

Landfalling AR to impact the Pacific Northwest this weekend into early next week

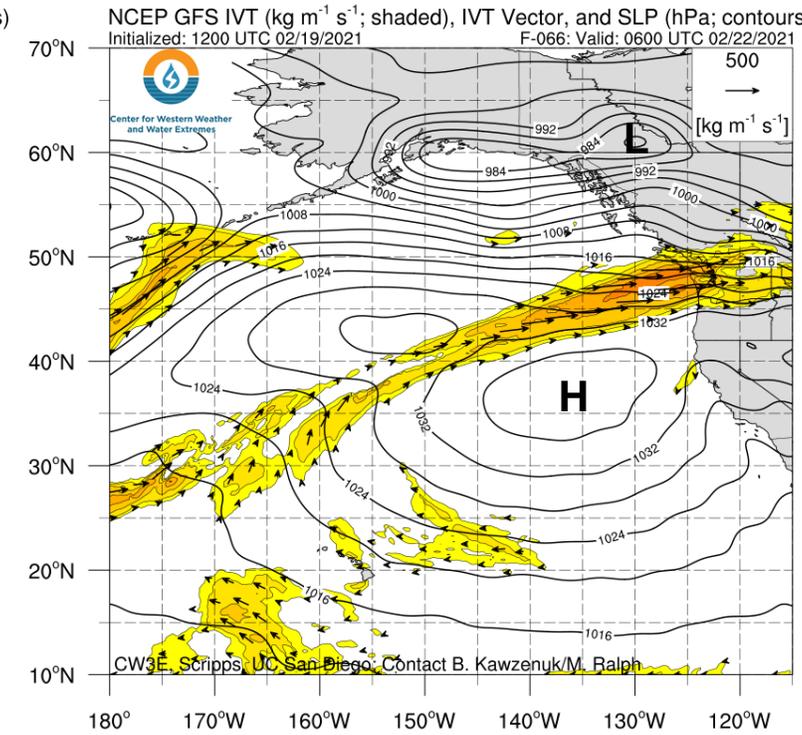
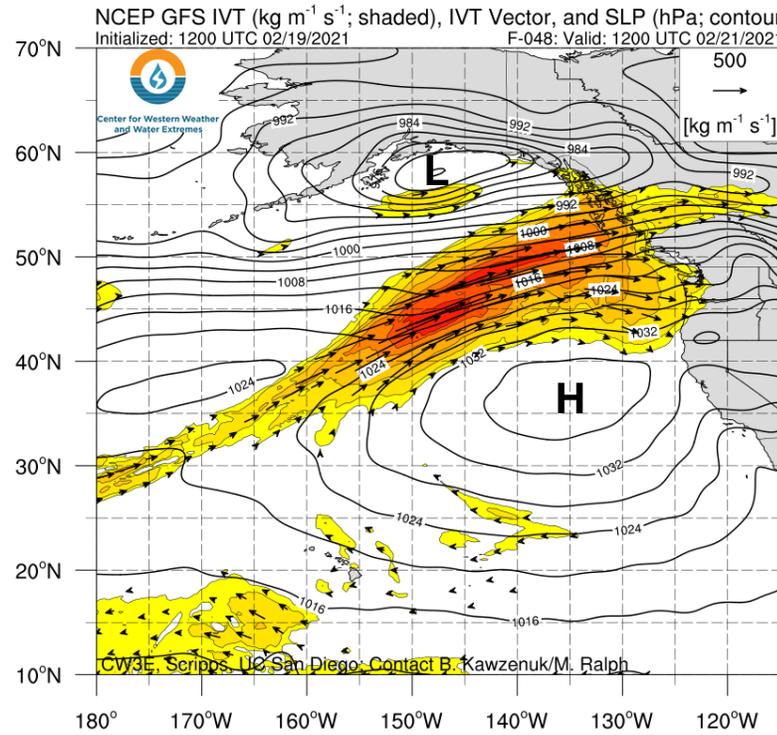
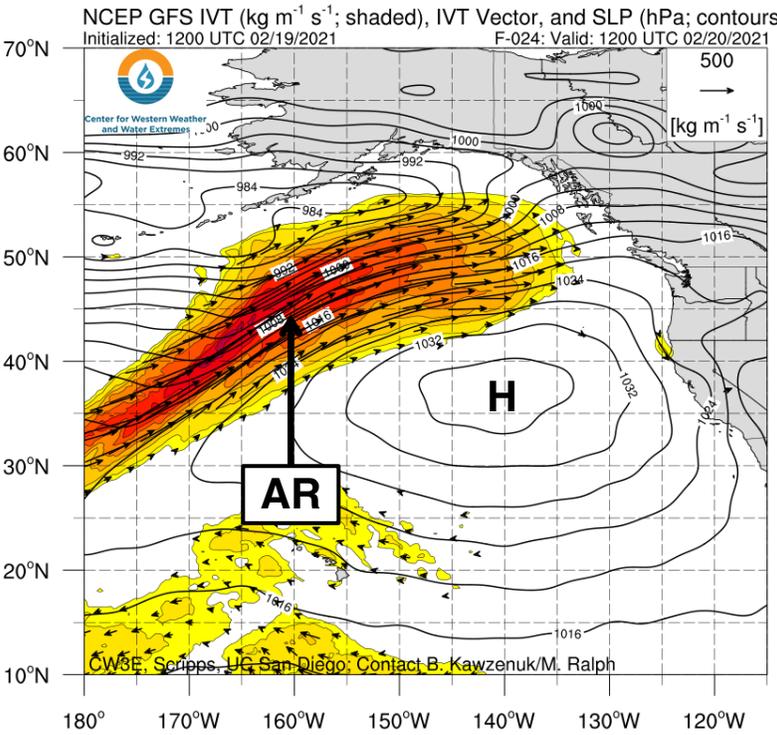
- An AR is forecast to make landfall across Washington and northern Oregon early Sunday morning
- AR 2 conditions (based on the Ralph et al. 2019 AR Scale) are possible in coastal Washington and northern coastal Oregon
- More than 5 inches of total precipitation (locally > 7 inches) are forecast in the Olympic Mountains and North Cascades during the next 5 days
- Rising freezing levels in association with this AR will likely result in rain-on-snow in areas that have recently received significant snowfall
- The combination of near-saturated soil conditions, heavy rain, and melting snow may lead to flooding at lower elevations in western Washington

GFS IVT & SLP Forecasts

(A) Valid: 1200 UTC 20 Feb (F-24)

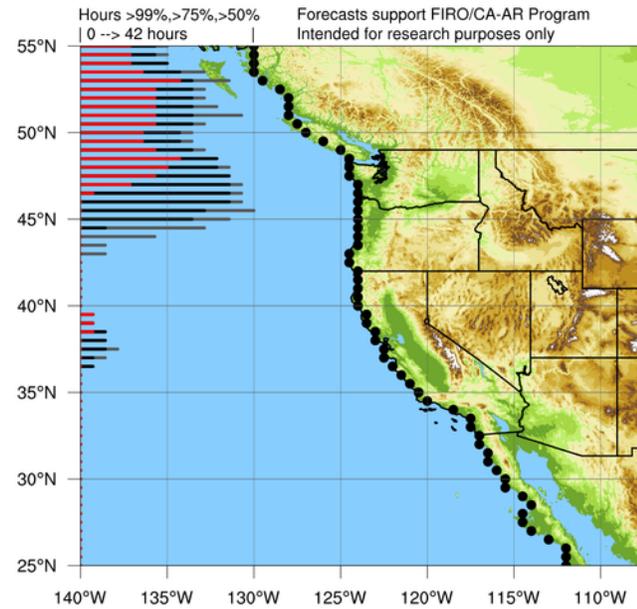
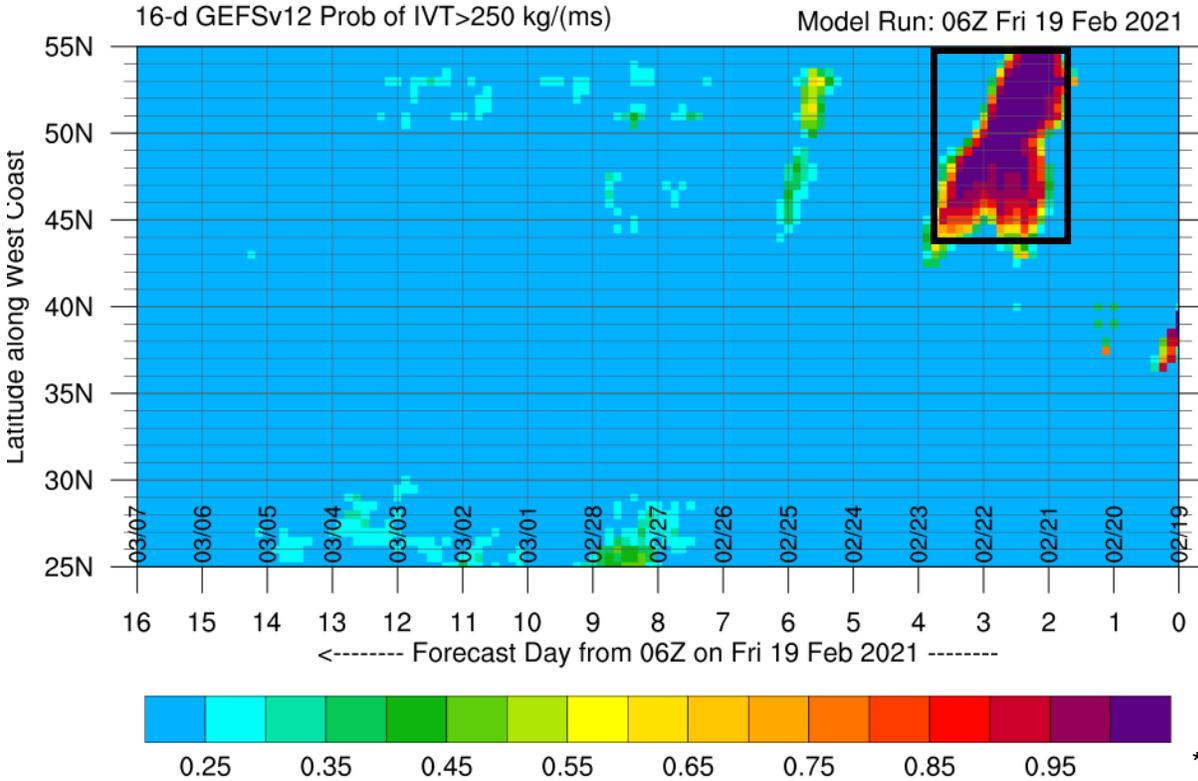
(B) Valid: 1200 UTC 21 Feb (F-48)

(C) Valid: 0600 UTC 22 Feb (F-66)

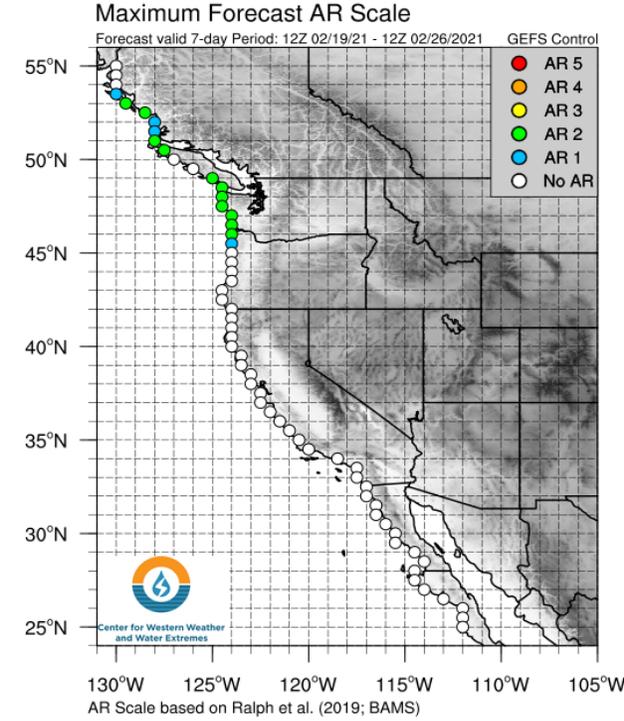


- This AR is currently located near the International Date Line and will move northeastward across the Northeast Pacific Ocean during the next 24–48 hours (Figures A and B)
- The AR is forecast to make landfall over the Pacific Northwest around 12Z 21 Feb on the northern periphery of a surface anticyclone (Figure B)
- The strongest moisture transport over land is forecast to occur around 06–12Z as the core of the AR moves inland (Figure C)
- The orientation of the IVT vectors suggests that upslope moisture flux will lead to orographic enhancement of precipitation in western WA

Probability of AR Conditions Along Coast



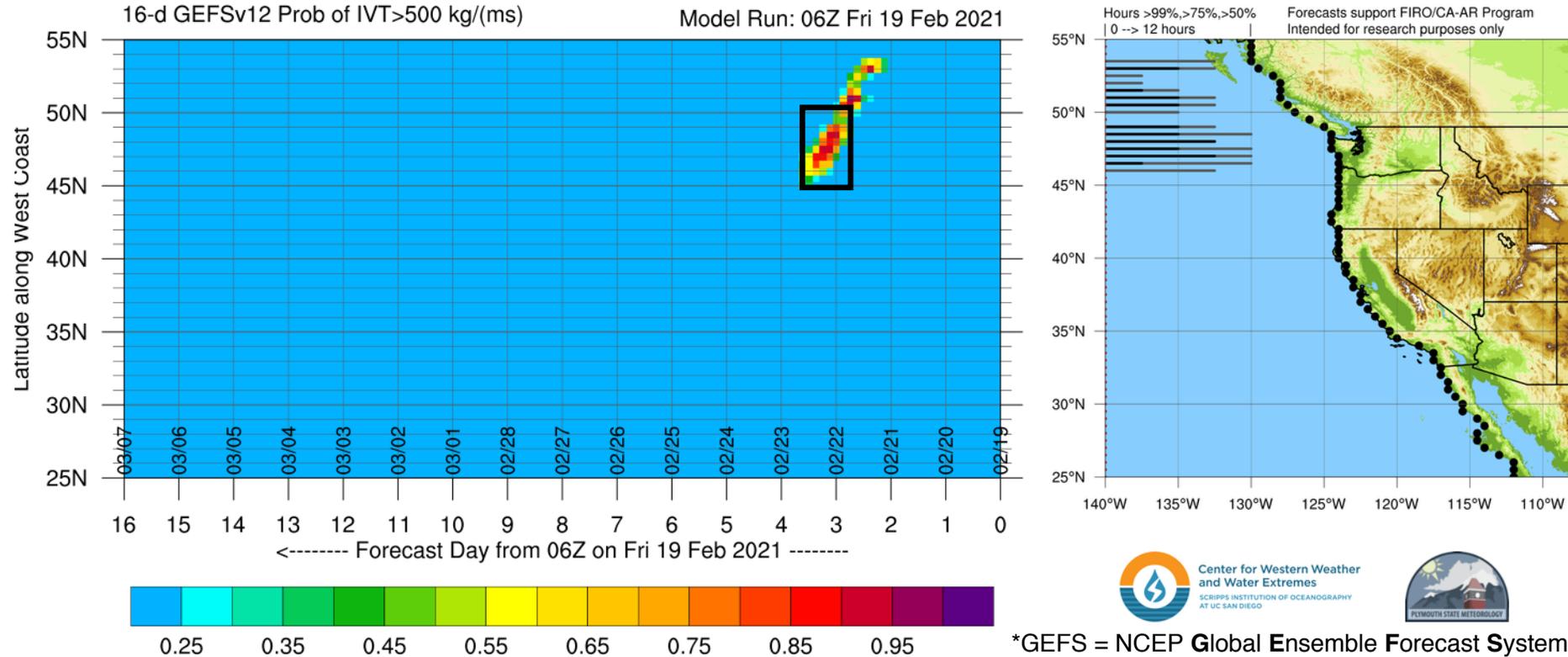
AR Scale



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

- The 06Z GEFS is showing very high confidence (> 90% probability) in AR conditions (IVT > 250 kg m⁻¹ s⁻¹) over Vancouver Island, coastal Washington, and northern coastal Oregon between 12Z 21 Feb and 00Z 22 Feb
- The combination of AR duration (> 24 hours) and maximum IVT magnitude (> 500 kg m⁻¹ s⁻¹) is forecast to produce AR 2 conditions in these areas (based on the Ralph et al. 2019 AR Scale)
- A significant regime change is possible after this event, with few GEFS members predicting landfalling AR activity along the U.S. West Coast over the remainder of the next two weeks

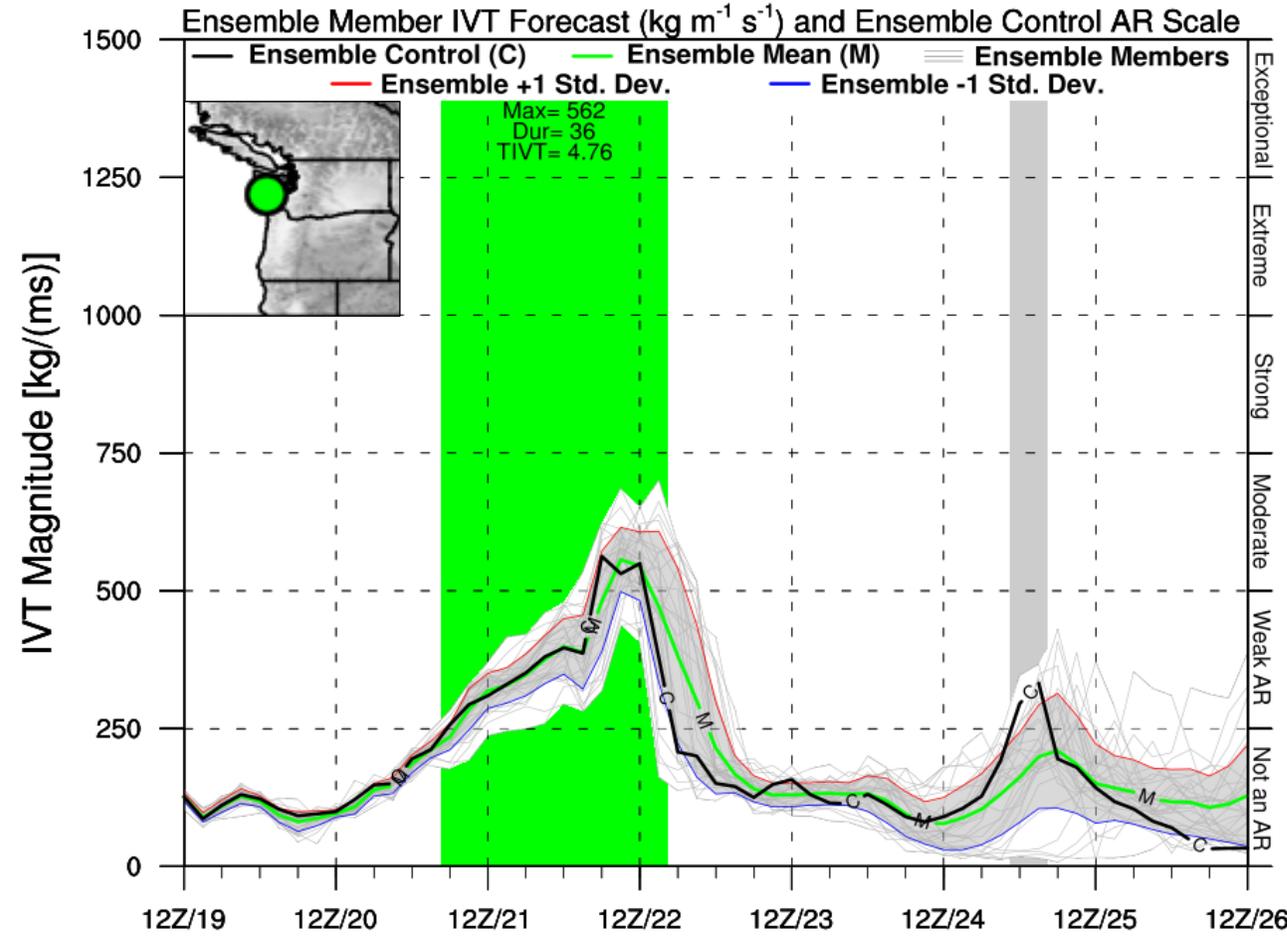
Probability of Moderate AR Conditions Along Coast



- The 06Z GEFS is also showing high confidence (> 80% probability) in a brief period of moderate AR conditions (IVT > 500 kg m⁻¹ s⁻¹) over coastal Washington around 06–12Z 22 Feb
- The highest probability of moderate AR conditions coincides with the arrival of the core of the AR

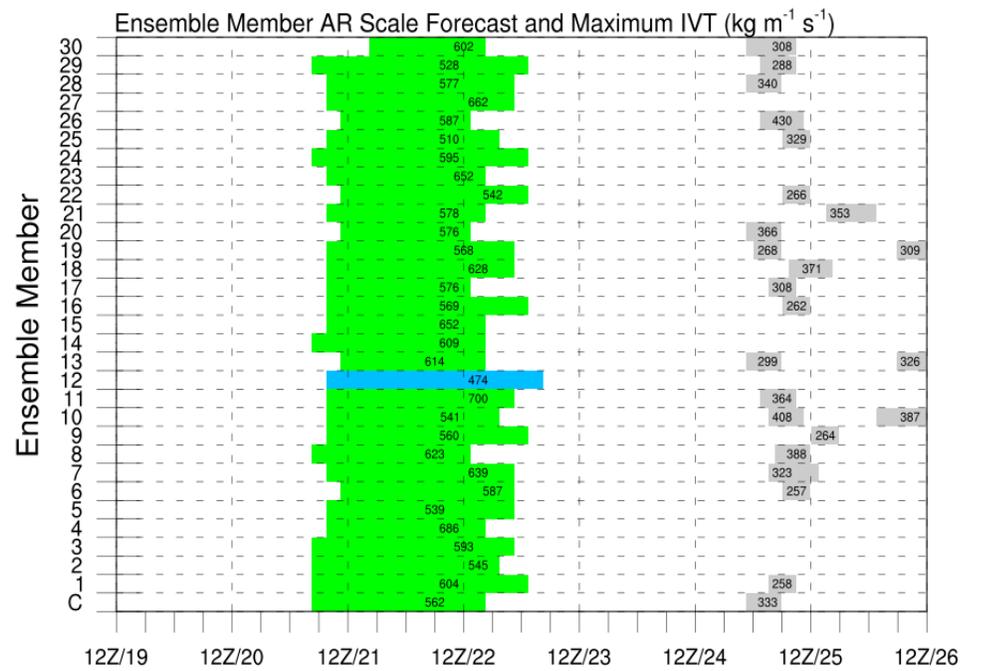
GEFS AR Scale and IVT Forecasts

GFS Ensemble Initialized: 12Z Fri 02/19/21



Categorical AR Strength by Ralph/CW3E

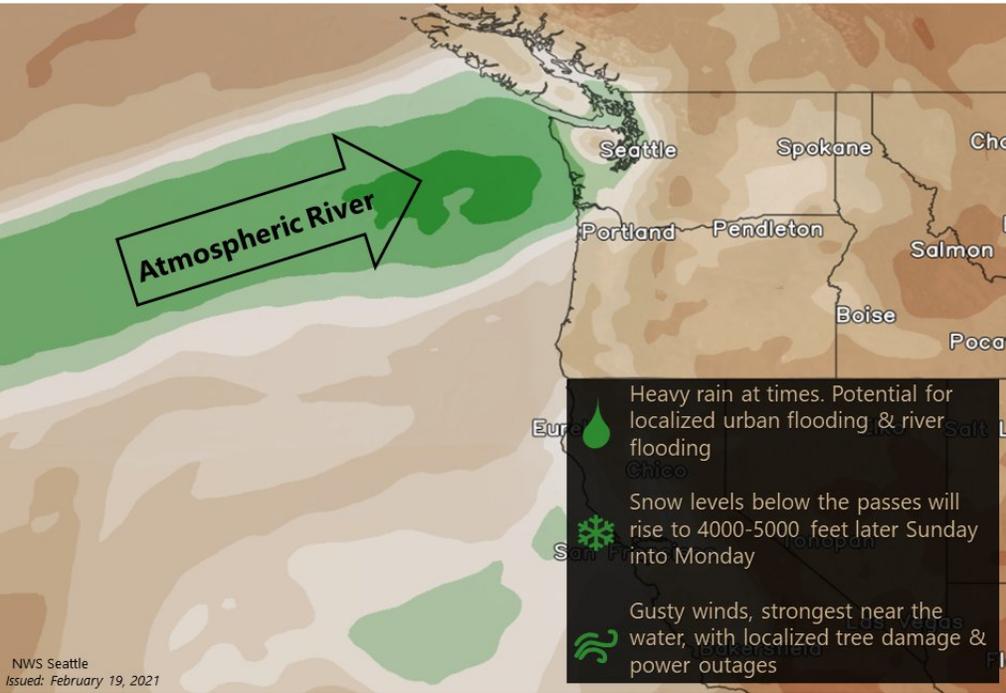
- The 12Z GEFS control run is forecasting AR 2 conditions at 47°N , 124°W (near North Bay, WA)
- There is good agreement between the individual GEFS members, with 30/31 members (97%) forecasting an AR 2 at this location
- The strongest moisture transport is forecast to occur around 06–12Z 22 Feb, with peak IVT values $> 500 \text{ kg m}^{-1} \text{ s}^{-1}$



AR 1 AR 2 AR 3 AR 4 AR 5

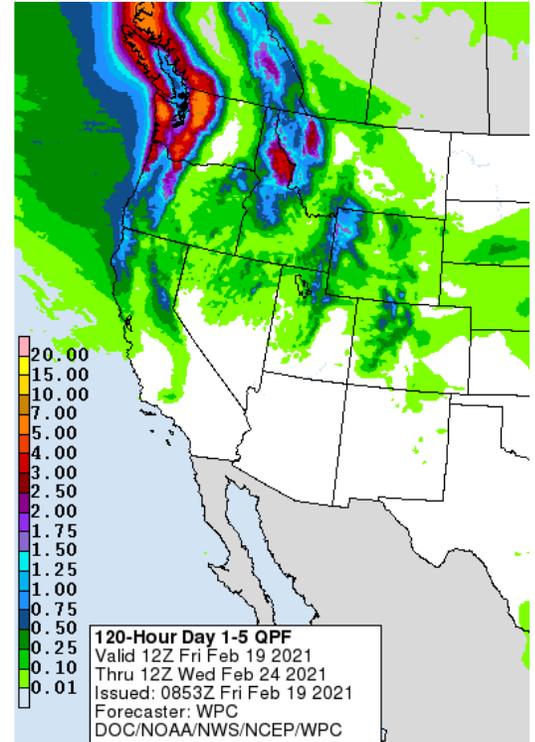
Forecast Time Initialized at 12Z Fri 02/19/21

Wet Weather on the Way for Sunday - Tuesday



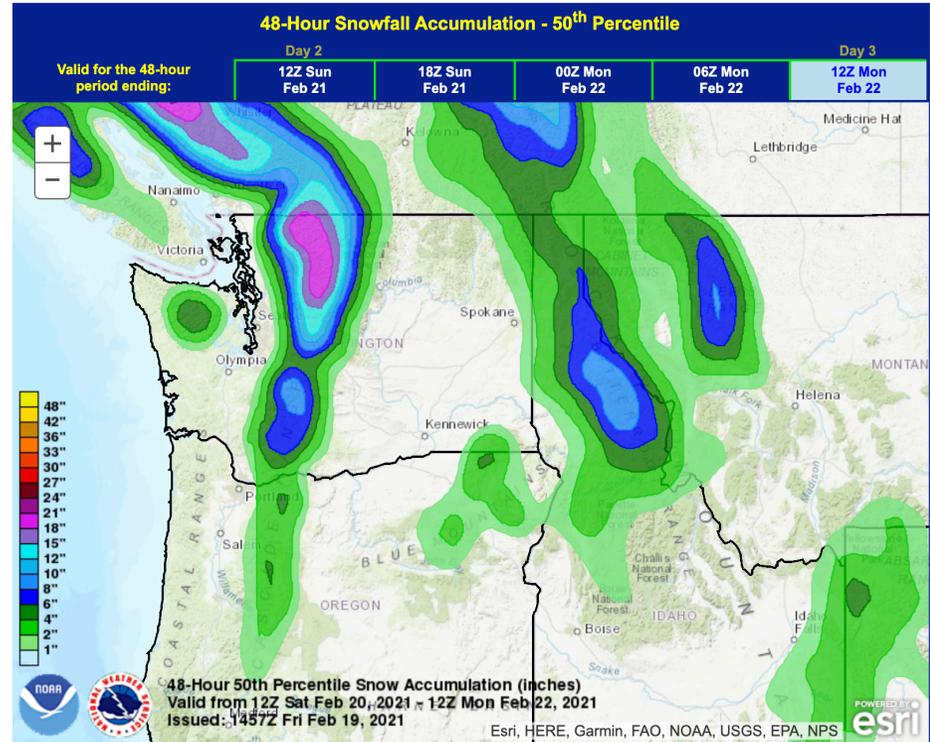
Source: NWS Seattle, <https://www.weather.gov/sew/>

WPC 120-h QPF
Valid 12Z 19–24 Feb



Source: NOAA/NWS Weather Prediction Center, <https://www.wpc.ncep.noaa.gov/>

WPC 48-h Snowfall (50th Percentile)
Valid 12Z 20–22 Feb

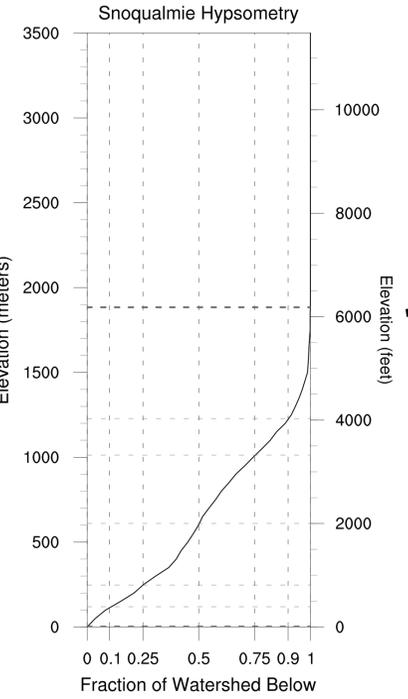
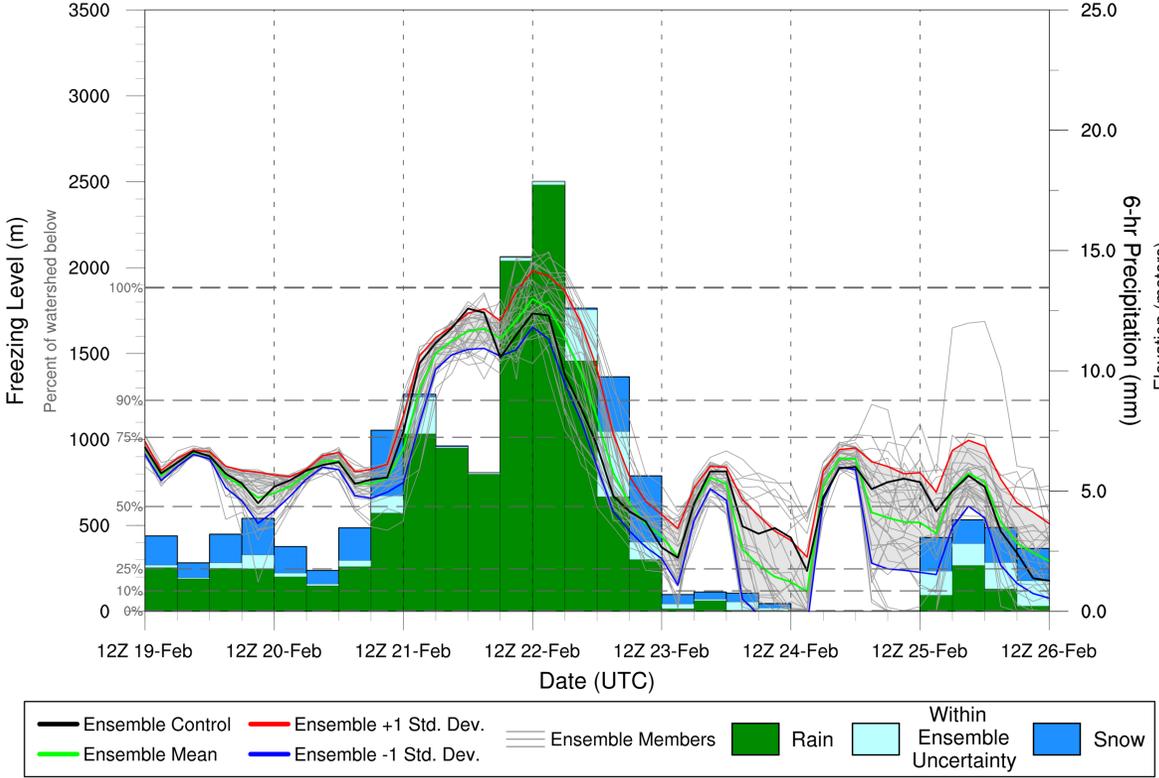


- The NWS Weather Prediction Center (WPC) is forecasting at least 3–7 inches of total precipitation over portions of western Washington and northwestern Oregon during the next 5 days
- The highest amounts (> 7 inches locally) are expected in the Olympic Mountains and North Cascades
- This AR is also forecast to produce significant snowfall accumulations (at least 1–2 feet by early Monday) in the higher elevations of the North Cascades

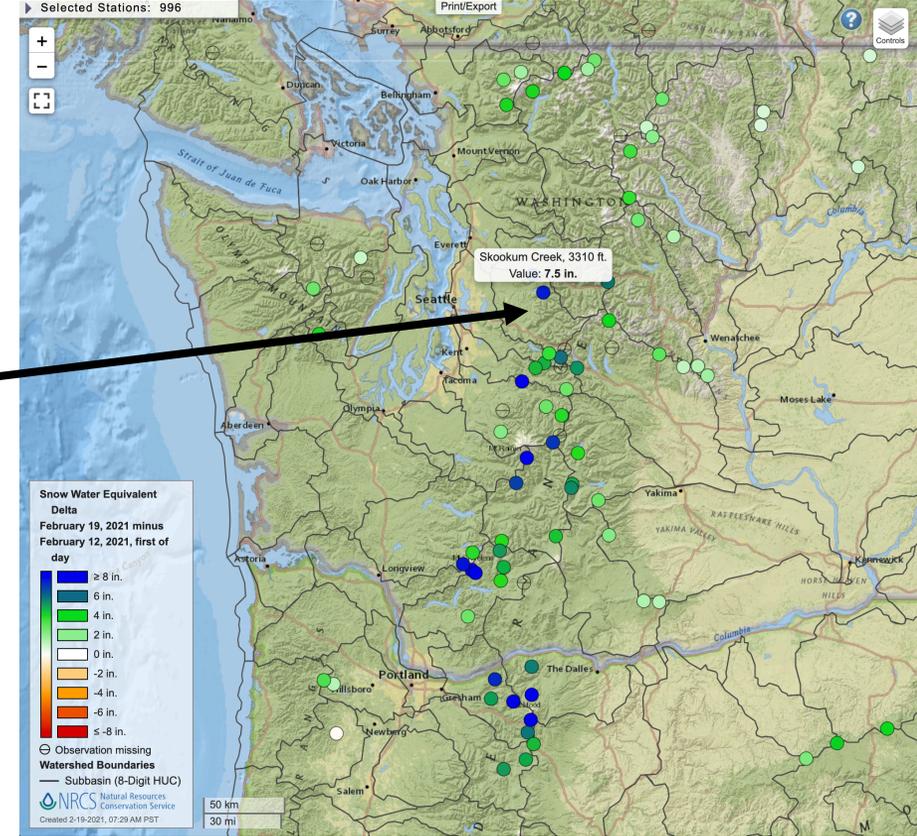
GEFS 7-day Watershed Freezing-Level Forecasts

Snoqualmie; GEFS Forecast Initialized 2021-Feb-19 12 UTC

7-day WPC Precipitation Total: 125.39 mm (4.937 in); 70.9% Rain, 11.5% Uncertain, 17.5% Snow



7-day SWE Change: Valid 12-19 Feb

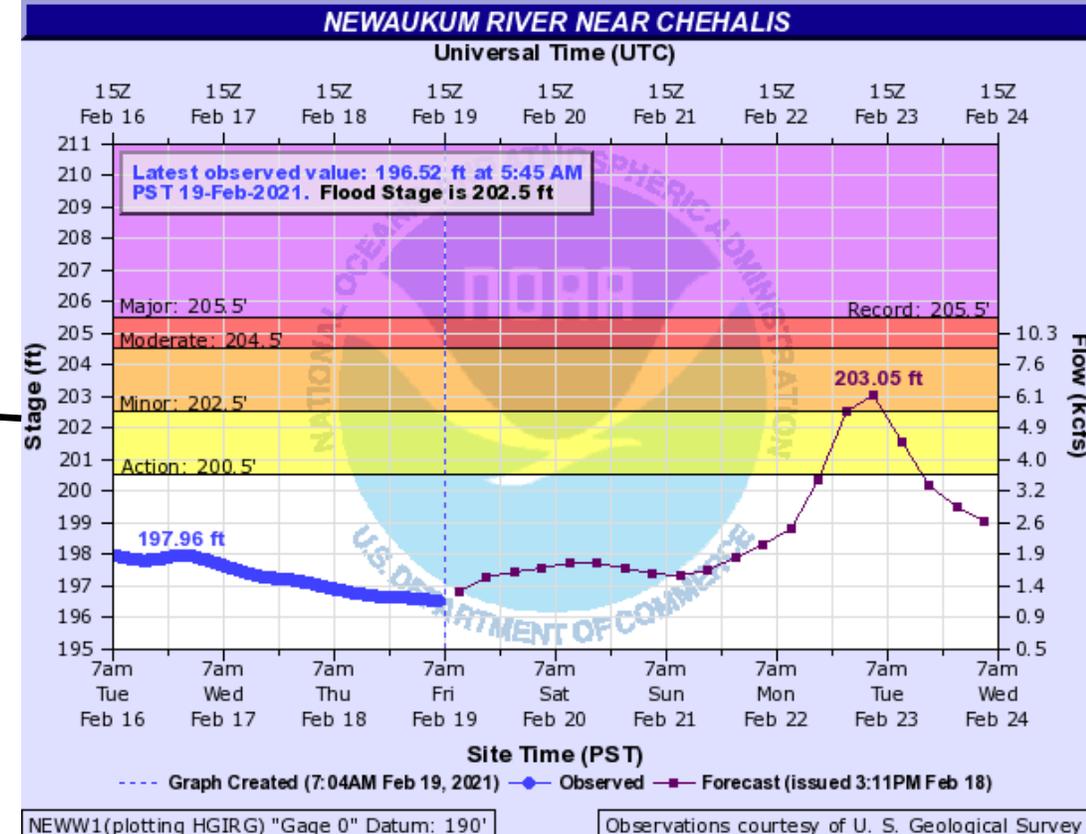
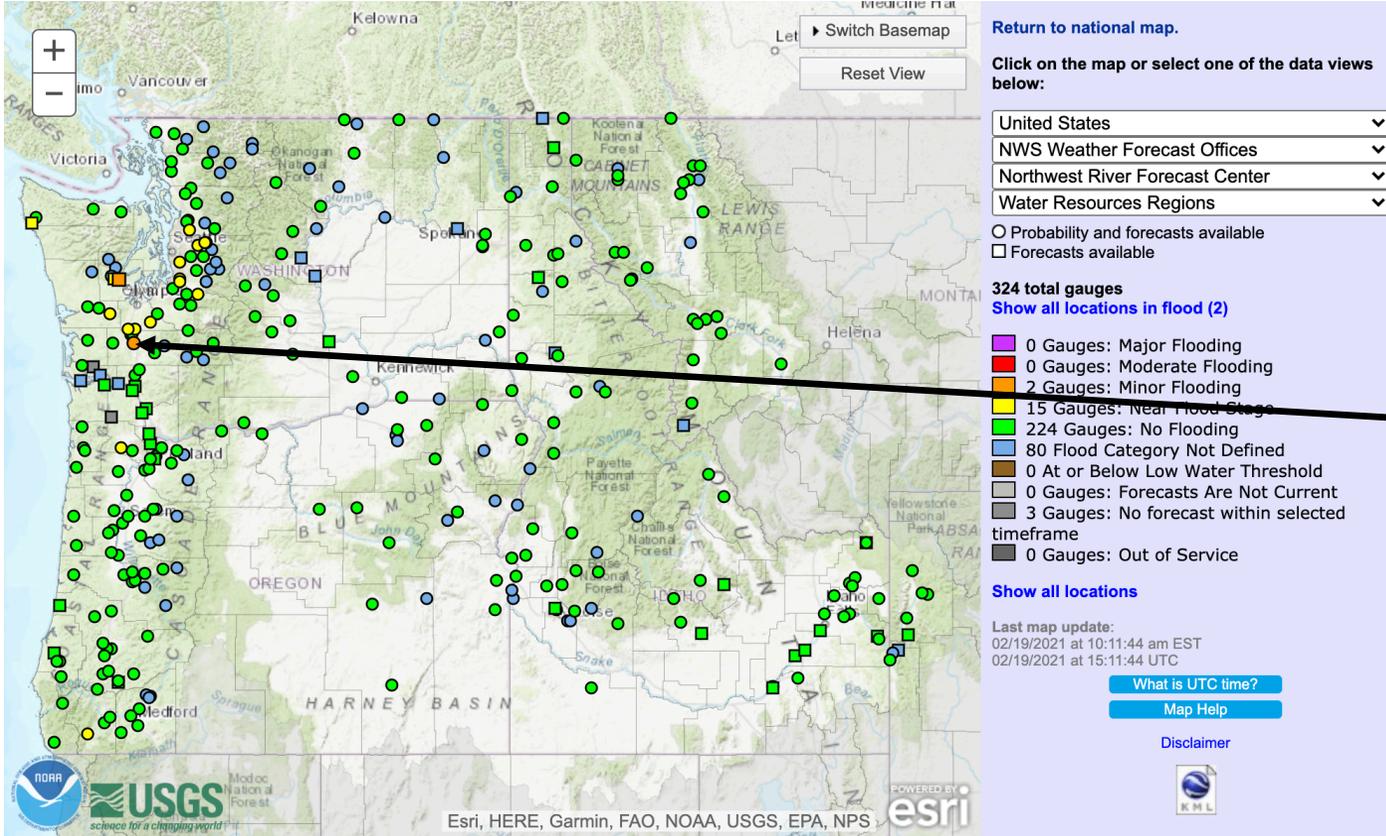


Source: USDA NRCS National Water and Climate Center, <https://www.nrcs.usda.gov/wps/portal/wcc/>

- Freezing levels over the Pacific Northwest are forecast to rise as warmer air associated with this landfalling AR moves inland
- The combination of rising freezing levels, heavy precipitation, and recent snowfall in the lower elevations of the Cascades (below 4,000 ft) suggests that a significant rain-on-snow event is likely in these areas
- Snow water equivalent (SWE) has increased by 7.5 inches at the Skookum Creek SNOTEL site (3,310 ft) over the past 7 days

7-day Maximum Flood Category Forecast

Newaukum River (near Chehalis, WA)



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

- The combination of near-saturated soil conditions, heavy rain, and melting snow may lead to flooding at lower elevations in western Washington
- The Newaukum River (near Chehalis, WA) is forecast to rise above minor flood stage during the morning of 23 Feb