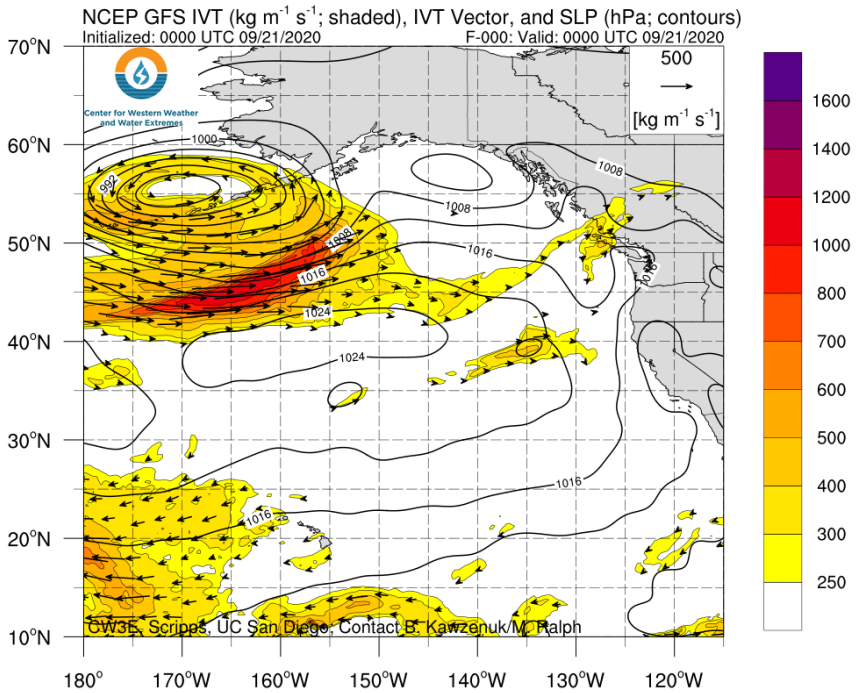
CW3E AR Outlook

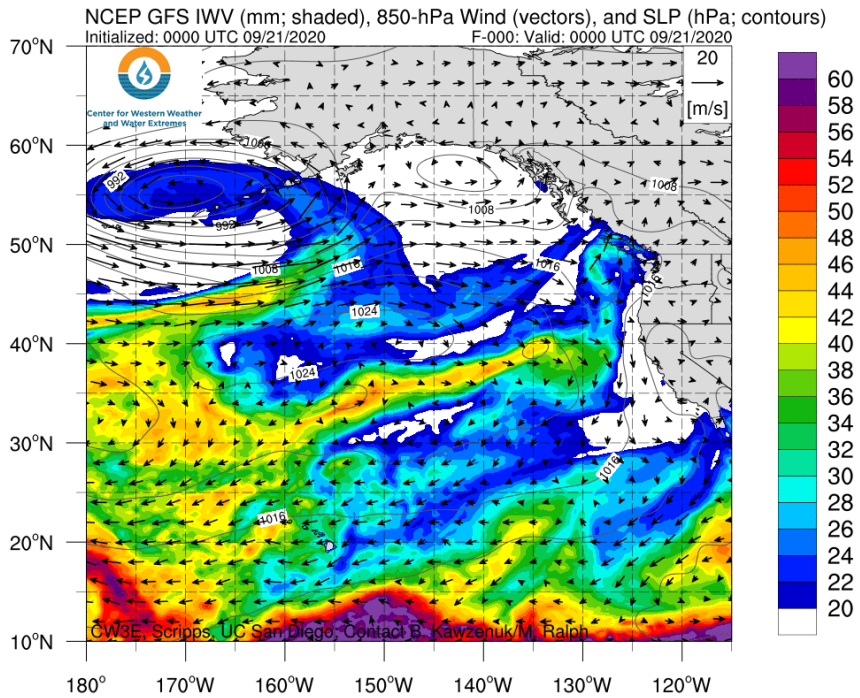
For California DWR's AR Program

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

Update on potentially strong atmospheric river forecast to impact the Pacific Northwest

- Forecast agreement between models and ensemble members has increased in the magnitude, duration, and location of AR conditions in association with the potentially strong AR forecast to make landfall this week
- Forecasts of the strongest IVT magnitudes have shifted further south where **AR 5** conditions are now forecast to impact Northern Oregon
- Although AR 5s are often hazardous later in the season, given early season conditions (dry soils, low streamflow) this AR is unlikely to produce hazardous impacts
- Ensemble probabilities of strong AR conditions (IVT magnitudes >750 kg m^{-1} s^{-1}) have also increased over portions of the PNW
- Model forecasts of precipitation accumulations have increased for portions of the Cascade, Olympic, and Coastal Mountains, though there is still some model-to-model disagreement in exact accumulation





AR Outlook: 21 Sep 2020

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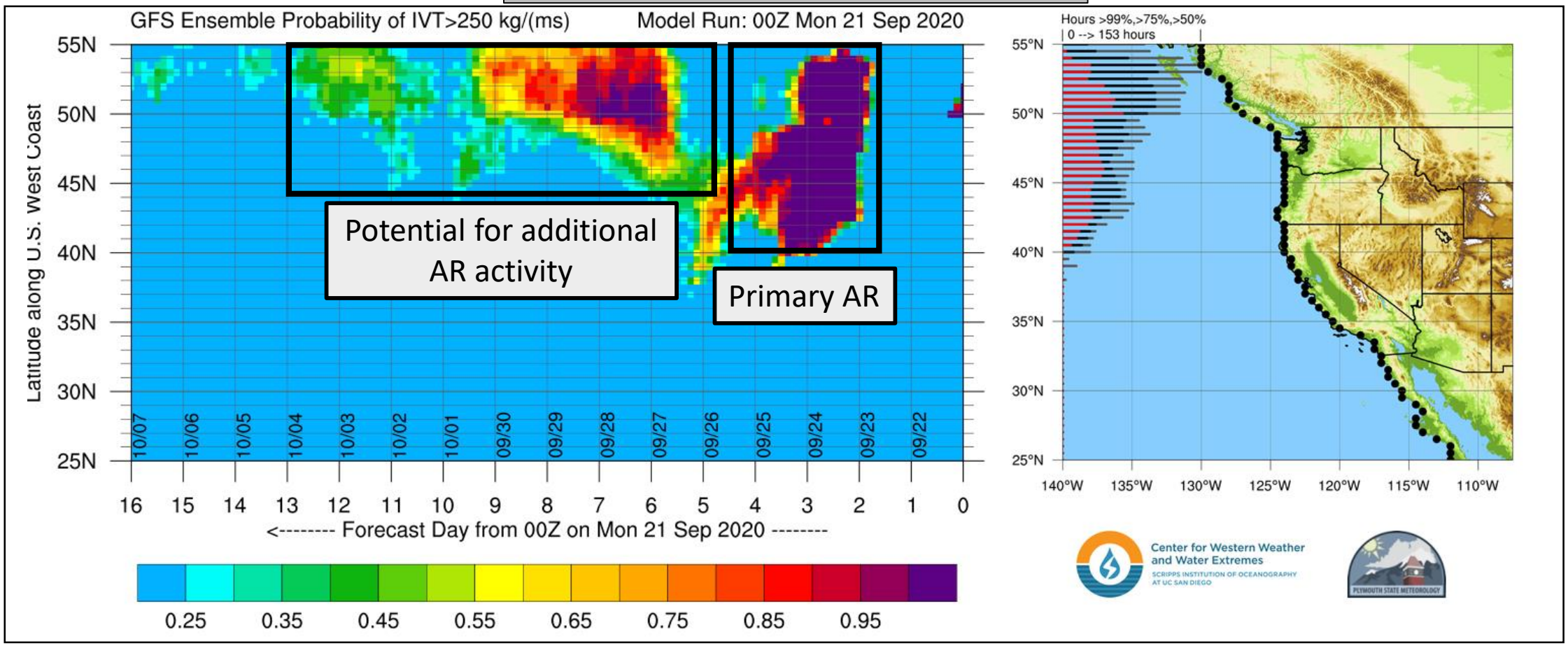
Probability of AR Conditions Along Coast



- **GFS Ensemble probability of at least weak AR conditions (IVT magnitude >250 kg m^{-1} s^{-1}) has increased to ~100% for coastal locations spanning from British Columbia to Northern California (~40°N)**
- **The GEFS is also illustrating a high probability of AR condition durations of >24 hours across a large portion of the Pacific Northwest**
- **There is an additional period of higher probabilities of AR activity between days 5 and 9, but uncertainty is currently higher**

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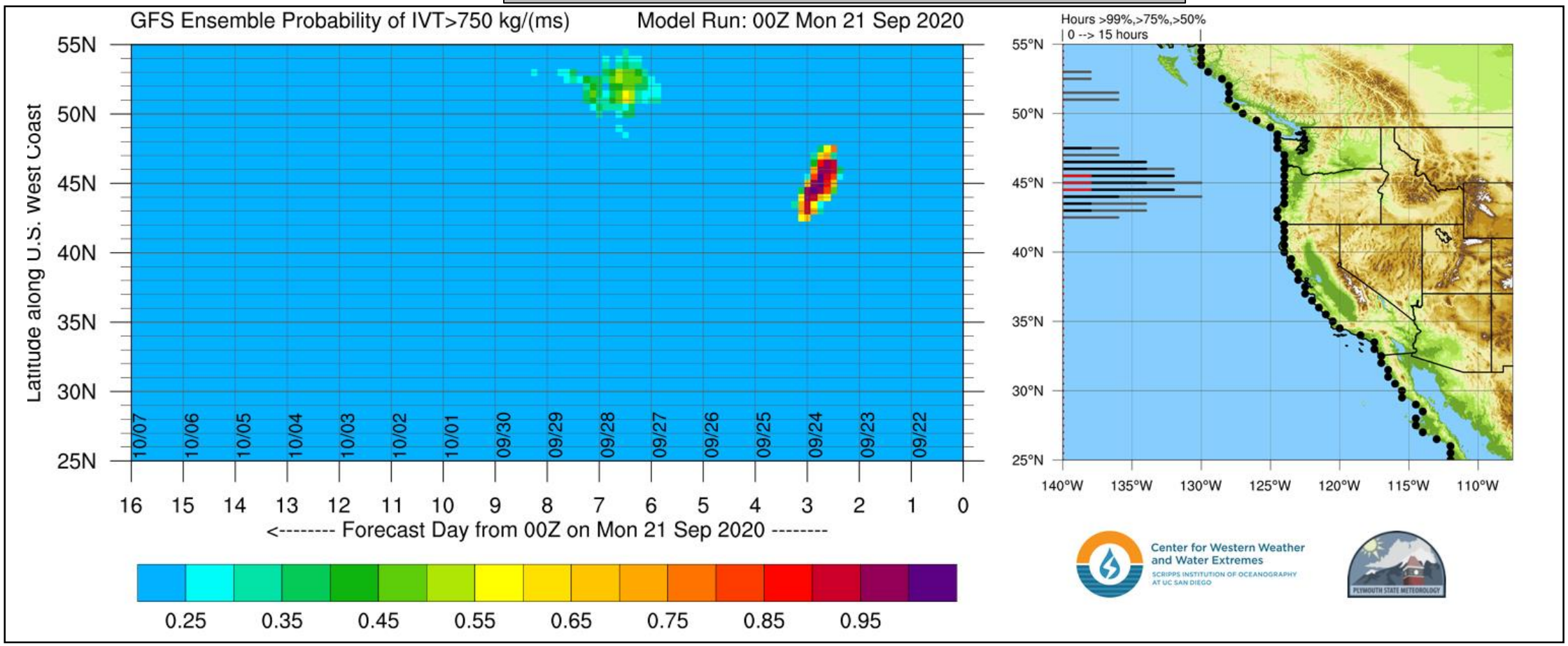
Probability of Strong AR Conditions Along Coast



- **The GEFS is currently forecasting a high probability (>85% of ensembles) of strong AR conditions (IVT >750 kg m^{-1} s^{-1}) for a brief period (6–12 hours) over Northern Oregon and Southern Washington**
- **The GEFS is also highlighting the potential (25–60%) of strong AR conditions within the next period of AR activity (Days 6–7)**

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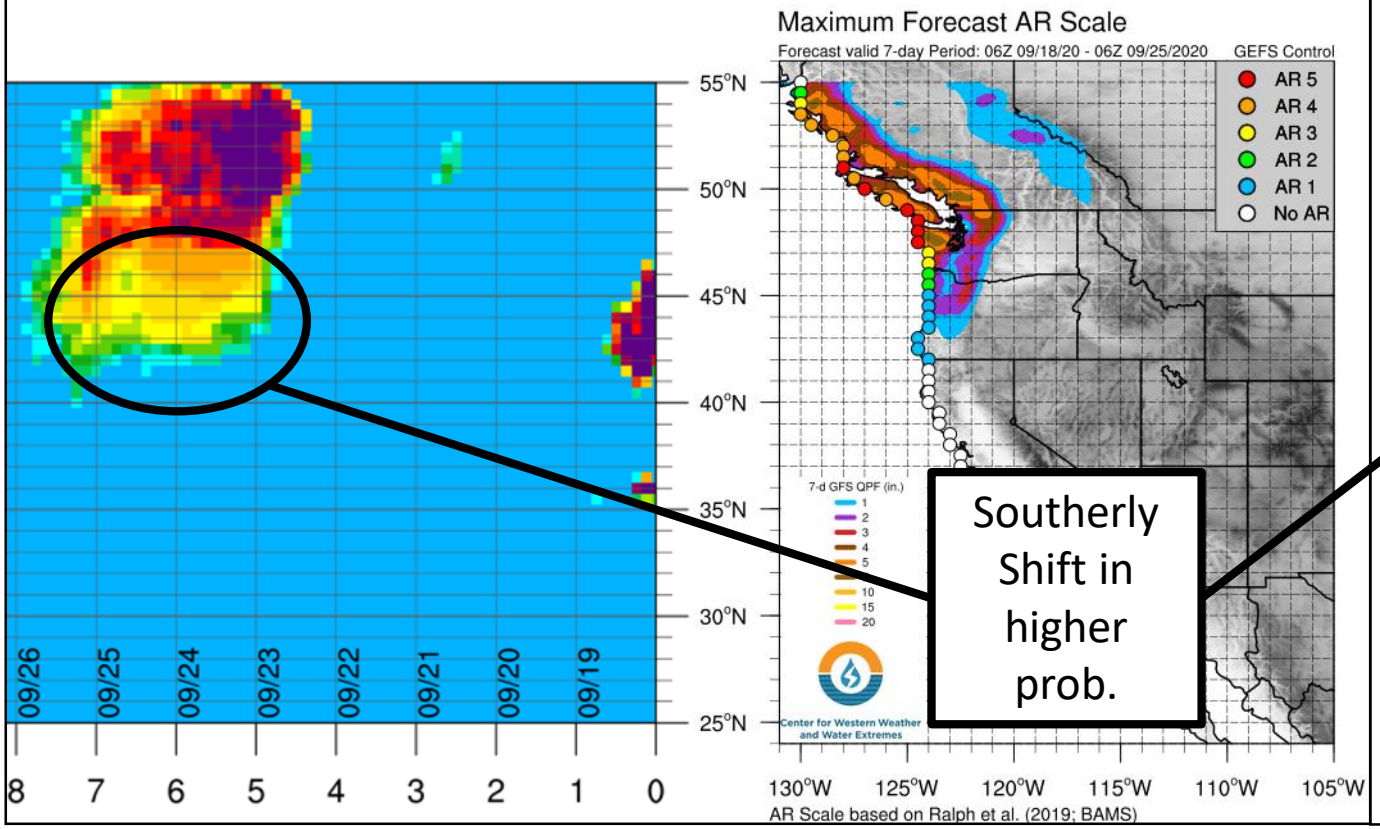
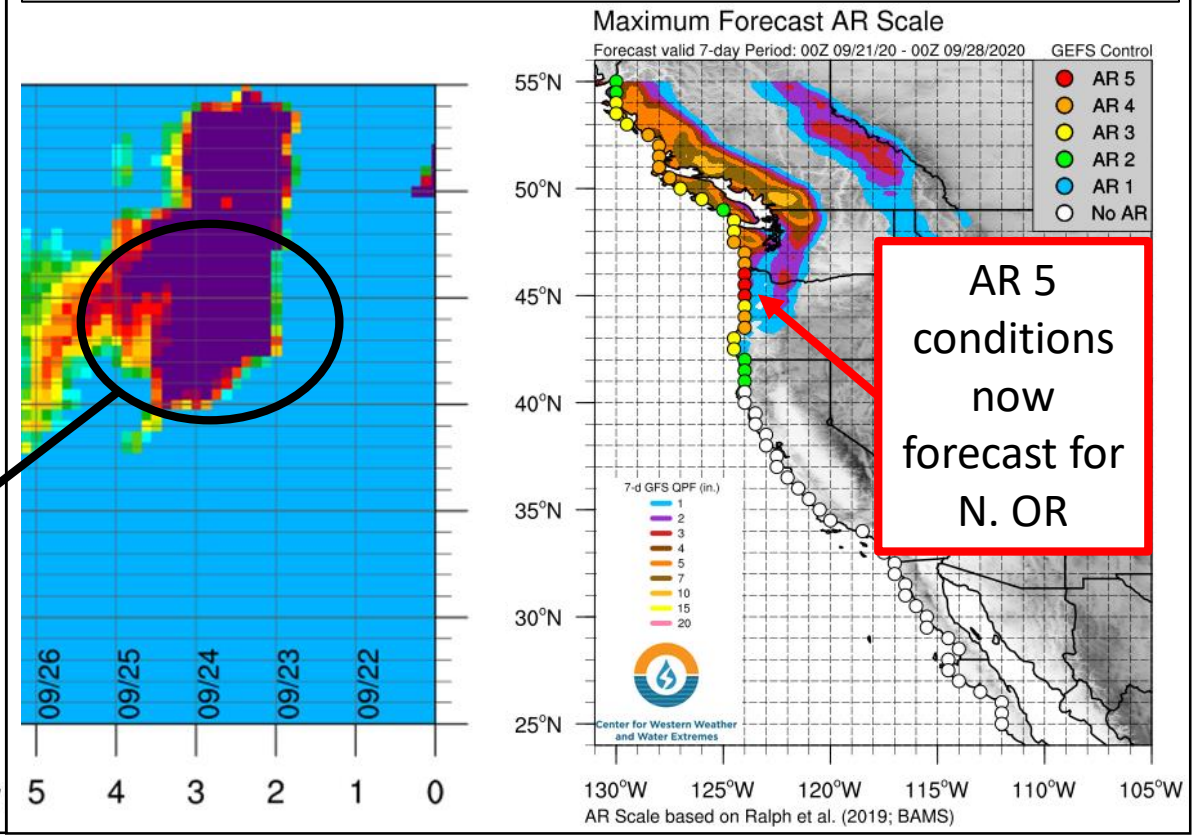
AR Landfall Tool & Control AR Scale: Initialized 06Z 18 Sep.



Southerly Shift in higher prob.

AR Landfall Tool & Control AR Scale: Initialized 00Z 21 Sep.



AR 5 conditions now forecast for N. OR

- **A large southerly shift in high probabilities of AR conditions has occurred since the last outlook (issued 18 September)**
  - **Higher probabilities are now being forecast by the GEFS over Oregon and Northern California**
- **The forecast of AR 5 conditions by the GEFS Control Member has also shifted southward and is now forecast to impact Northern Oregon**

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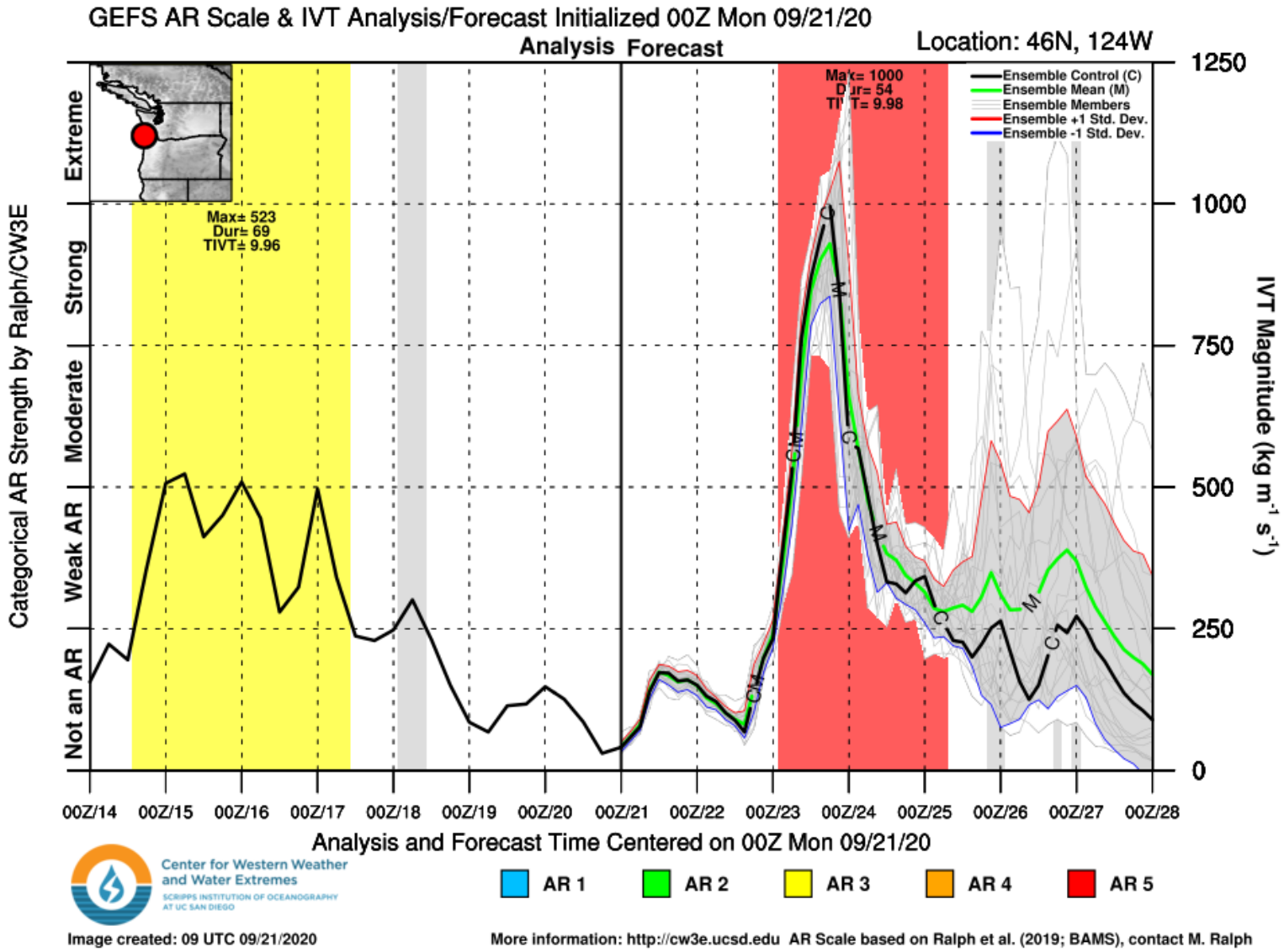
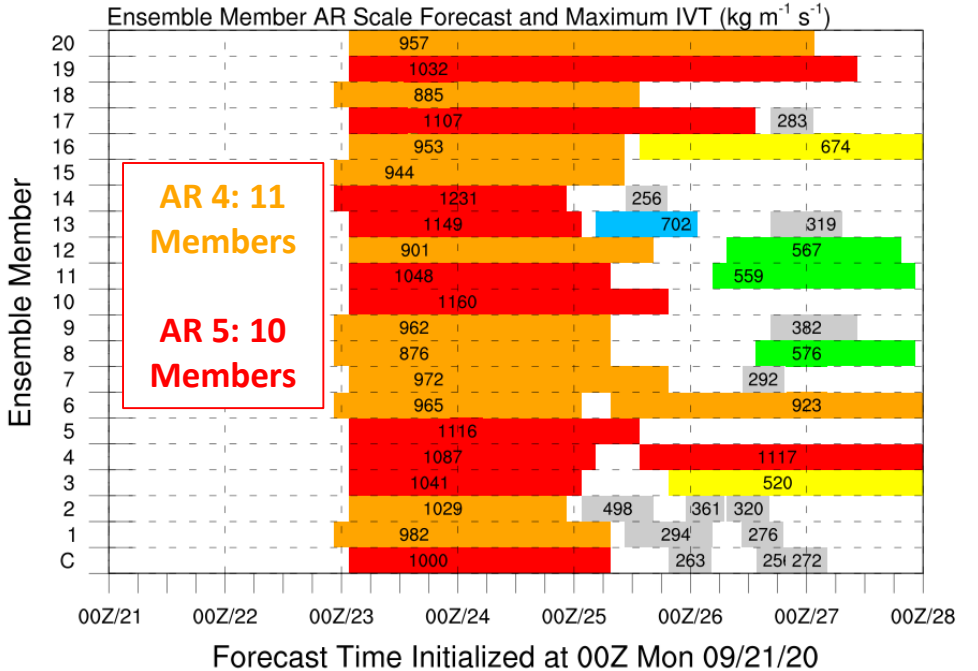
GEFS AR Scale & IVT Forecasts



- **00Z GEFS control run is currently predicting an AR5 (max IVT > 1000 m^{-1} s^{-1}; AR duration > 54 hours) over Northern OR based on the Ralph et al. (2019) AR Scale**
- **While ensemble spread has decreased since the last outlook (18 Sep) there is still some slight uncertainty in the current forecast**
- **The individual GEFS members are predicting AR 4 to AR 5 conditions (55% and 45% of ensemble members respectively)**



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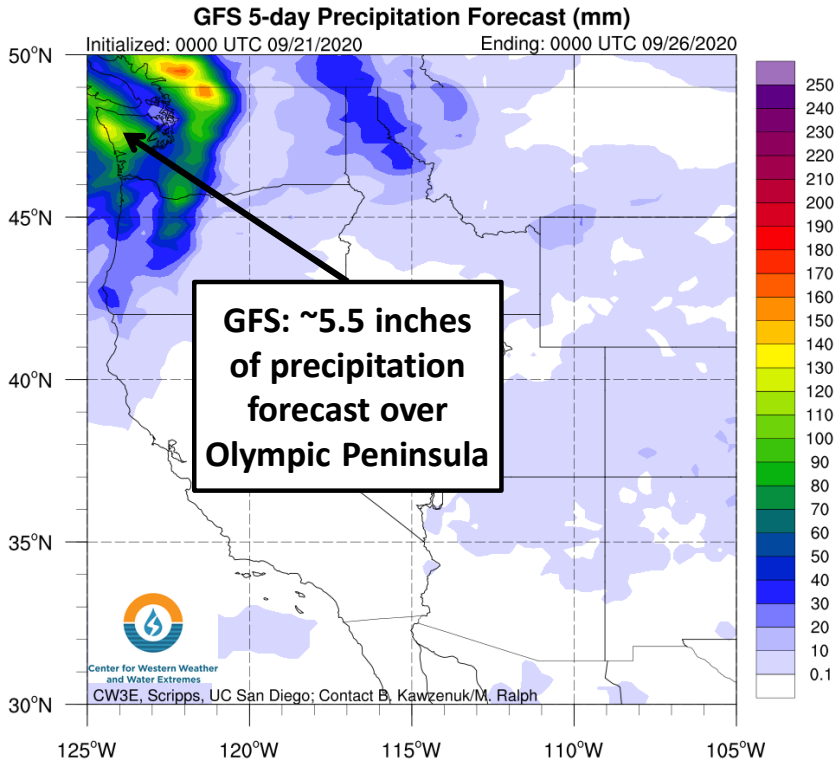
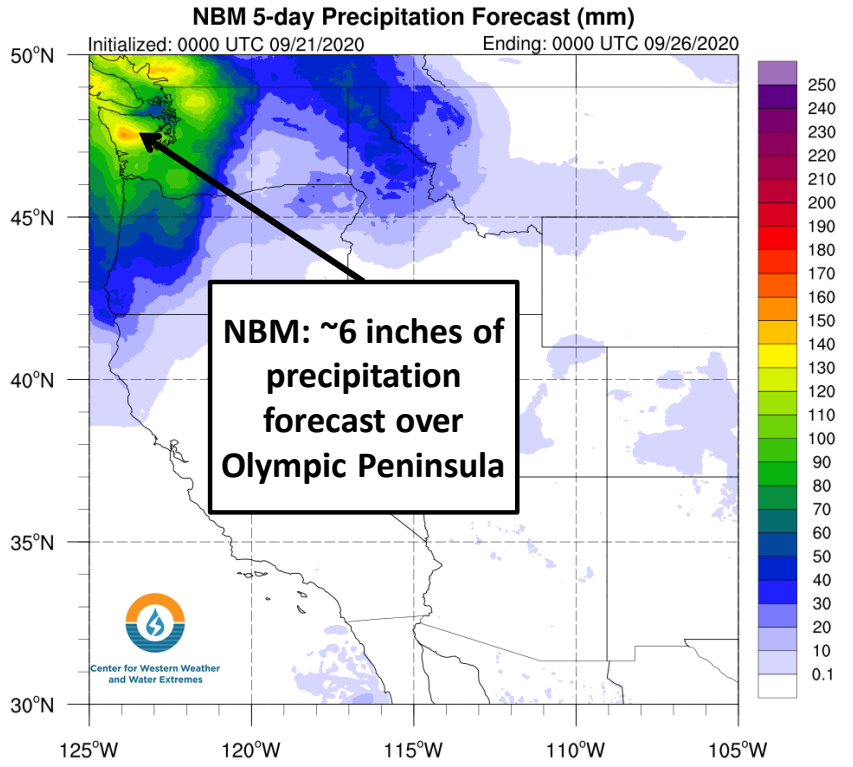
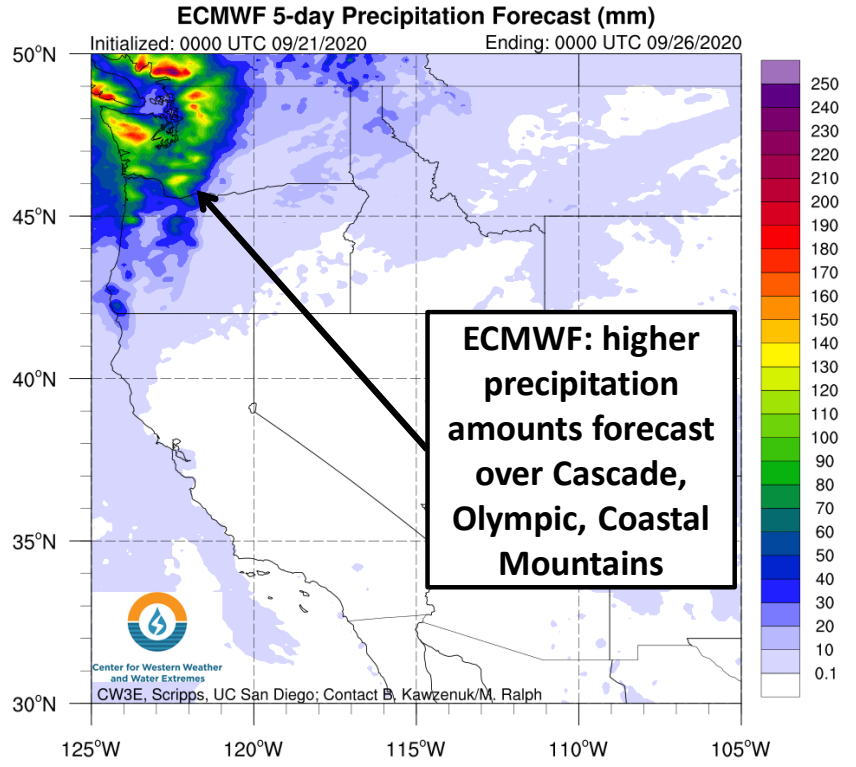
Model 5-day QPF: Valid 0000 UTC 21–26 Sep







*GFS = NCEP Global Forecast System (United States)
*NBM = National Blend of Models (Blend of NWS and non-NWS models)
*ECMWF = European Center for Medium-Range Weather Forecasts (Europe)

- **GFS, NBM, and ECMWF are all forecasting at least 2–5 inches of precipitation across western Washington and Oregon during the next 7 days, with the heaviest precipitation expected over the Olympic Peninsula**
- **The GFS is currently forecasting lower precipitation amounts over the Olympic Peninsula than the NBM and ECMWF**
- **The ECMWF is currently forecasting higher precipitation amounts over the Cascades than the GFS and NBM**