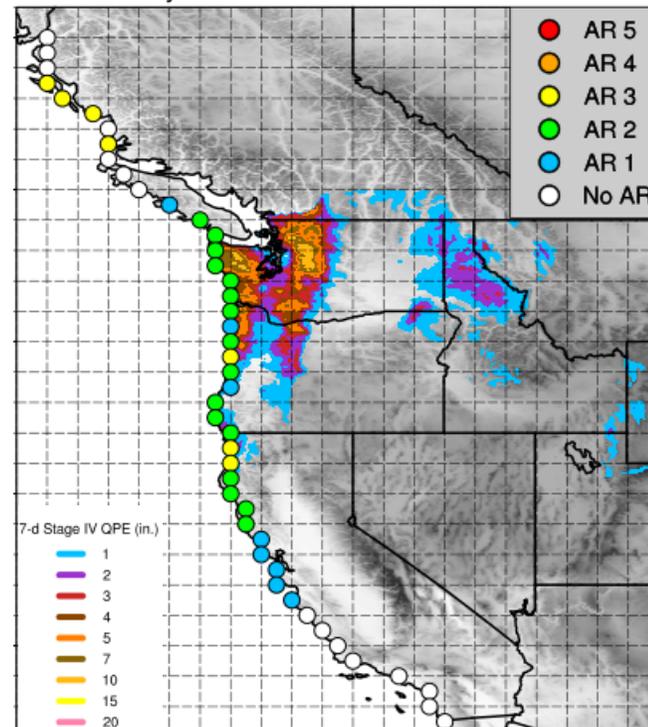


- Forecast and observed maximum AR scale were very similar for the 7-day period ending 1200 UTC (5 AM PDT) 22 Oct
- NWS 7-day QPF captured the spatial pattern of precipitation quite well, but significantly overestimated precipitation amounts over the Oregon and southern Washington Cascades, and significantly 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

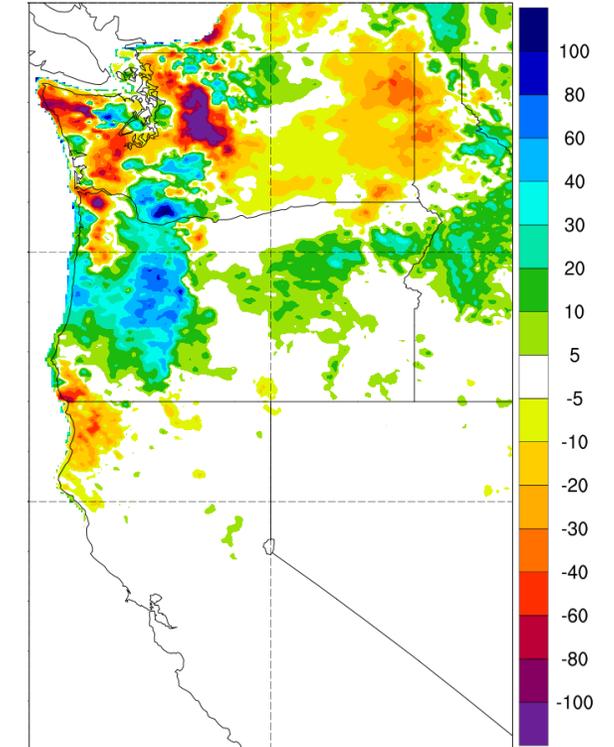
AR Scale Forecast and WPC 7-Day QPF
Forecast valid: 12Z 10/15/19 - 12Z 10/22/2019



Observed AR Scale and Stage IV QPE
Analysis valid: 12Z 10/15/2019 - 12Z 10/22/19



WPC 7-day QPF - Stage-IV QPE (mm)
Initialized: 1200 UTC 10/15/2019 Valid: 1200 UTC 15-22 Oct 2019



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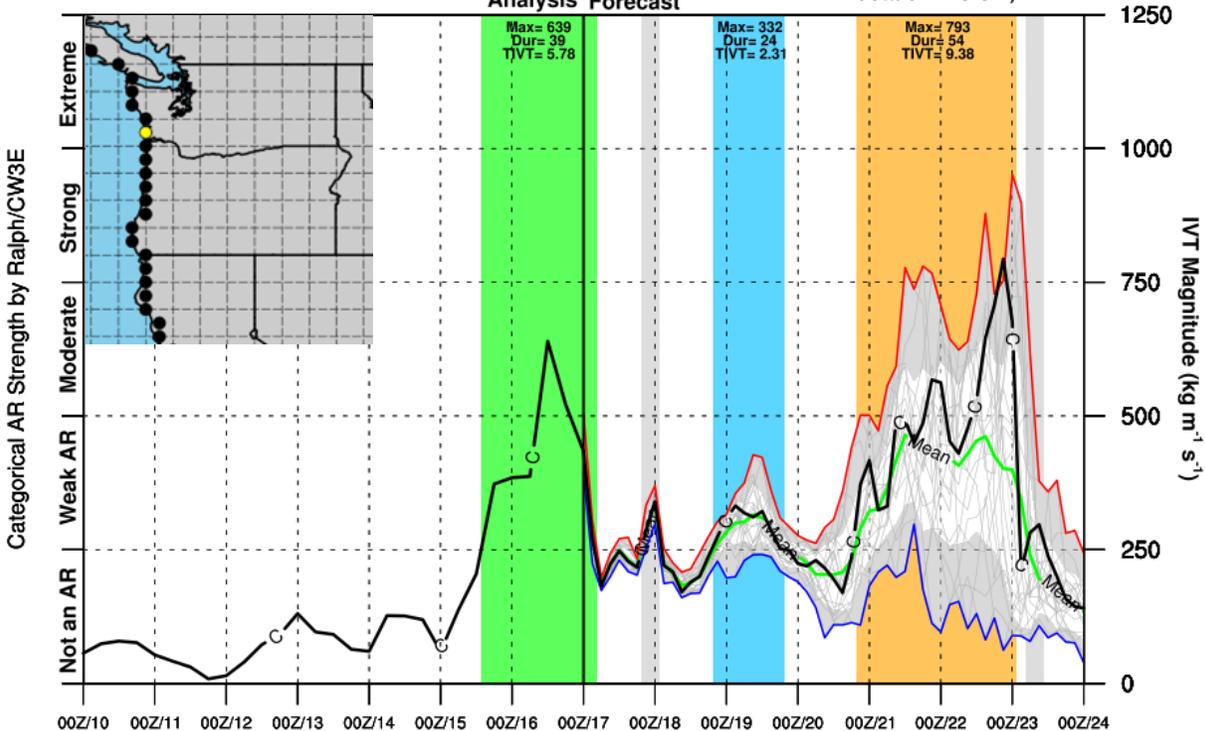
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- When the previous AR outlook was issued (17 Oct), the GEFS control member suggested the possibility of AR 4 conditions near the Washington–Oregon border
- The observed landfalling AR was characterized by weaker IVT and a much shorter duration
- The GEFS ensemble mean outperformed the control member in terms of forecast IVT

AR Scale & IVT Analysis/Forecast Initialized 00Z Thu 10/17/19

Location: 46.5N, 124W



Analysis and Forecast Time Centered on 00Z Thu 10/17/19

AR 1 AR 2 AR 3 AR 4 AR 5

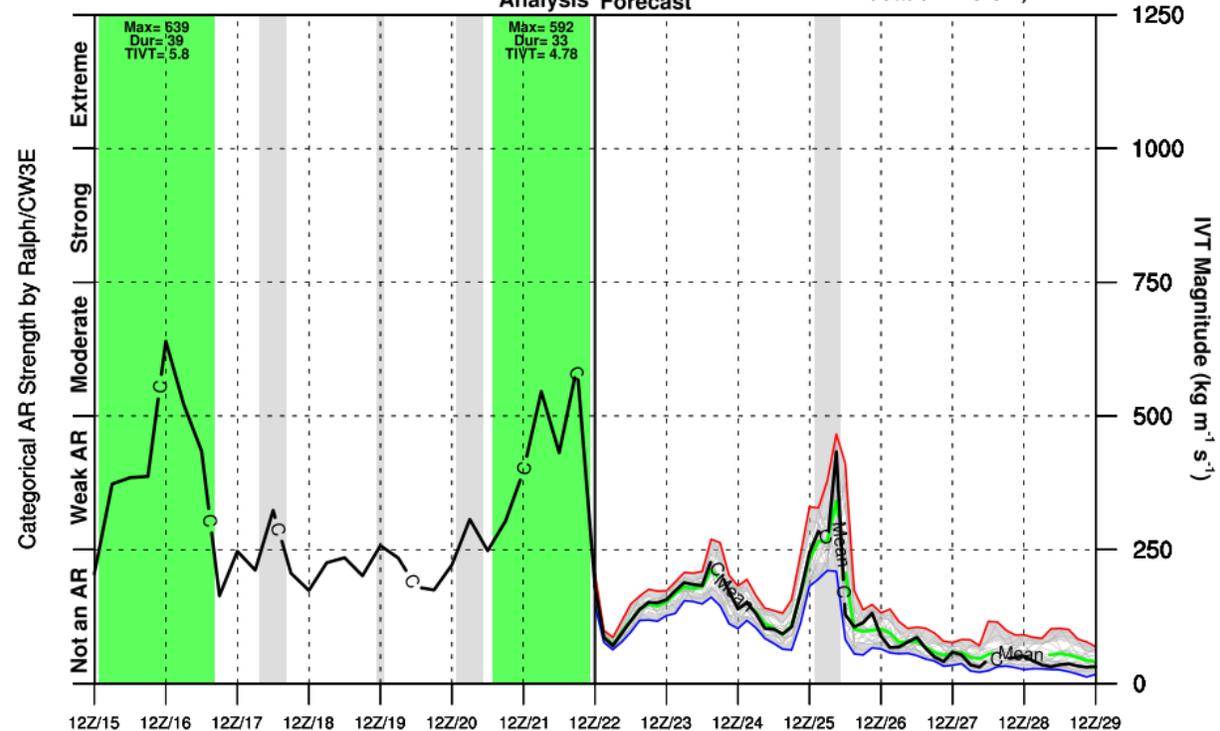


Image created: 09 UTC 10/17/2019

More information: <http://cw3e.ucsd.edu> AR Scale based on Ralph et al. (2019; BAMS), contact M. Ralph

AR Scale & IVT Analysis/Forecast Initialized 12Z Tue 10/22/19

Location: 46.5N, 124W



Analysis and Forecast Time Centered on 12Z Tue 10/22/19

AR 1 AR 2 AR 3 AR 4 AR 5



Image created: 21 UTC 10/22/2019

More information: <http://cw3e.ucsd.edu> AR Scale based on Ralph et al. (2019; BAMS), contact M. Ralph