

CW3E Atmospheric River Outlook: 26 October 2022

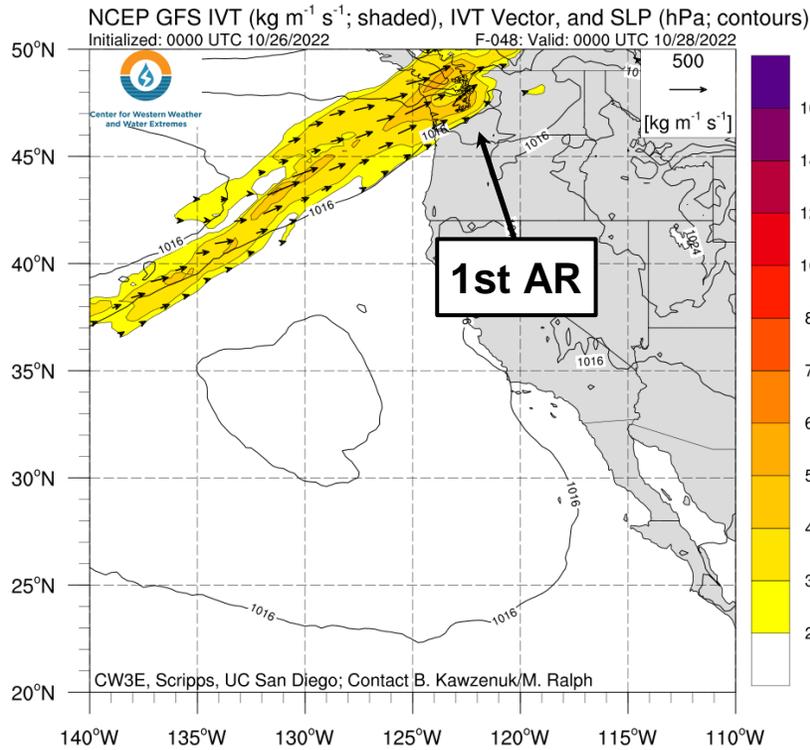
Multiple Atmospheric Rivers to Bring Precipitation to the Pacific Northwest

- Two atmospheric rivers (ARs) are forecast to move south along the British Columbia coast and bring AR conditions to the Pacific Northwest through the end of October
- The first AR is forecast to make landfall on 27 Oct and bring AR 1 conditions (based on the Ralph et al. 2019 AR Scale) to coastal Washington and Oregon
- There is substantial uncertainty in the timing, location, and duration of AR conditions with the potentially stronger second AR which is forecast to make landfall between 29 and 30 Oct
- The 00Z ECMWF EPS is forecasting the second AR to make landfall earlier and bring stronger AR conditions to the Pacific Northwest
- The National Weather Service (NWS) Weather Prediction Center (WPC) is forecasting 3-6 inches of precipitation over the Coast Ranges of Washington and Oregon and the northern Cascades over the next 7 days
- Precipitation associated with these ARs will help to improve severe drought conditions in the northern Coast Ranges and Cascades
- The second AR may bring precipitation to the Willamette National Forest in Oregon this weekend and help with firefighting efforts at the Cedar Creek Fire

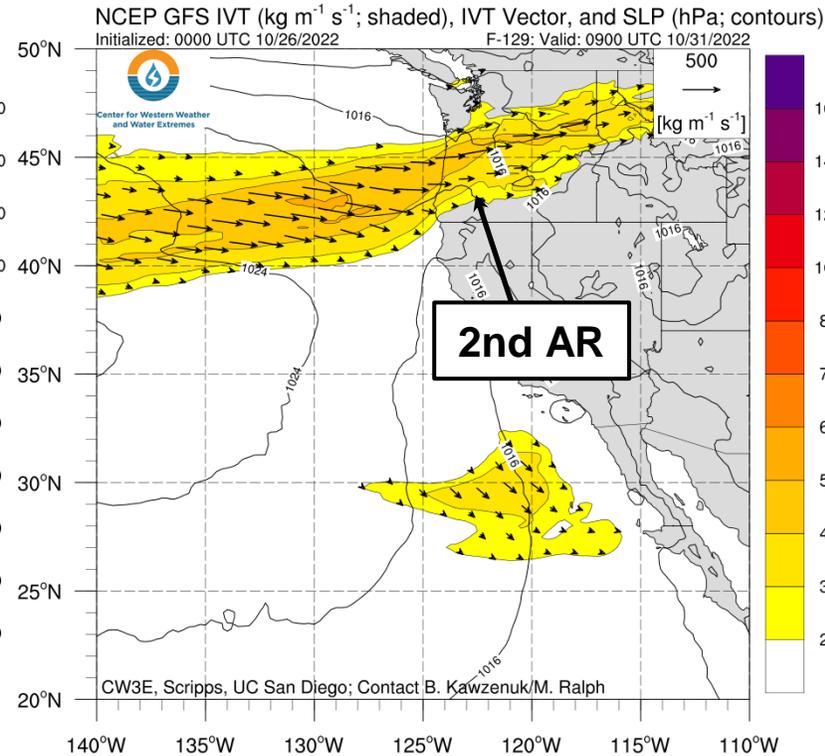
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Model IVT & SLP Forecasts

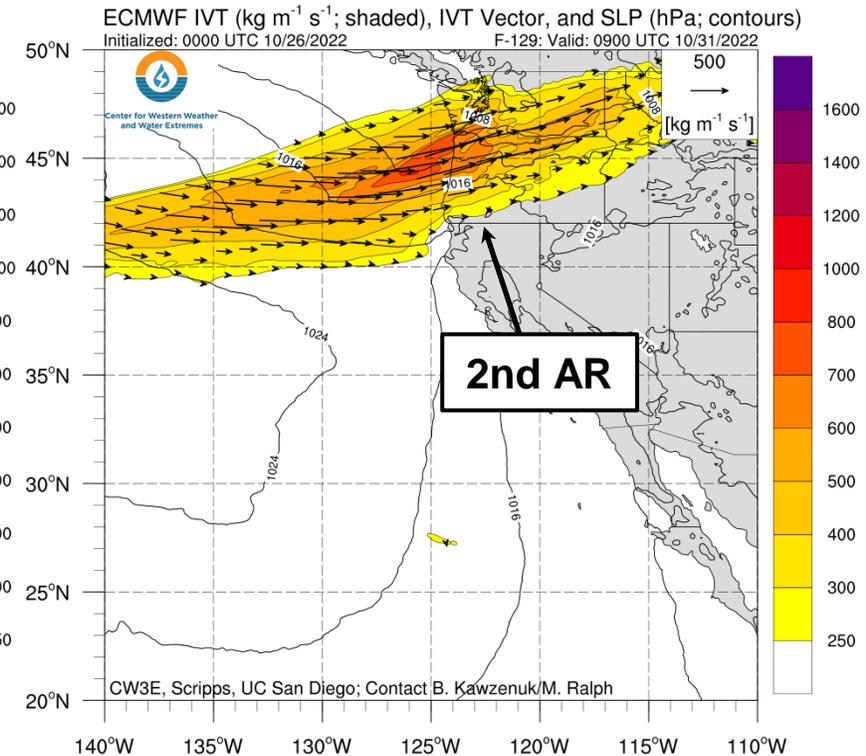
(A) GFS Valid: 5 PM PT 27 Oct (F-48)



(B) GFS Valid: 2 AM PT 31 Oct (F-129)



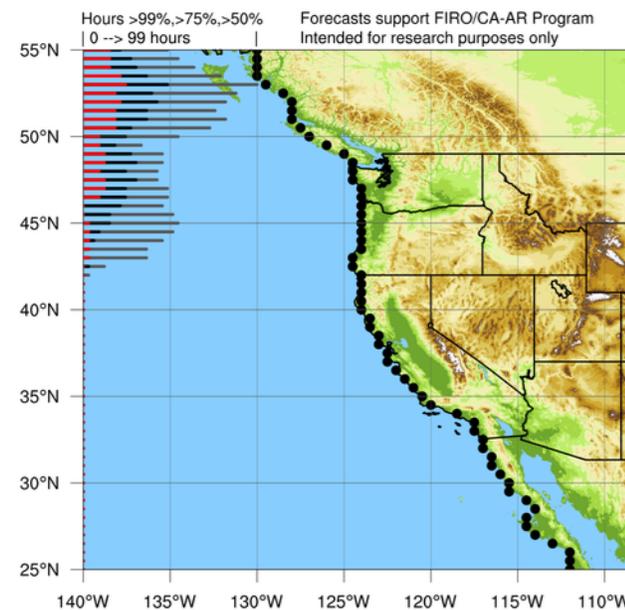
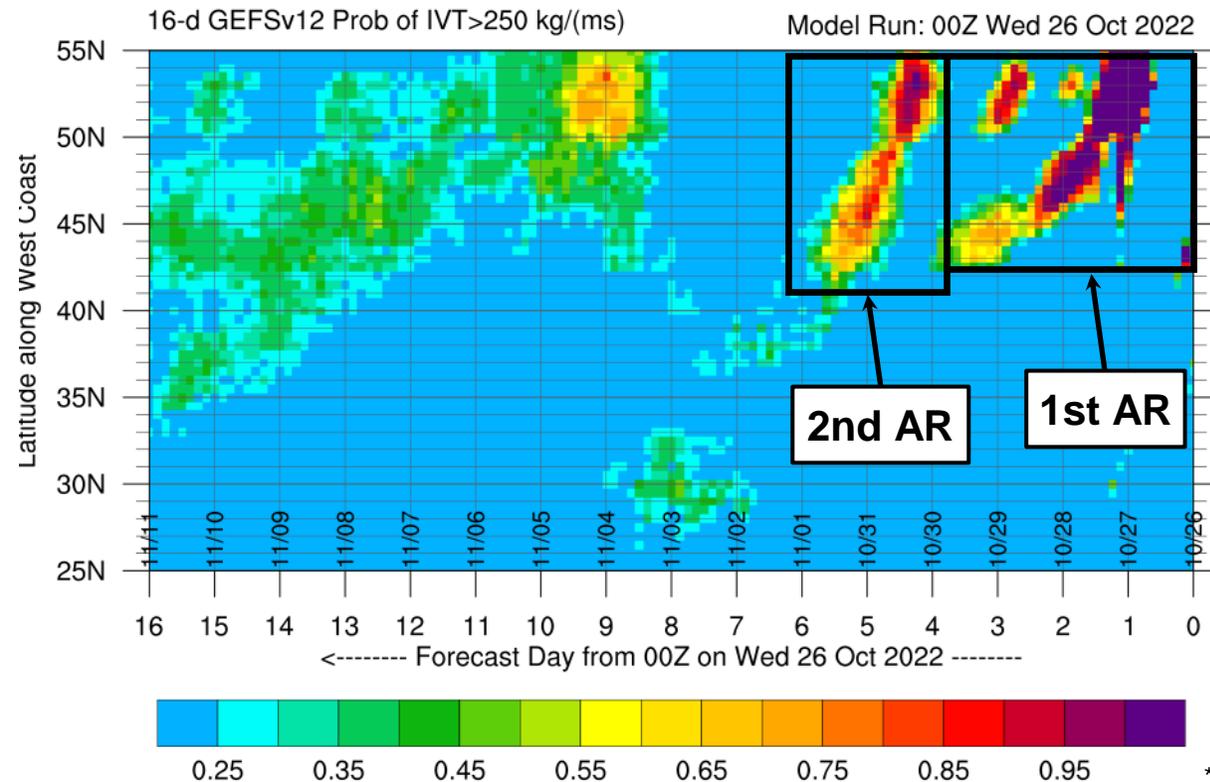
(C) ECMWF Valid: 2 AM PT 31 Oct (F-129)



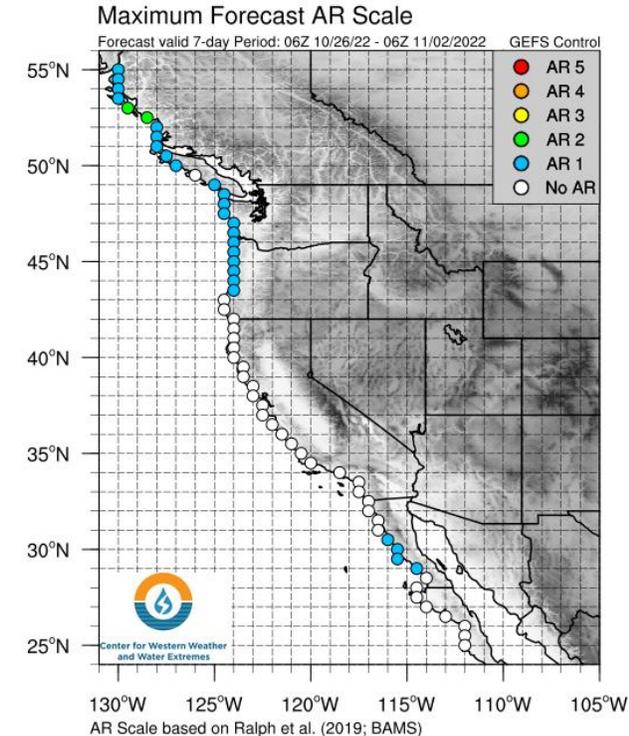
- The first AR is forecast to move south along the British Columbia coast and make landfall over Washington on 27 Oct (Figure A)
- Coastal locations of Washington and Oregon are expecting weak AR conditions ($\text{IVT} < 500 \text{ kg m}^{-1} \text{s}^{-1}$) during the first AR (Figure A)
- There are large model-to-model differences in the evolution of the second AR (Figures B and C)
- The 00Z ECMWF is forecasting higher IVT values than the 00Z GFS ($\text{IVT up to } 800 \text{ kg m}^{-1} \text{s}^{-1}$) with much longer duration of AR conditions (Up to 36 hours)

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Probability of AR Conditions Along Coast (GEFS)



AR Scale

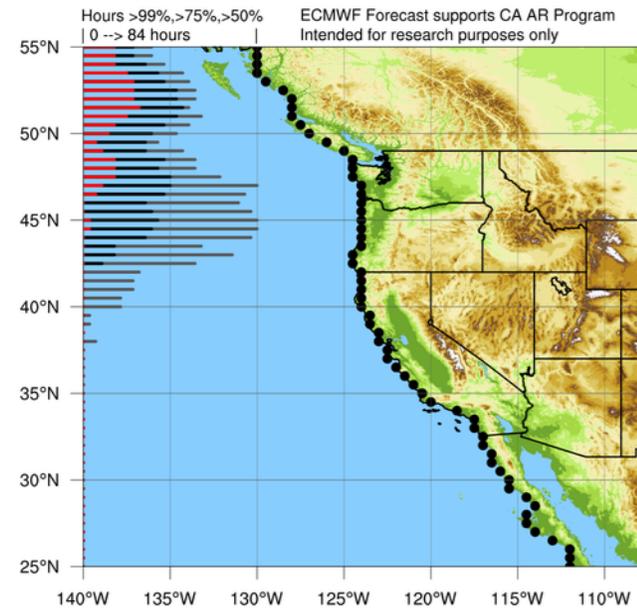
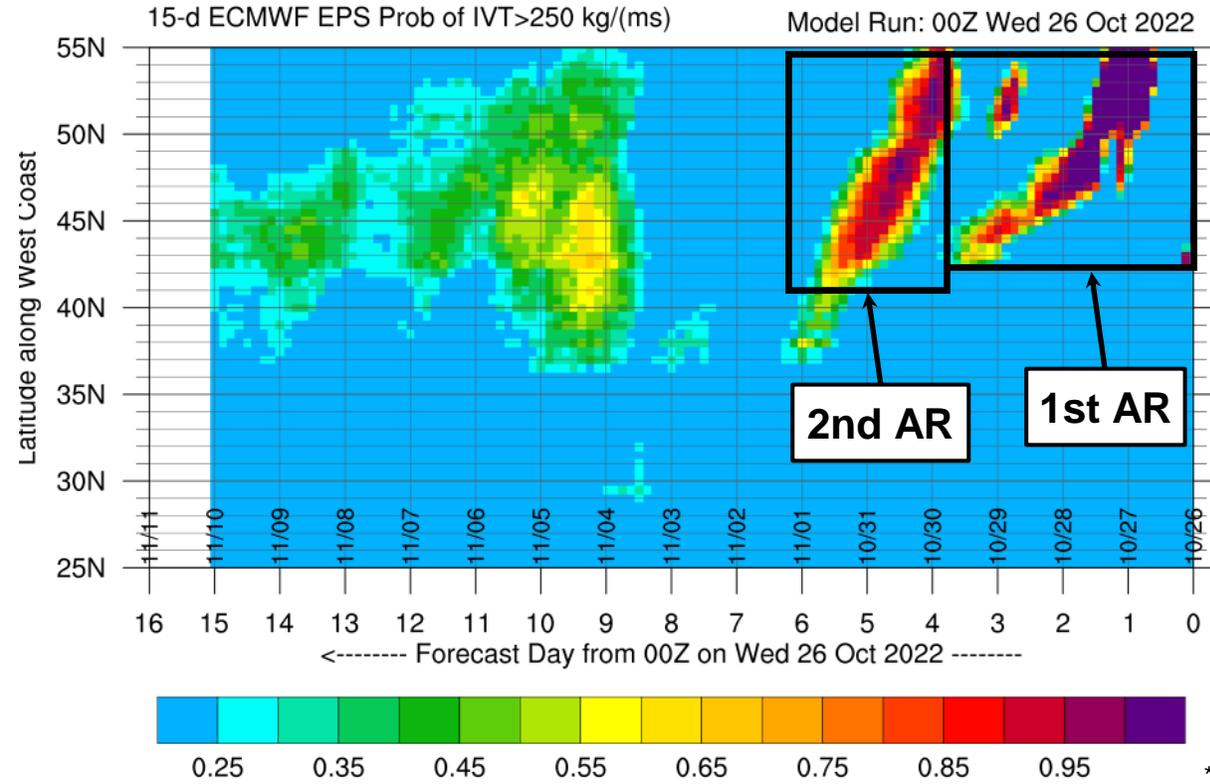


*GEFS = NCEP Global Ensemble Forecast System (United States)

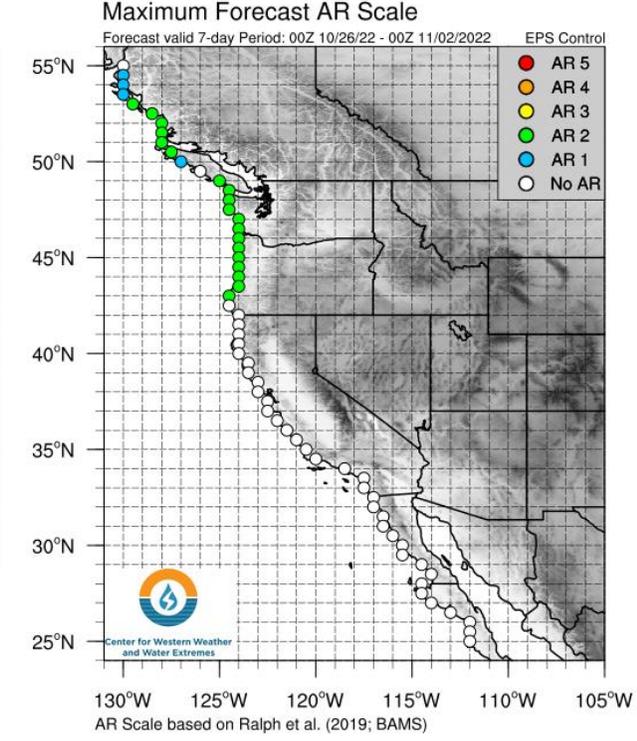
- The 00Z GEFS is showing very high confidence (> 95% probability) in a period of AR conditions (IVT > 250 m⁻¹ s⁻¹) over coastal Washington and northern coastal Oregon with the first AR. There is less confidence (~65-80% probability) in central coastal Oregon
- For the second AR, the 00Z GEFS control run is showing high confidence (> 80% probability) in a period of AR conditions in Washington and Oregon
- The 00Z GEFS control run is predicting AR 1 conditions for Washington and Oregon
- There is large uncertainty in the location and duration of AR conditions during the second AR

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Probability of AR Conditions Along Coast (ECMWF EPS)



AR Scale



*ECMWF EPS = **ECMWF** Ensemble Prediction System (Europe)

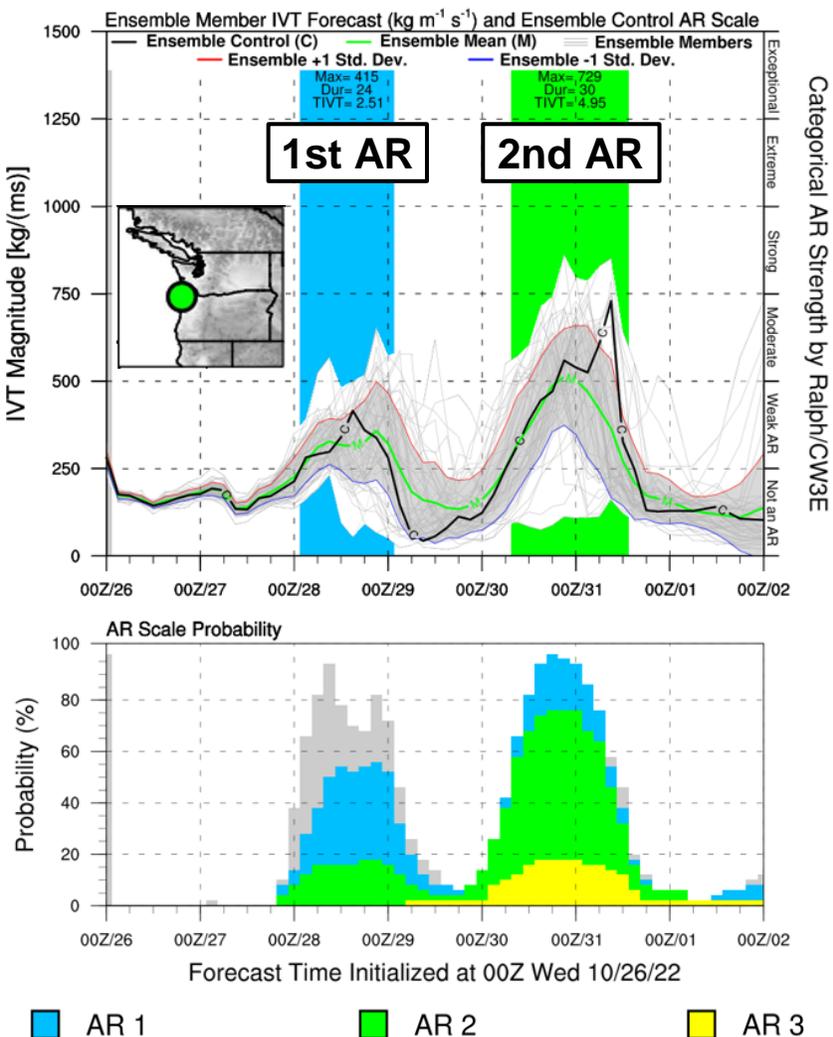
- The 00Z ECMWF EPS is showing very high confidence (> 95% probability) in a period of AR conditions over coastal Washington in association with the first AR. The ECMWF EPS is showing higher confidence in coastal central Oregon than the GEFS
- For the second AR, The 00Z ECMWF EPS control run is showing high confidence (80-90% probability) in a period of AR conditions in Washington and Oregon with an earlier onset and longer duration than the GEFS
- The 00Z ECMWF EPS control run is predicting AR 2 conditions for Washington and Oregon
- The second AR reaches the Pacific Northwest earlier in the ECMWF EPS and is forecast to persist for a longer duration



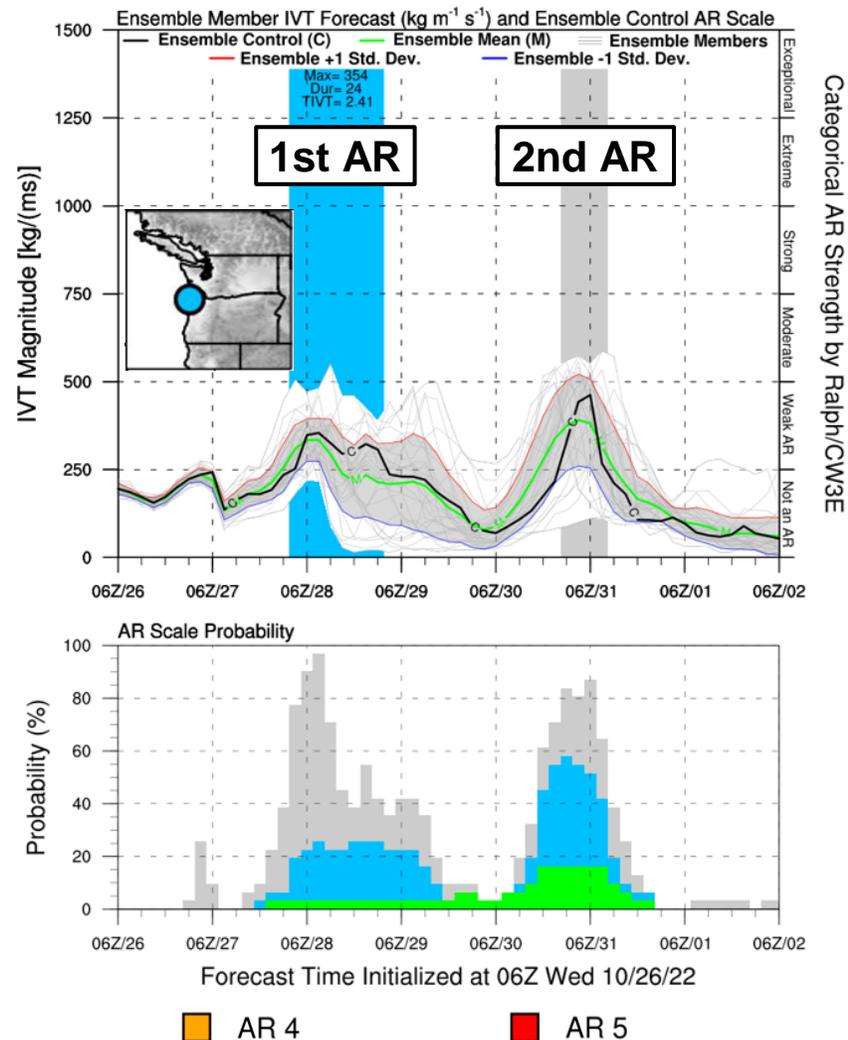
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AR Scale and IVT Forecasts: GEFS vs. ECMWF EPS

ECMWF Ensemble Initialized: 00Z Wed 10/26/22



GFS Ensemble Initialized: 06Z Wed 10/26/22

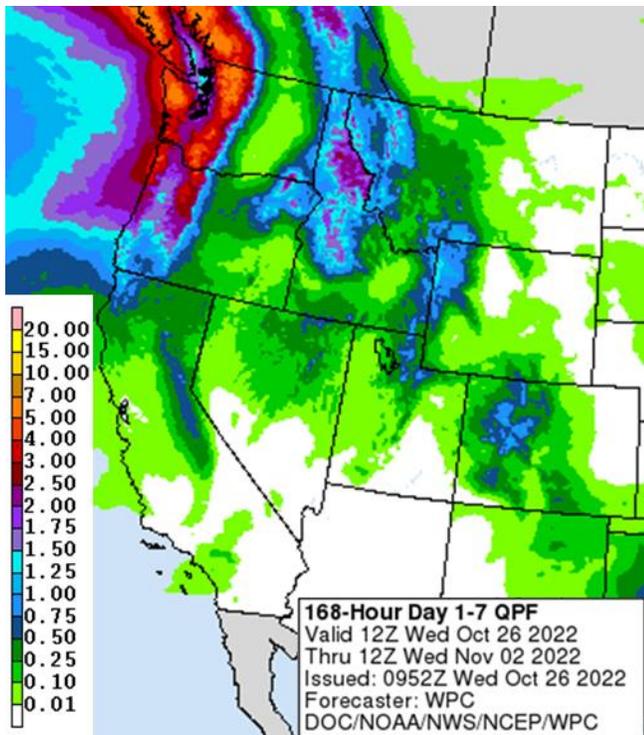


- The 00Z GEFS and ECMWF EPS control runs are both forecasting AR 1 conditions (based on the Ralph et al. 2019 AR Scale) at 45.5°N, 124°W (northwestern OR) in association with the first AR
- The 00Z ECMWF EPS control is forecasting AR 2 conditions at the same location while the GEFS control is showing weak AR conditions
- The 00Z ECMWF EPS control is forecasting higher IVT values for the second AR
- Both ensemble systems show considerable uncertainty in both IVT magnitude and duration at this location for both ARs

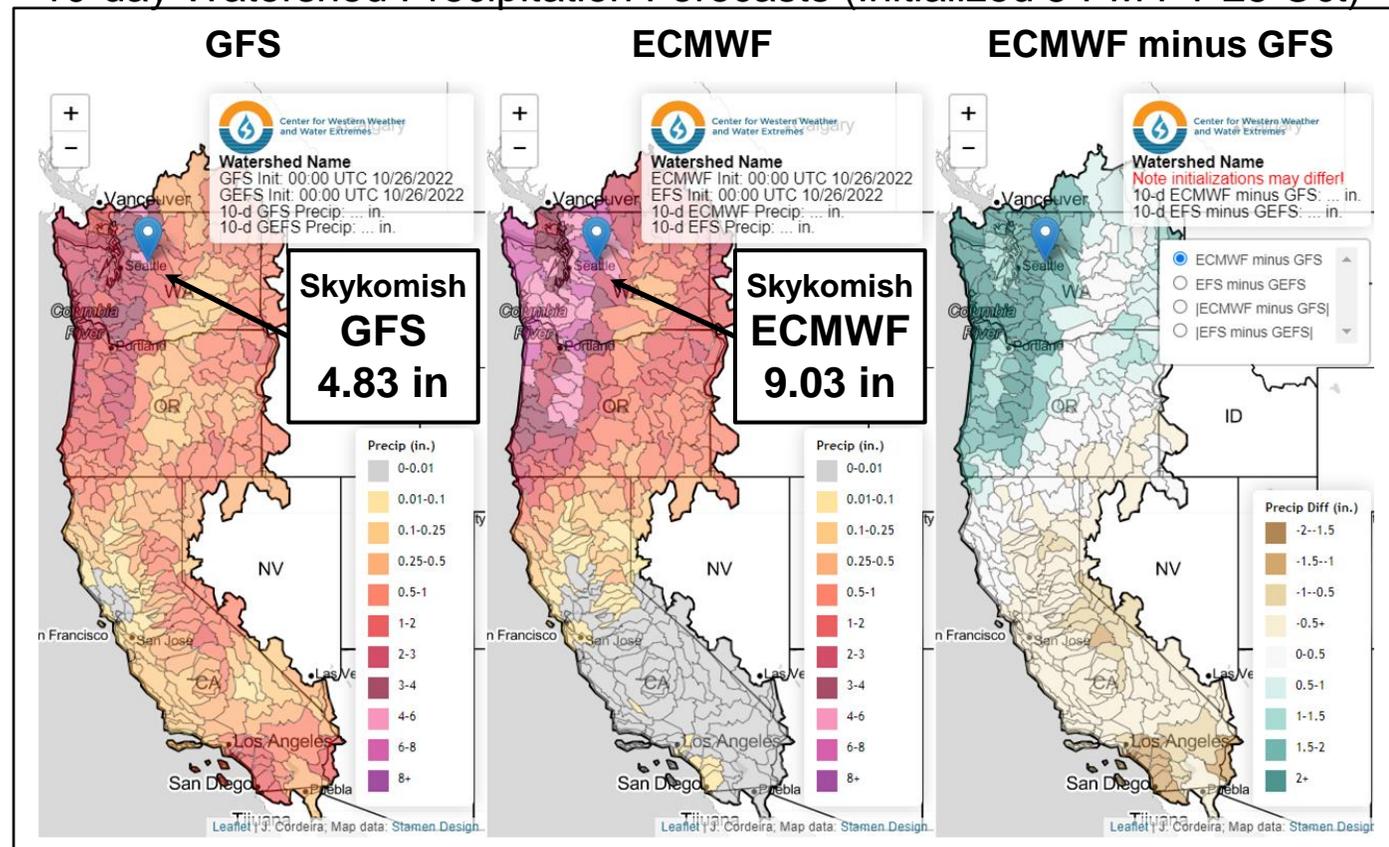
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Precipitation Forecasts

WPC 7-day QPF: Valid 5 AM PT 26 Oct to 02 Nov



10-day Watershed Precipitation Forecasts (Initialized 5 PM PT 25 Oct)



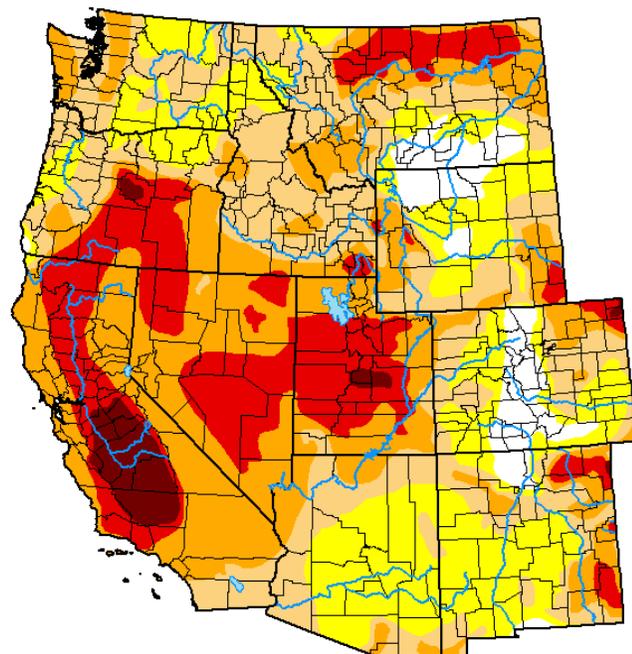
- The NWS Weather Prediction Center (WPC) is forecasting 3–6 inches of precipitation over the Cascades and coastal ranges of Washington and Oregon during the next 7 days with the highest amounts expected in the northern Cascades and Olympic Peninsula
- There is model disagreement in 10-day forecast precipitation in the Cascades, with the ECMWF (GFS) forecasting higher (lower) amounts
- The 00Z ECMWF is forecasting 9.03 inches of mean areal precipitation in the Skykomish Watershed over the next 10 days, while the 00Z GFS is forecasting 4.83 inches over the same watershed. 10-day totals hereon include precipitation from subsequent ARs

Drought & Soil Moisture

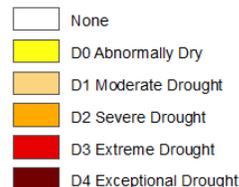
U.S. Drought Monitor
West

October 18, 2022
(Released Thursday, Oct. 20, 2022)
Valid 8 a.m. EDT

NASA SPoRT-LIS 0–100 cm Soil Moisture Percentile



Intensity:



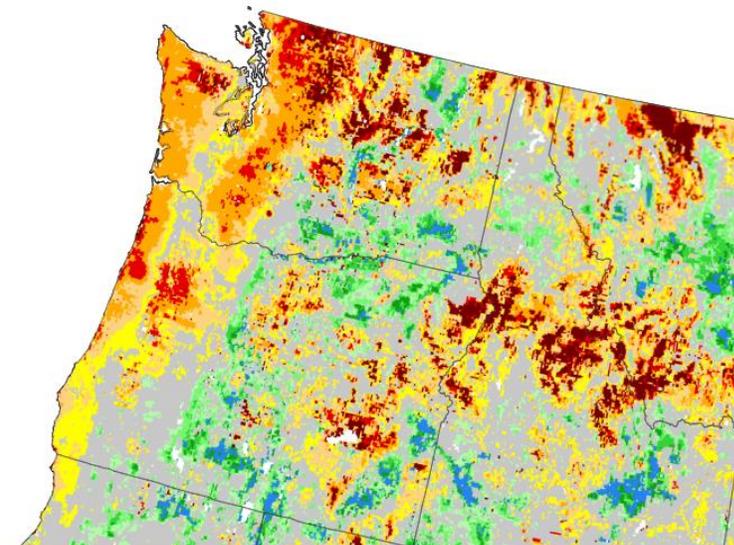
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Adam Hartman
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu



0–100 cm Soil Moisture Percentile



Source(s): NASA
Updates Daily - 10/26/22

[Drought.gov](https://drought.gov)

- These ARs will bring precipitation to regions currently experiencing D2 severe drought conditions in the Cascades and coastal Washington and Oregon
- NASA SPoRT-LIS 0–100 cm soil moisture percentiles are below the 10th percentile of climatology over the Coast Ranges and northern Cascades