



Center for Western Weather  
and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

# CW3E S2S Outlook: 16 Feb 2022

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UC San Diego



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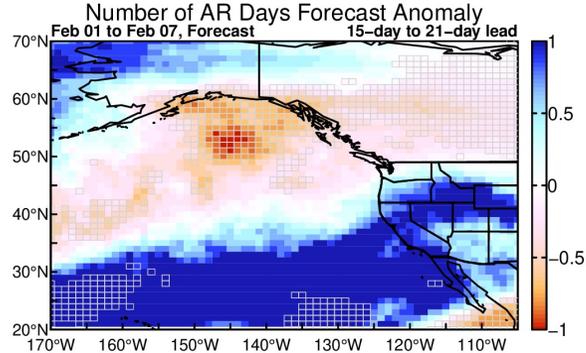
# Summary

- **Week 2 forecasts (22–28 Feb):** Models disagree on the likelihood of landfalling AR activity over Baja California and the southwestern U.S.
  - NCEP is showing moderate probabilities (40–70%) of AR activity over Baja California and Arizona, and low probabilities (20–40%) of AR activity over Southern California
  - ECMWF is showing much lower probabilities (< 30%) of AR activity in these areas, especially Southern California
- NCEP GEFS model predicts the MJO will be located over the Indian Ocean and the Maritime Continent during the next two weeks, which is generally unfavorable for AR activity over the western US
- **Week 3 forecasts (1–7 Mar):** Models agree on general pattern of AR activity, but disagree somewhat on the magnitude of the anomalies in different regions
  - Below-normal AR activity over the western US; above-normal AR activity over Baja California Sur
  - Negative (positive) AR activity anomalies are stronger (weaker) in ECMWF over the Pacific Northwest (Baja California Sur)
- NCEP (ECMWF) shows high (low) confidence in ridging activity west of California during Weeks 1–2
  - The West-Ridge type is typically associated with wet (dry) conditions over the Pacific Northwest (California)

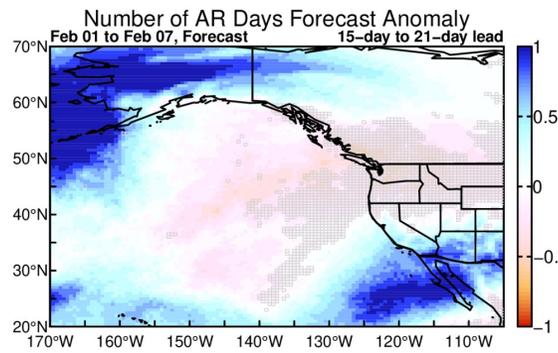
# Looking Back: Week 3 AR Activity Forecasts

Valid: 1–7 Feb 2022

NCEP Experimental Forecast Initialized: Jan 17, 2022



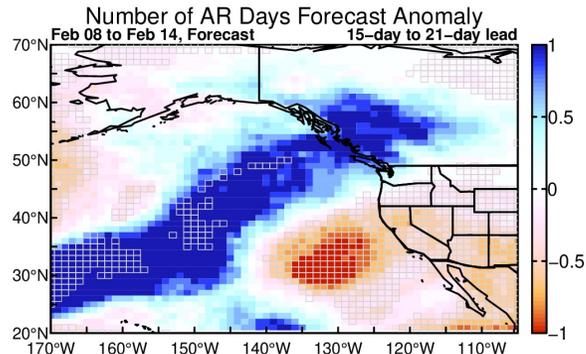
ECMWF Experimental Forecast Initialized: Jan 17, 2022



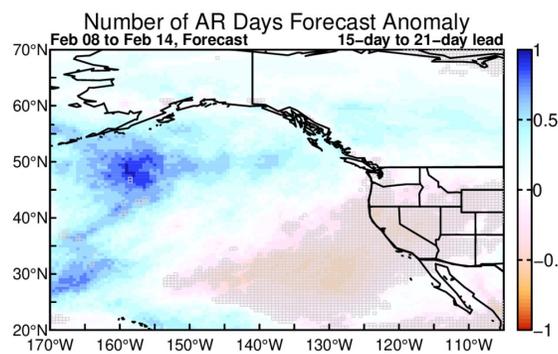
- NCEP: Above-normal AR activity over the western US and the Baja Peninsula; below-normal AR activity over southern Alaska and British Columbia
- ECMWF: Above-normal AR activity over Southern CA and the Baja Peninsula; below-normal AR activity over the Pacific Northwest and British Columbia

Valid: 8–14 Feb 2022

NCEP Experimental Forecast Initialized: Jan 24, 2022

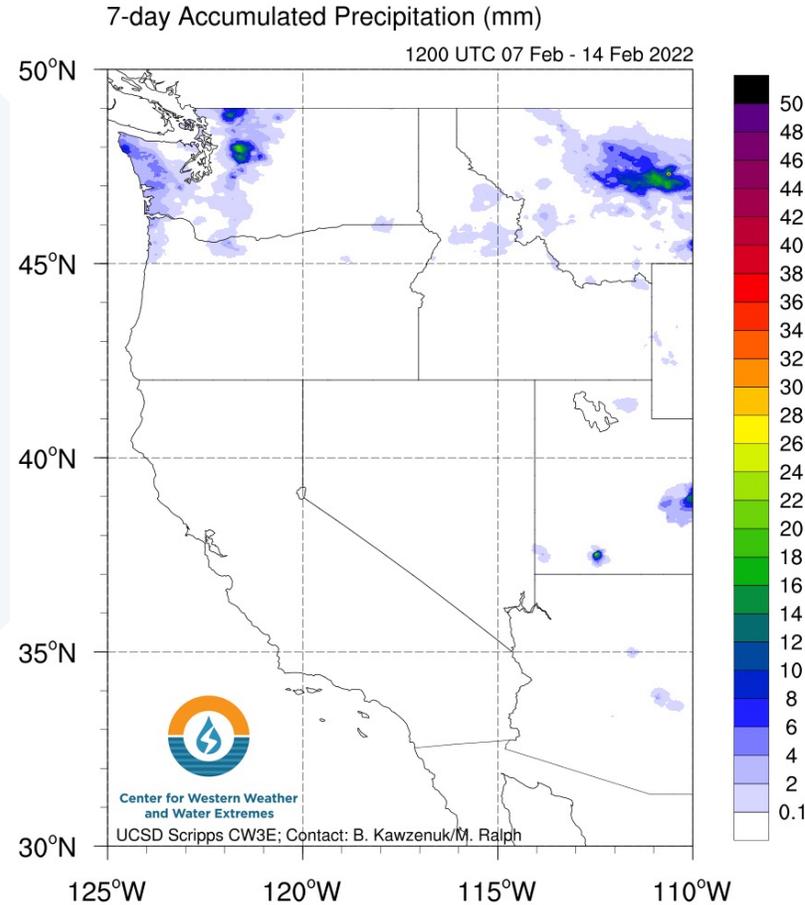
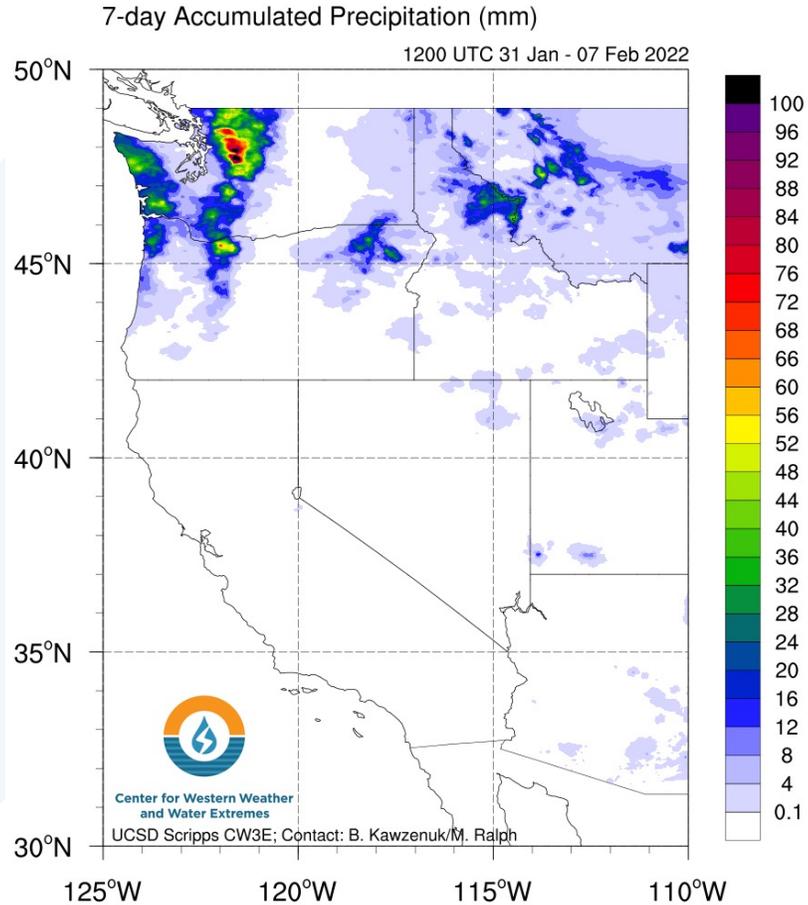


ECMWF Experimental Forecast Initialized: Jan 24, 2022



- NCEP: Below-normal AR activity over the western US, especially California; above-normal AR activity over British Columbia
- ECMWF: Below-normal AR activity over the western US; slightly above-normal AR activity over British Columbia

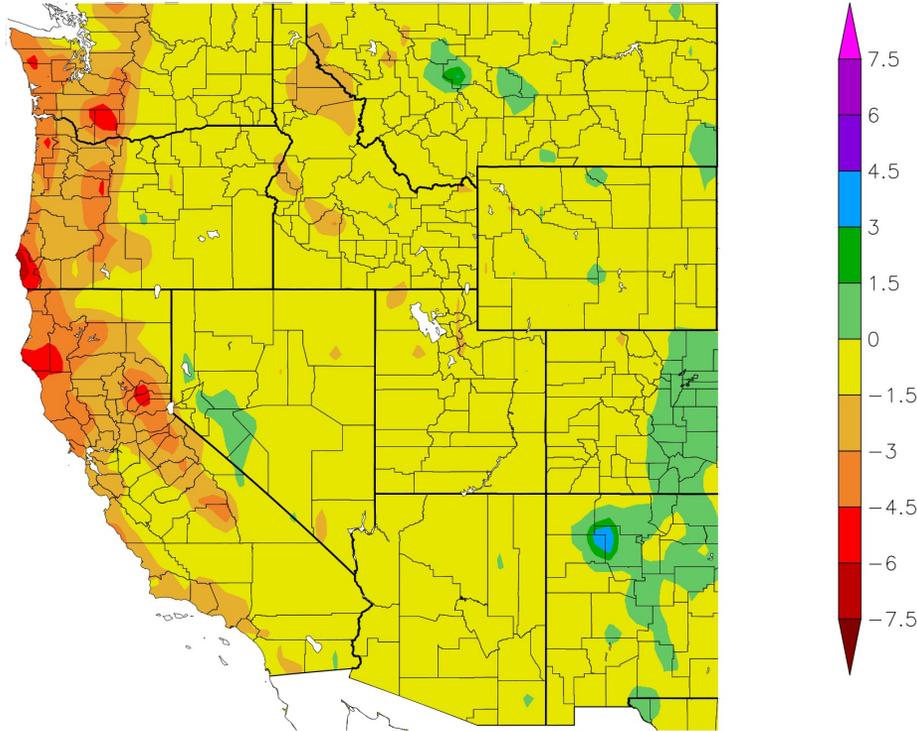
# Looking Back: Accumulated Precipitation (1–14 Feb)



- Multiple weak shortwaves brought light-to-moderate precipitation (generally 1–3 inches total) to portions of western Washington and northwestern Oregon during the first week of February
- Otherwise, dry conditions were generally observed across the western US during the previous two weeks

# Looking Back: 14-day Precipitation Anomaly (1–14 Feb)

Departure from Normal Precipitation (in)  
2/1/2022 – 2/14/2022

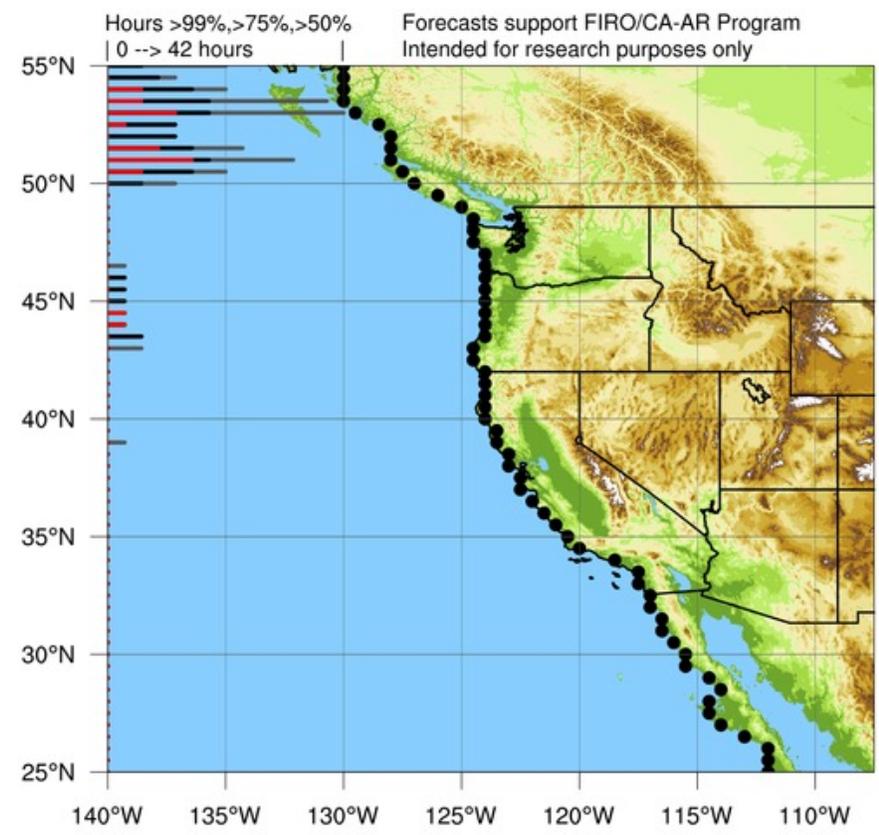
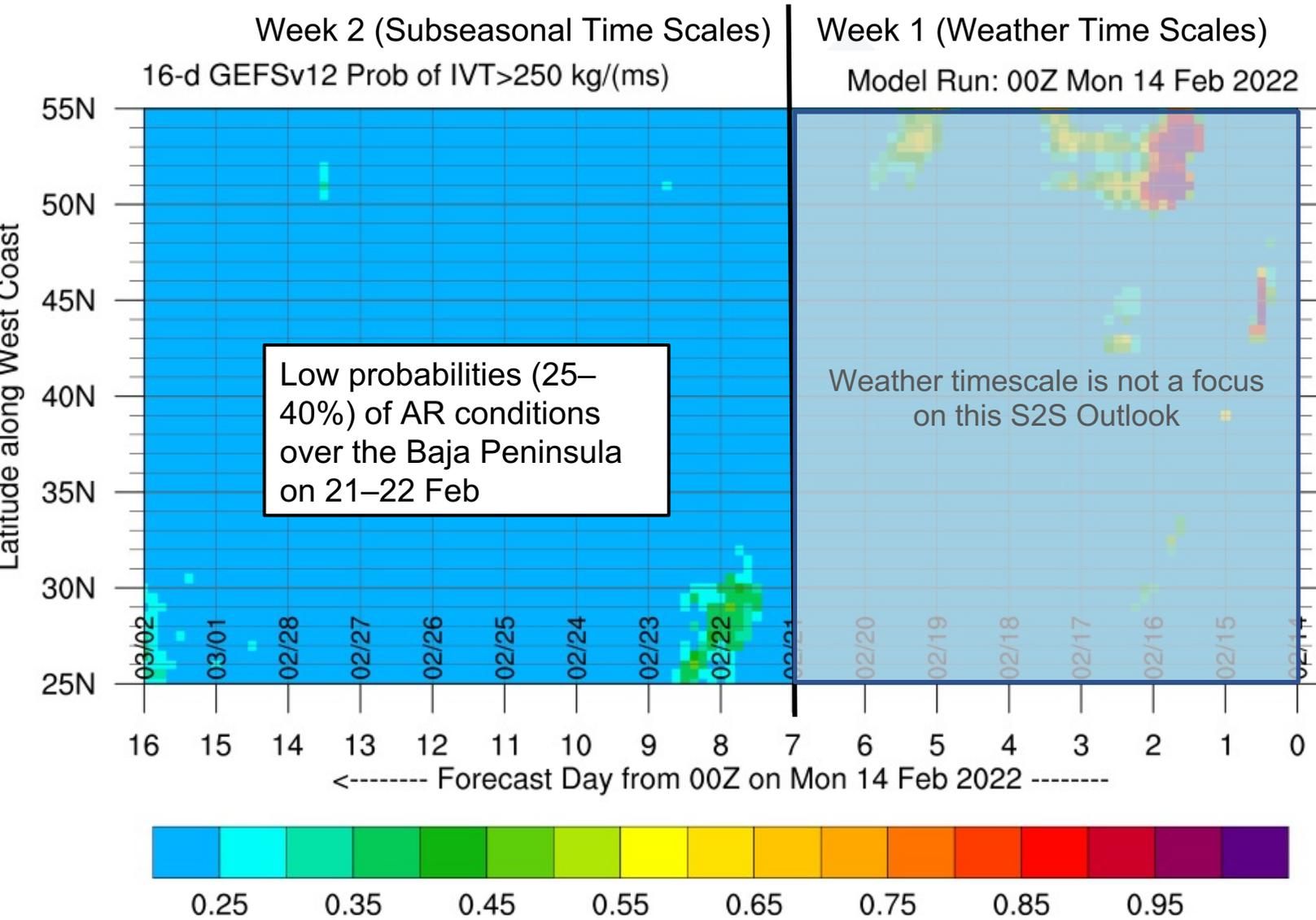


- Abnormally dry conditions over the US West Coast, especially in the Pacific Coast Ranges and the Sierra Nevada

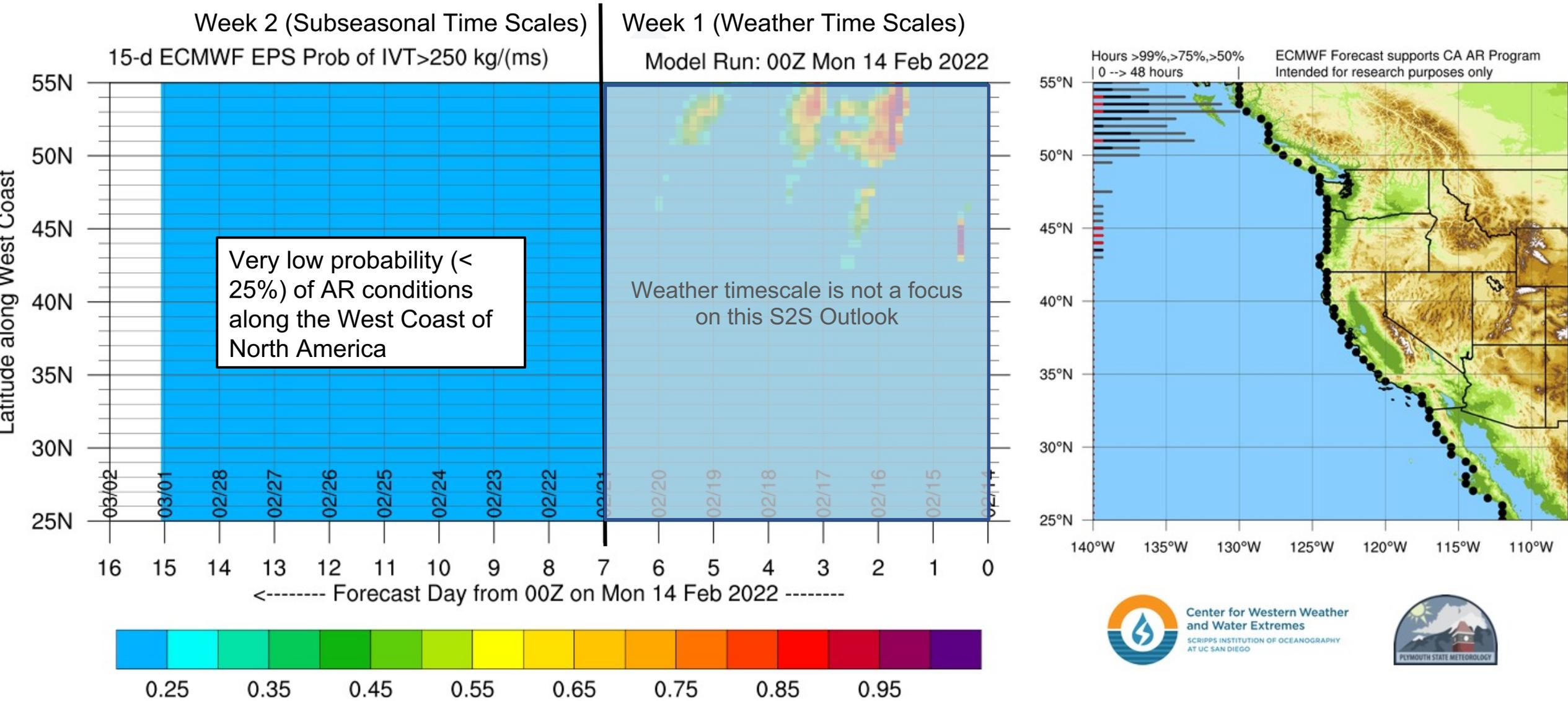
Generated 2/15/2022 at HPRCC using provisional data.

NOAA Regional Climate Centers

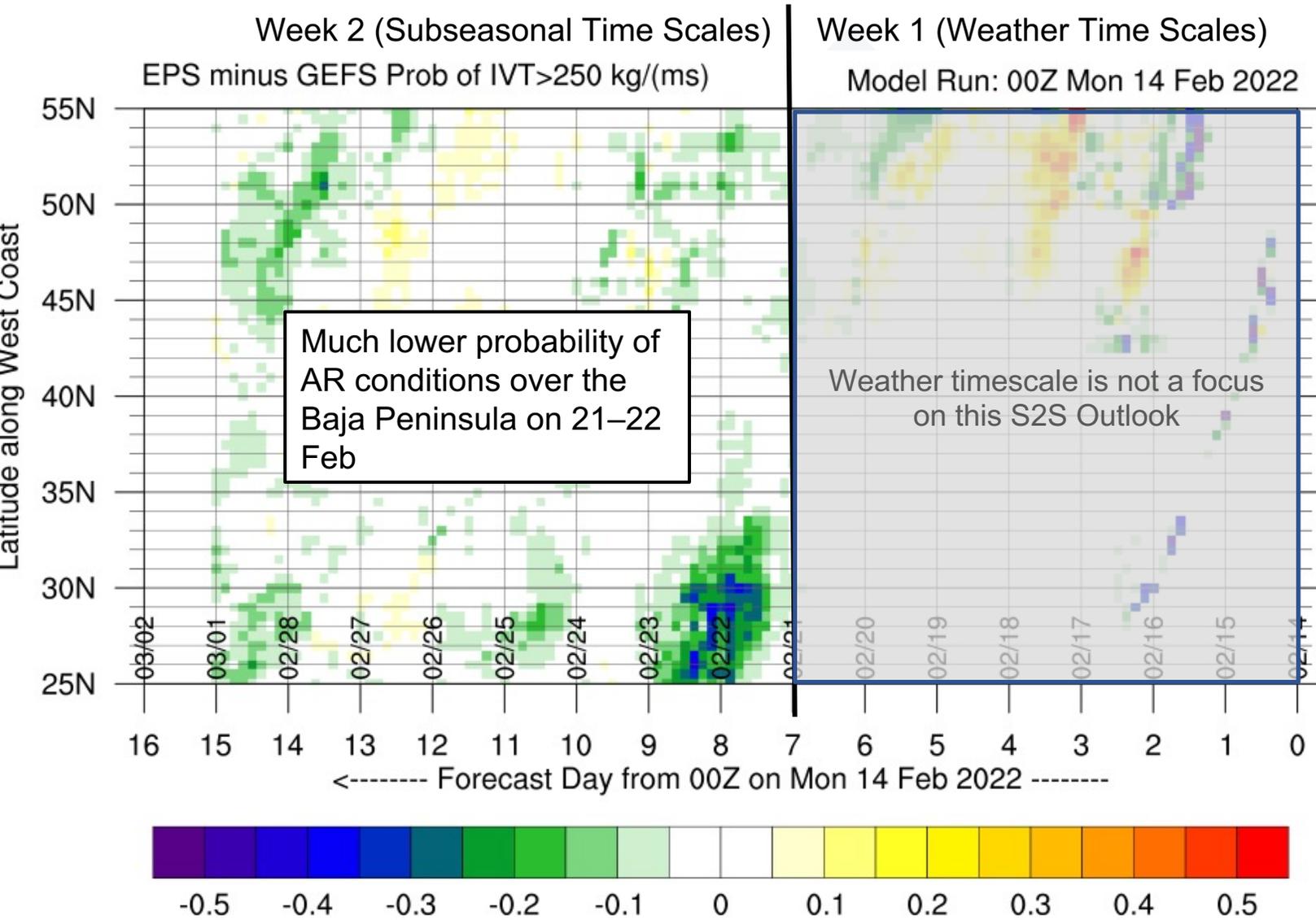
# GEFS AR Landfall Tool: Valid 00Z 14 Feb – 2 Mar



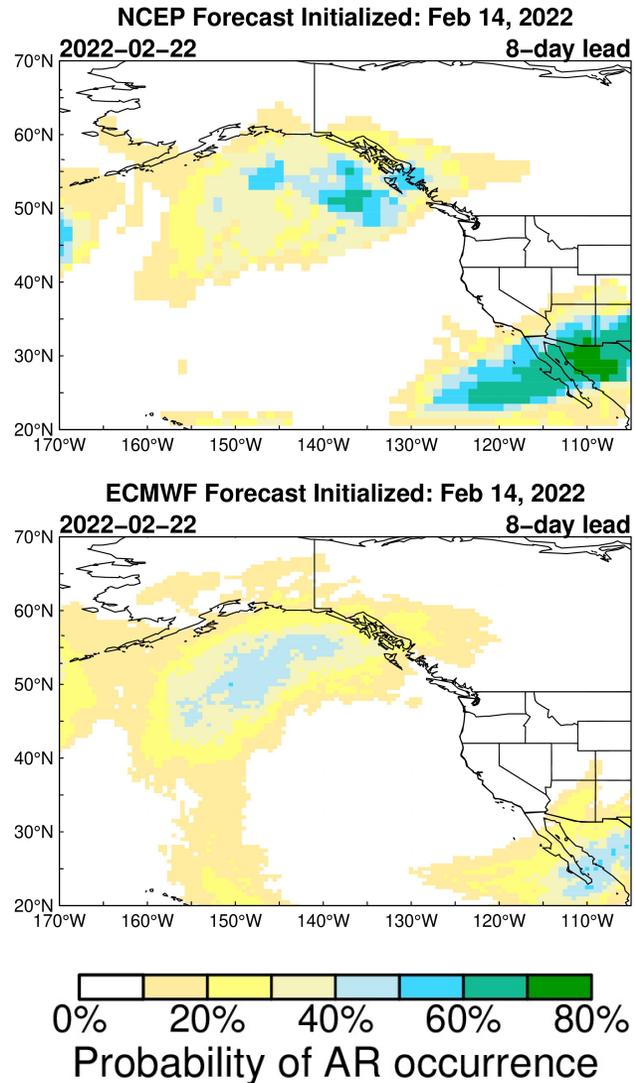
# ECMWF EPS AR Landfall Tool: Valid 00Z 14 Feb – 1 Mar



# ECMWF Minus GFS AR Landfall Tool: Valid 00Z 14 Feb – 1 Mar



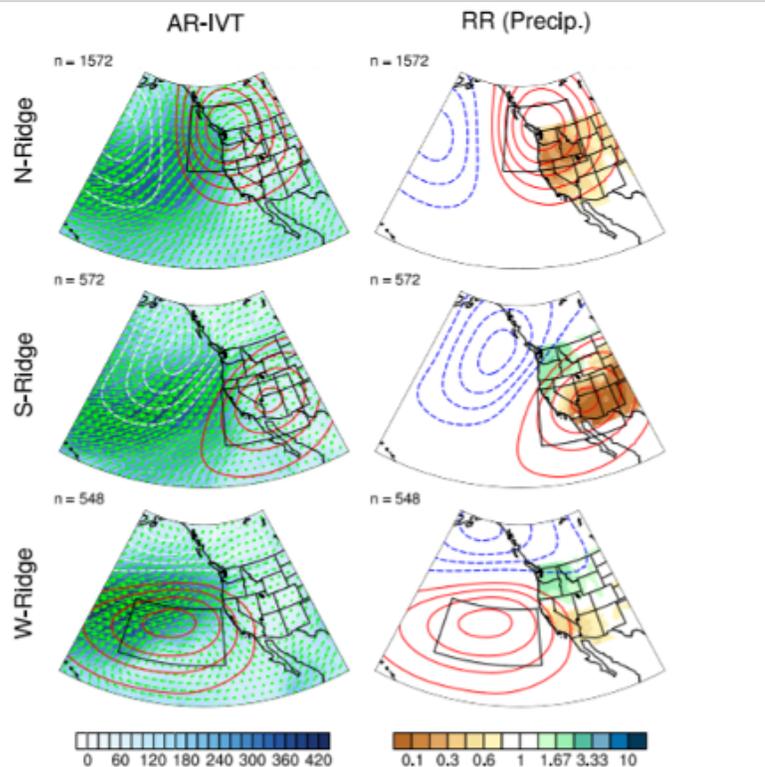
# Subseasonal Outlooks: Week 2 AR Activity (NCEP vs. ECMWF)



- NCEP model is showing moderate probabilities (40–70%) of AR activity over Baja California and Arizona, and low probabilities (20–40%) of AR activity over Southern CA on 22 Feb
- ECMWF model is showing much lower probabilities of AR activity in these areas, with the highest probabilities (40–50%) over far southern Baja California Sur

NCEP model is showing a higher likelihood of AR activity in Baja California, Southern CA, and Arizona during Week 2

# Subseasonal Outlooks: Weeks 1–2 Ridging Forecasts (NCEP)



## How each ridge type typically influences precipitation

**Left:** Maps showing the average influence of each ridge type (red contours) on integrated vapor transport (IVT, blue shading indicates greater moisture transport, arrows indicate direction) during atmospheric river events

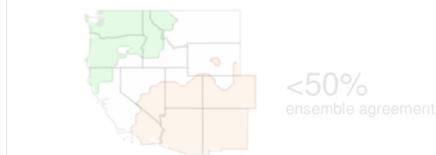
**Right:** Maps showing the 'Relative Risk' (RR) of precipitation under each ridge type. Brown shading indicates a reduced chance of precipitation when ridging occurs. For example, a RR value of 0.2 indicates a 5-fold reduction in the likelihood of precipitation

## North-Ridge



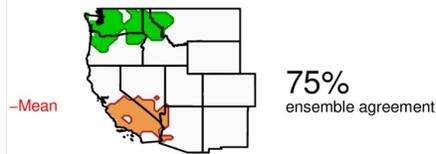
[weak north-ridge signal, <50% agreement]

## South-Ridge



[weak south-ridge signal, <50% agreement]

## West-Ridge



Legend:  
■ dry conditions  
■ wet conditions

- NCEP shows high confidence (75% ensemble agreement) in the occurrence of the West-Ridge type during Weeks 1–2 (14–28 Feb)

- The West-Ridge type is typically associated with wet (dry) conditions over the Pacific Northwest (California)

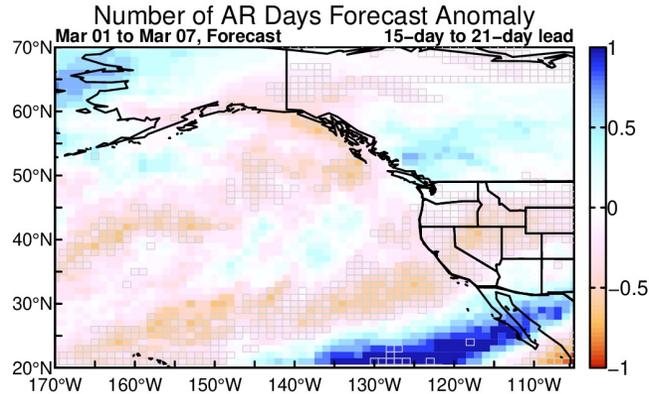
- ECMWF shows low confidence (< 50% ensemble agreement) in the occurrence of the West-Ridge type during Weeks 1–2 (not shown)

- Both models show low confidence in the occurrence of the North-Ridge and South-Ridge types during Weeks 1–2

The models disagree on the likelihood of the West-Ridge type during Weeks 1–2

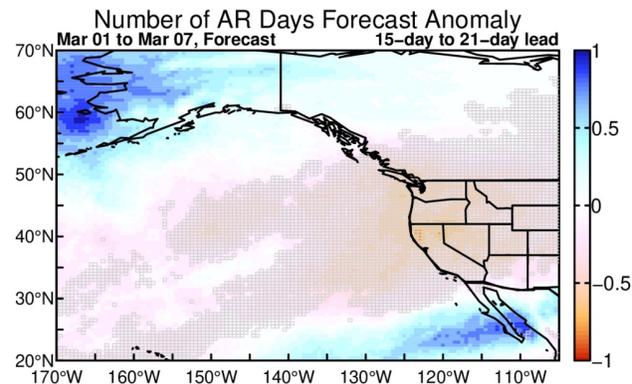
# Subseasonal Outlooks: Week 3 AR Activity (NCEP vs. ECMWF)

NCEP Experimental Forecast Initialized: Feb 14, 2022



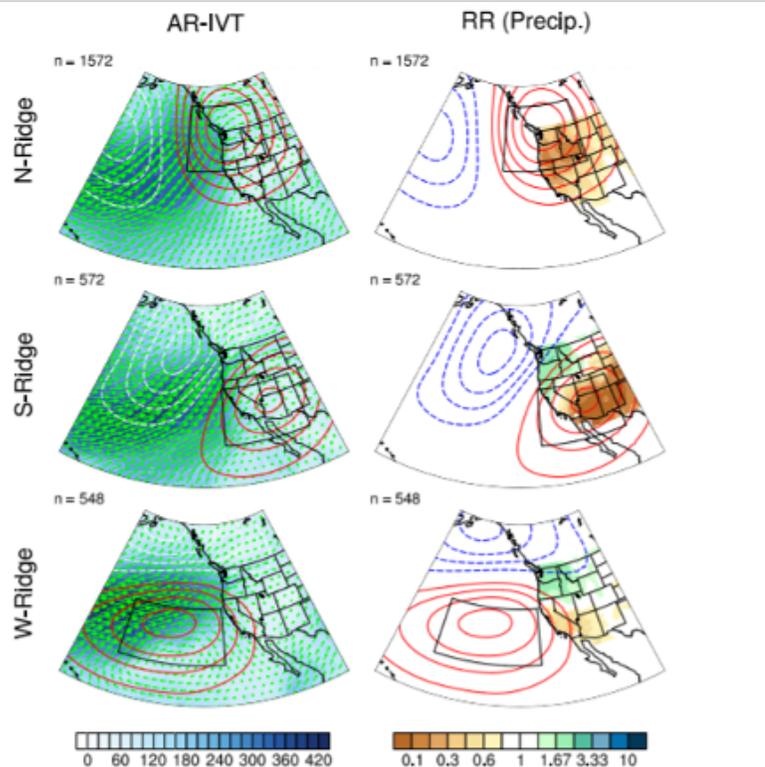
- NCEP model is predicting below-normal AR activity over the western US (especially in California and Nevada) and above-normal AR activity over Baja California Sur during Week 3 (1–7 Mar)
- ECMWF model is predicting a similar pattern of AR activity, but the negative anomaly signal is stronger over the Pacific Northwest

ECMWF Experimental Forecast Initialized: Feb 14, 2022



Both models are showing high confidence in below-normal AR activity over the western US during Week 3.

# Subseasonal Outlooks: Weeks 3–4 Ridging Forecasts (NCEP)

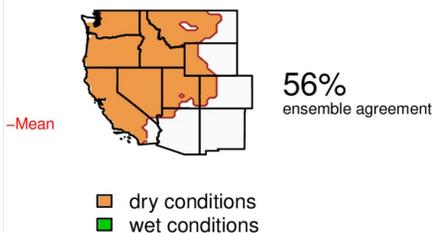


## How each ridge type typically influences precipitation

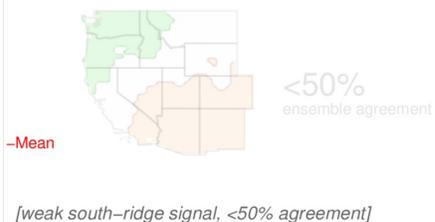
**Left:** Maps showing the average influence of each ridge type (red contours) on integrated vapor transport (IVT, blue shading indicates greater moisture transport, arrows indicate direction) during atmospheric river events

**Right:** Maps showing the 'Relative Risk' (RR) of precipitation under each ridge type. Brown shading indicates a reduced chance of precipitation when ridging occurs. For example, a RR value of 0.2 indicates a 5-fold reduction in the likelihood of precipitation

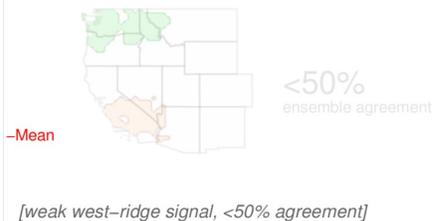
## North-Ridge



## South-Ridge



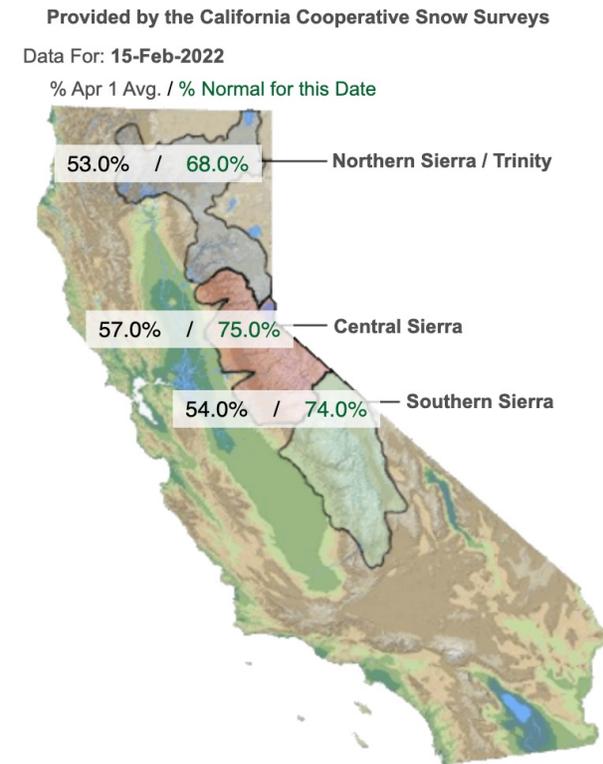
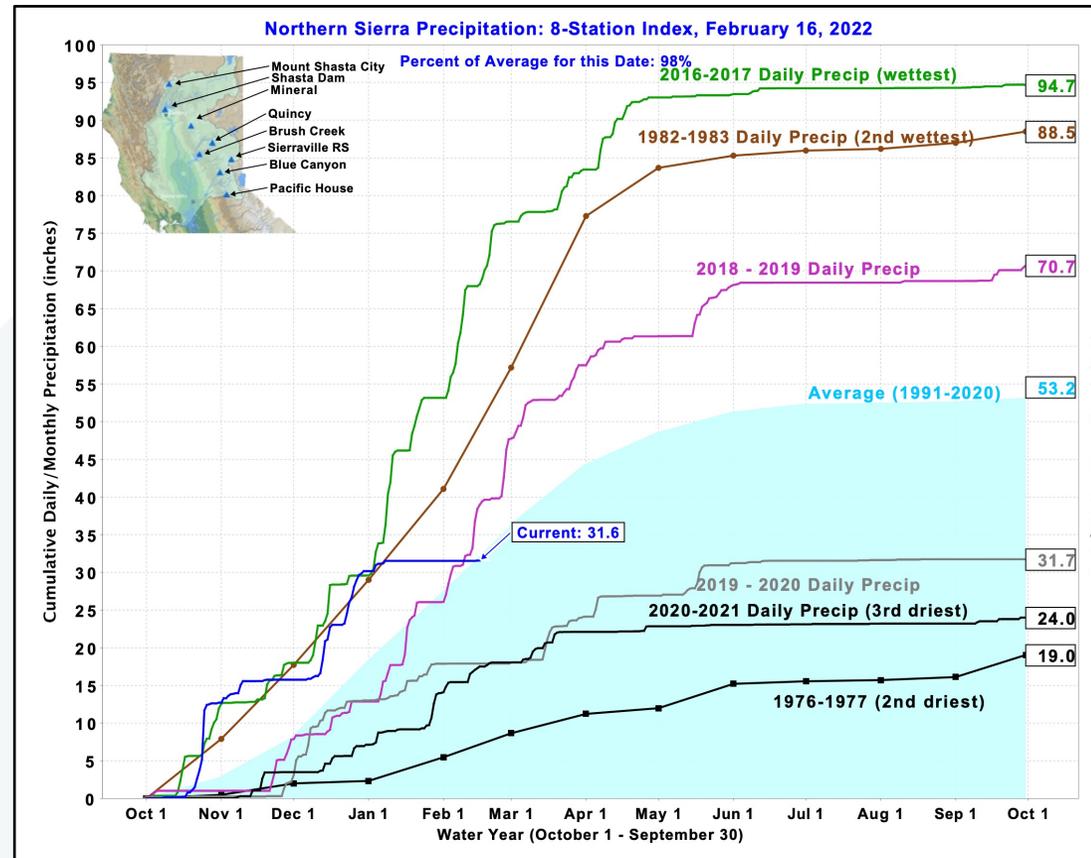
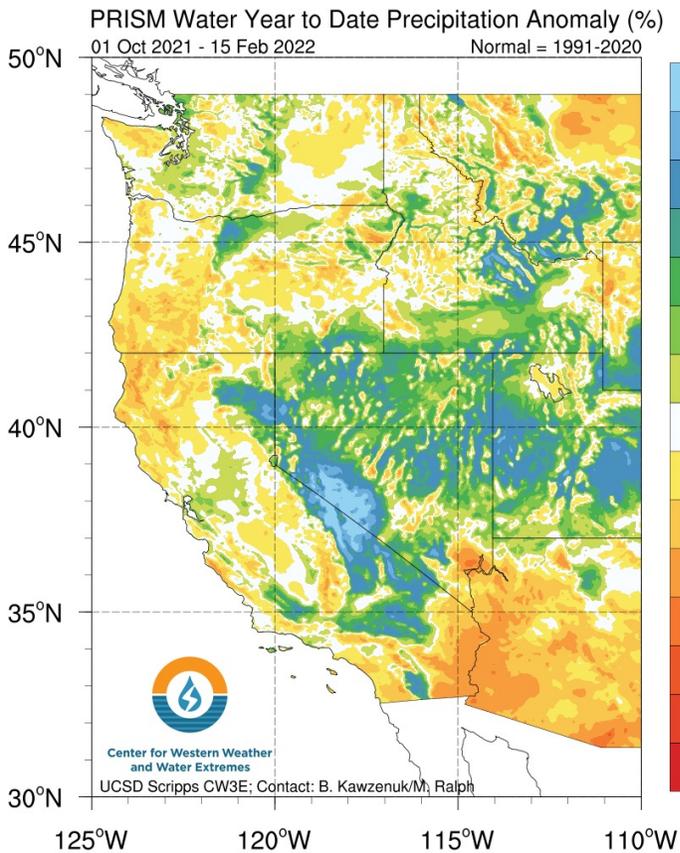
## West-Ridge



- NCEP shows moderate confidence (56% ensemble agreement) in the occurrence of the North-Ridge type near the US West Coast during Weeks 3–4 (28 Feb – 14 Mar)
- ECMWF shows lower confidence (< 50% ensemble agreement) in the occurrence of the North-Ridge type during Weeks 3–4 (not shown)
- Both models show low confidence in the occurrence of the South-Ridge and West-Ridge types during Weeks 3–4

There is low confidence overall in persistent ridging near the US West Coast during Weeks 3–4

# Water Year Precipitation Summary



Source: California Department of Water Resources

- As of 15 Feb, water-year-to-date precipitation is below normal over the Pacific Coast Ranges, the Oregon and Northern California Cascades, and the Sonoran Desert
- Water-year-to-date precipitation is significantly above normal across much of the Great Basin and portions of the Eastern Sierra Nevada and Mohave Desert
- After experiencing its wettest Oct–Dec period on record, the Northern Sierra Nevada has been exceptionally dry since early January
- Northern Sierra Nevada snowpack is now only 68% of normal for this time of year