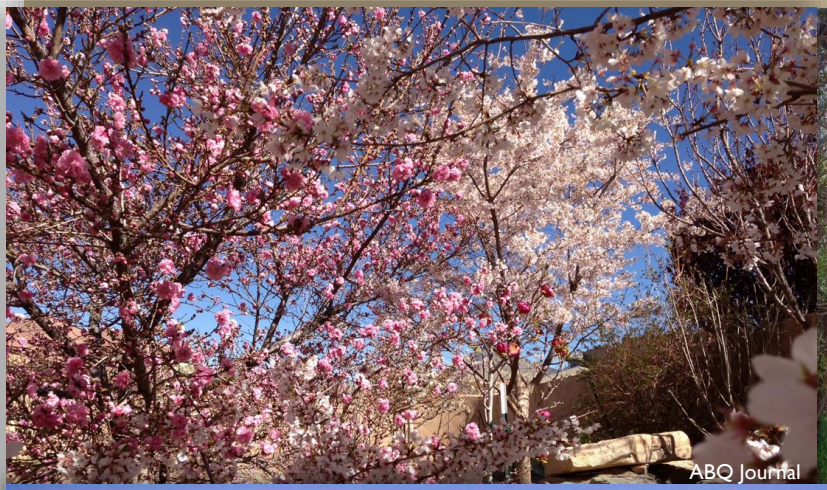
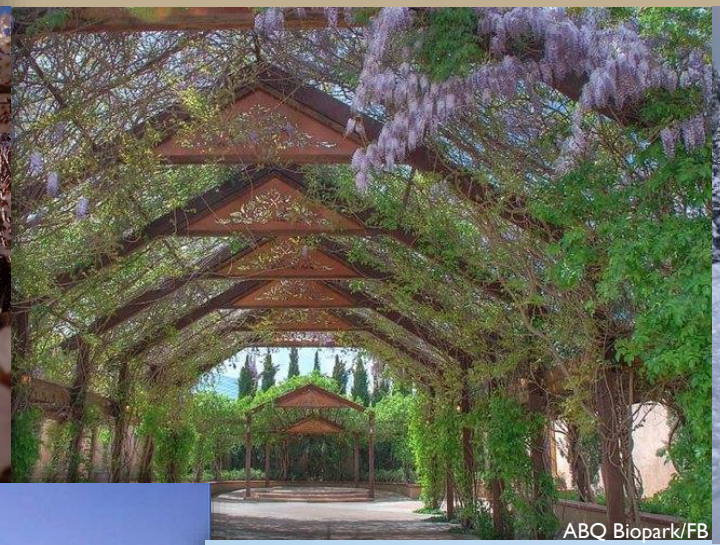
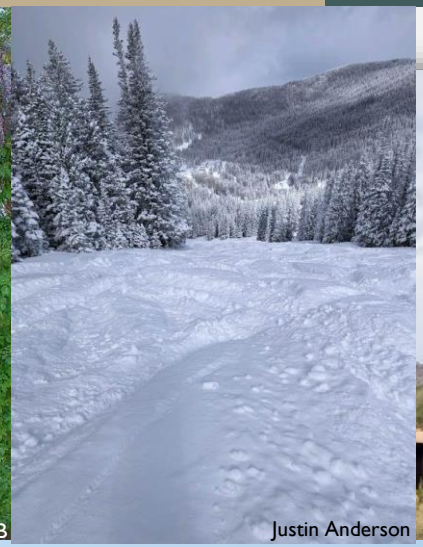
2023 Spring Outlook

For Northern & Central New Mexico

Albuquerque
WEATHER FORECAST OFFICE
Issued March 3, 2023


ABQ Journal


ABQ Biopark/FB


Justin Anderson


New Mexico Tourism Dept.


Thomas Shahan


Kent Kanouse

Despite well-above normal snowpack in the mountains of northern and western New Mexico this past winter season, vegetation on the eastern plains remains critically dry. A rapid end to the triple-dip La Niña climate pattern will likely change the dry conditions in eastern NM during spring.

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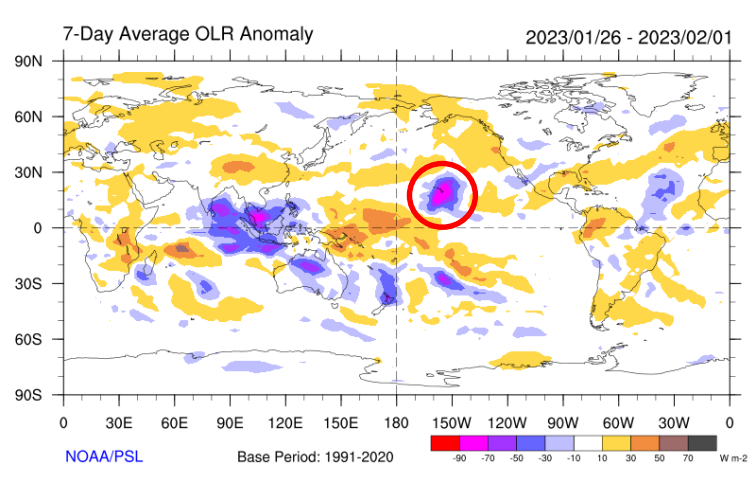

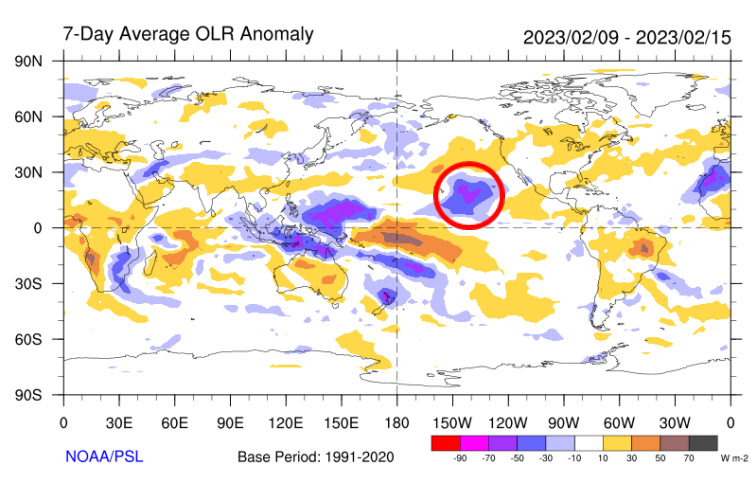

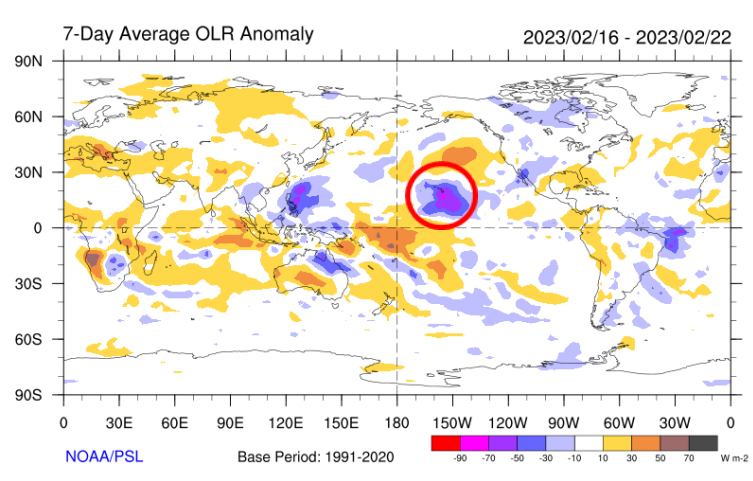

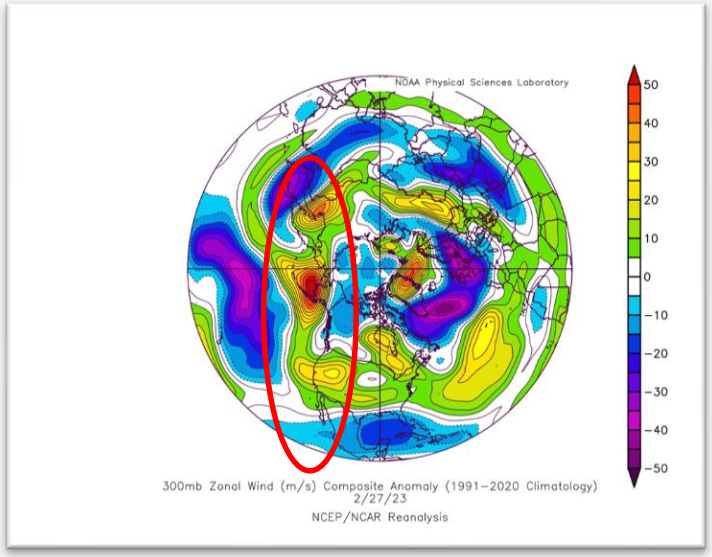

First off, a slide is necessary to discuss the recent extraordinarily strong wind events and blizzard conditions in western NM in February. After a three year-long La Niña climate pattern, the Pacific Ocean decided it was time to warm up rapidly during northern hemisphere winter (DJF 2023). This warming resulted in deep, anomalous convection in the central Pacific near HI which lead to an East Asian Jet (EAJ) that was stronger than average for a good portion of February 2023 (bottom slide).

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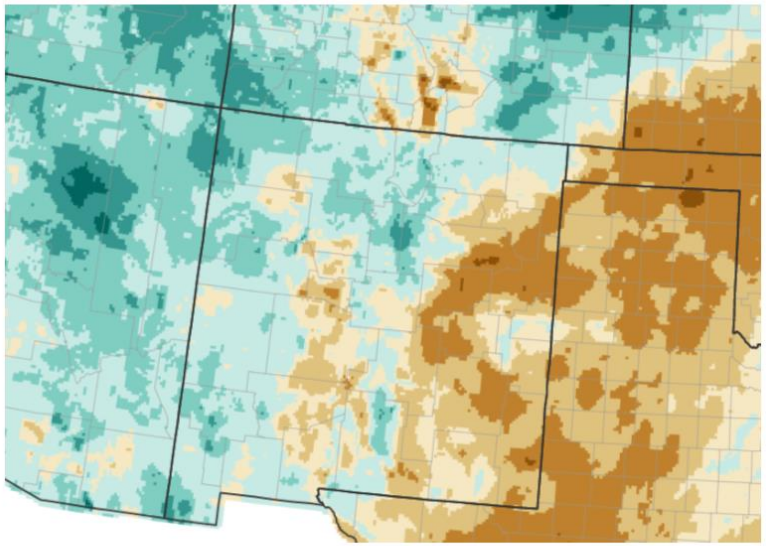
60-Day Percent of Normal Precipitation



Percent of Normal Precipitation (%)

0% 25% 50% 75% 100%

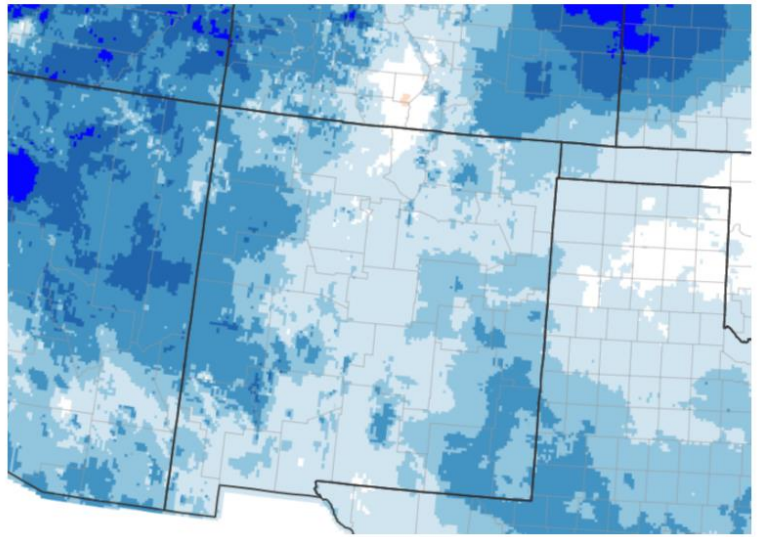
100% 150% 200% 300%

The 60 day percent of normal precipitation shows the difference of the last 60 days from the usual conditions for the same time period averaged from 1991-2020 using the gridMET and PRISM temperature datasets. Precipitation data are updated daily, with a delay of 3 to 4 days to allow for data collection and quality control.

Source(s): UC Merced, Climate Engine
Data Valid - 02/25/23

Drought.gov

30-Day Departure from Normal Maximum Temperature (°F)



Departure from Normal Max Temperature (°F)

-8 -6 -4 -3 -1 0

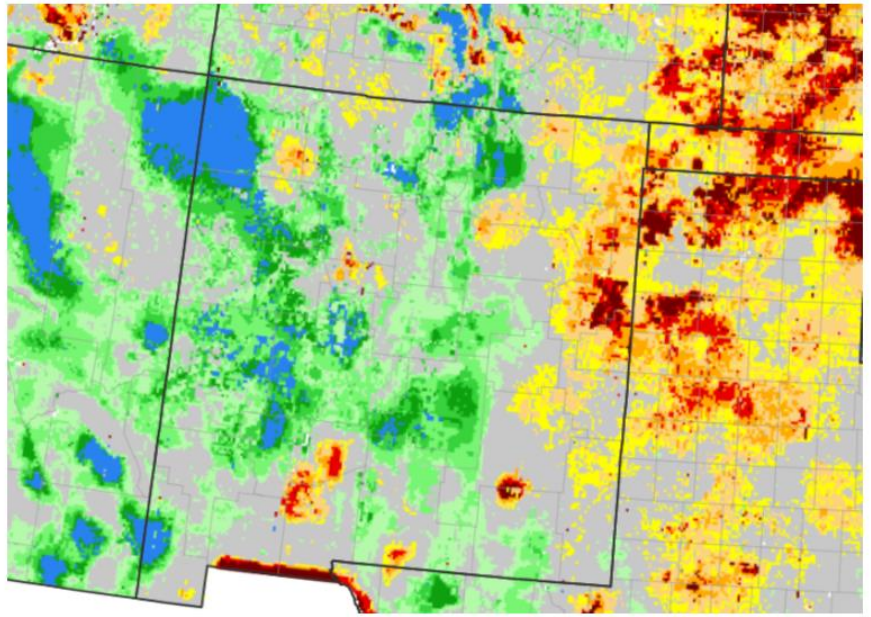
0 1 3 4 6 8

The 30-day departure from the normal maximum temperature (°F) shows the difference of the last 30 days from the usual conditions for the same time period averaged from 1991–2020 using the gridMET and PRISM temperature datasets. Temperature data are updated daily, with a delay of 3 to 4 days to allow for data collection and quality control.

Source(s): UC Merced, Climate Engine
Data Valid - 02/25/23

Drought.gov

NASA SPoRT-LIS 0–100 cm Soil Moisture Percentile



0–100 cm Soil Moisture Percentile

0 2 5 10 20 30 70

70 80 90 95 98 100

Source(s): NASA
Updates Daily - 03/01/23

Drought.gov

Past two months of difference from average precipitation, past month of difference from average temperature, and soil moisture percentiles from the surface to 3.3 feet

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Albuquerque
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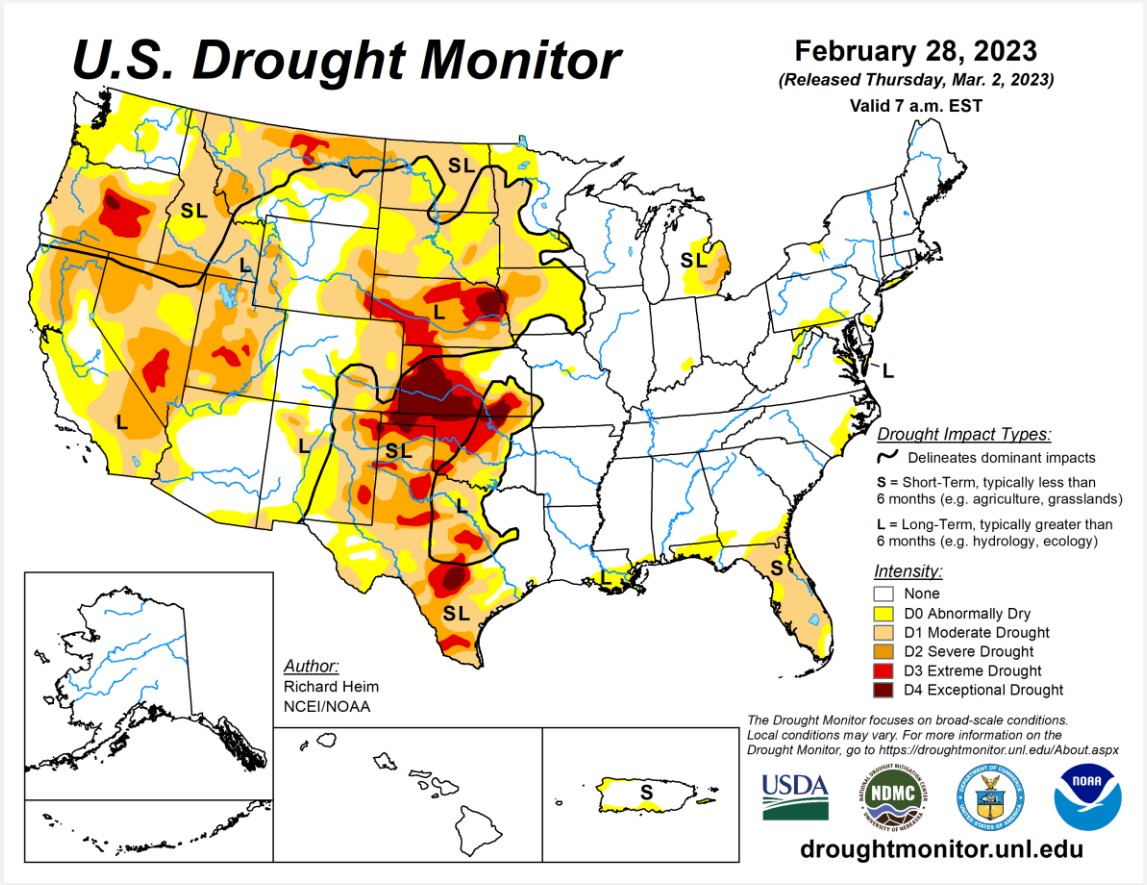

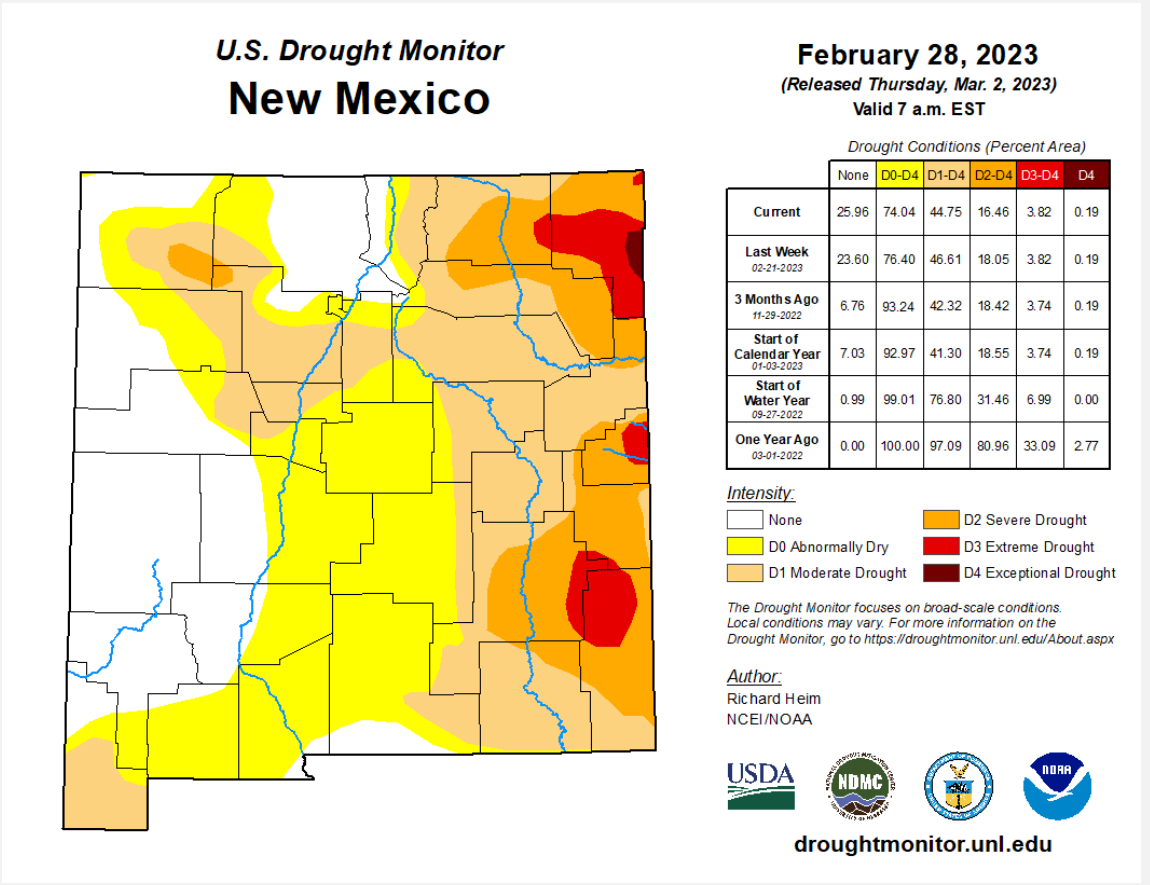

U.S. Drought Monitor showing that much of eastern New Mexico remains in Moderate drought with areas of Severe and localized Extreme conditions. New Mexico and much of the western half of the country are in a two decade-long megadrought. It's considered the most extreme drought during the past 1,200 years.

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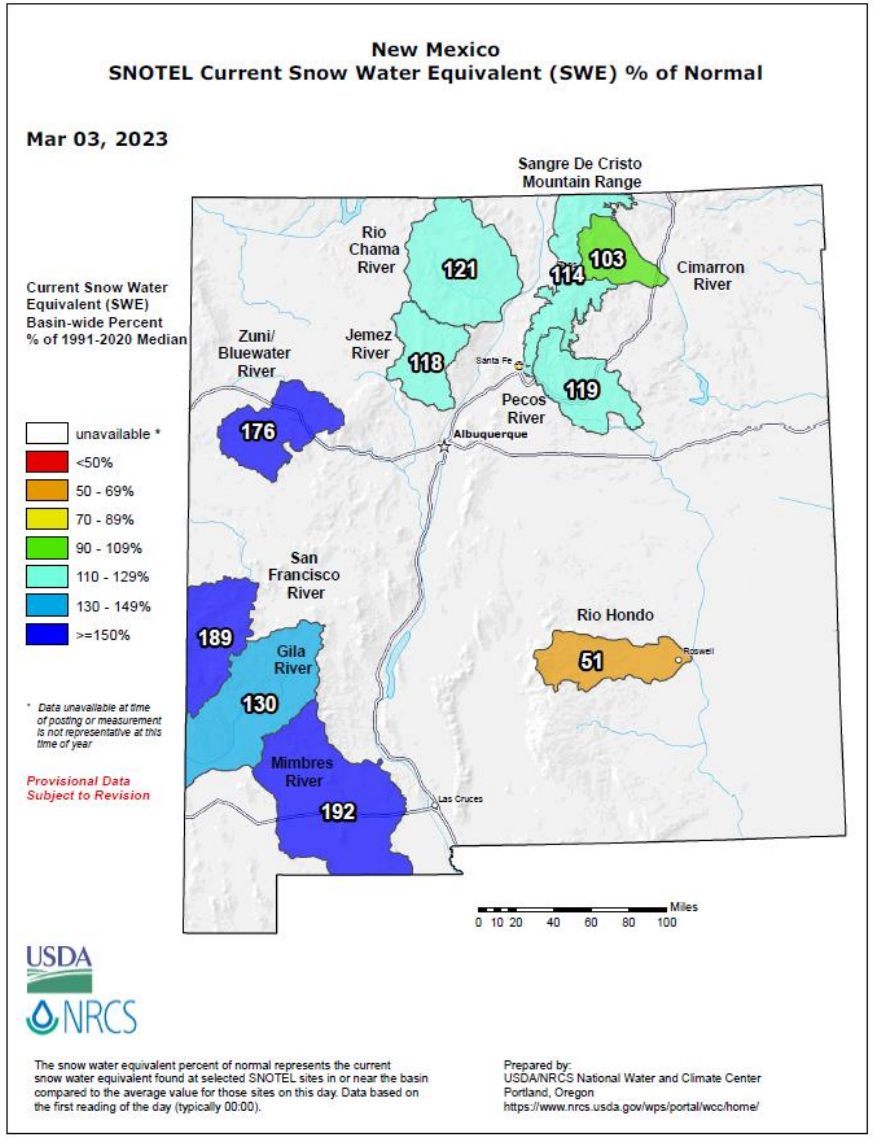

Snow water equivalent (SWE) percentage of normal. The vast majority of watersheds are well above average.

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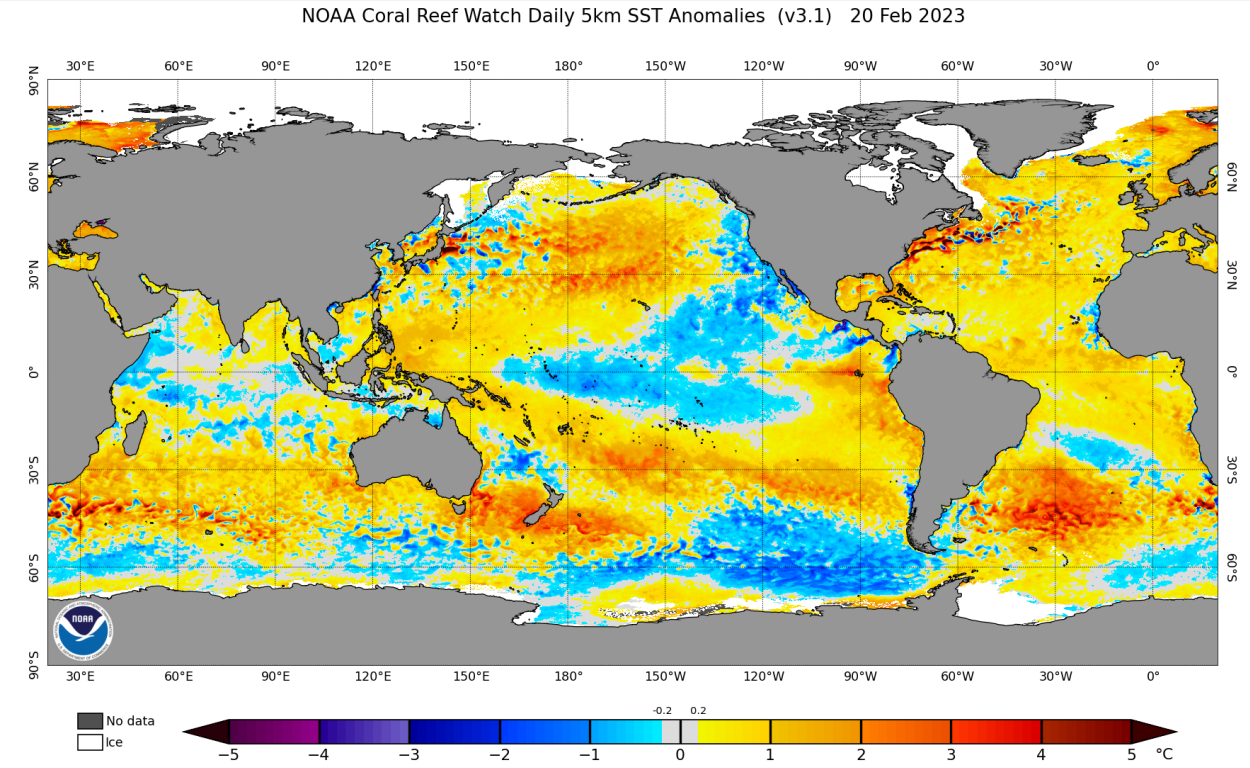

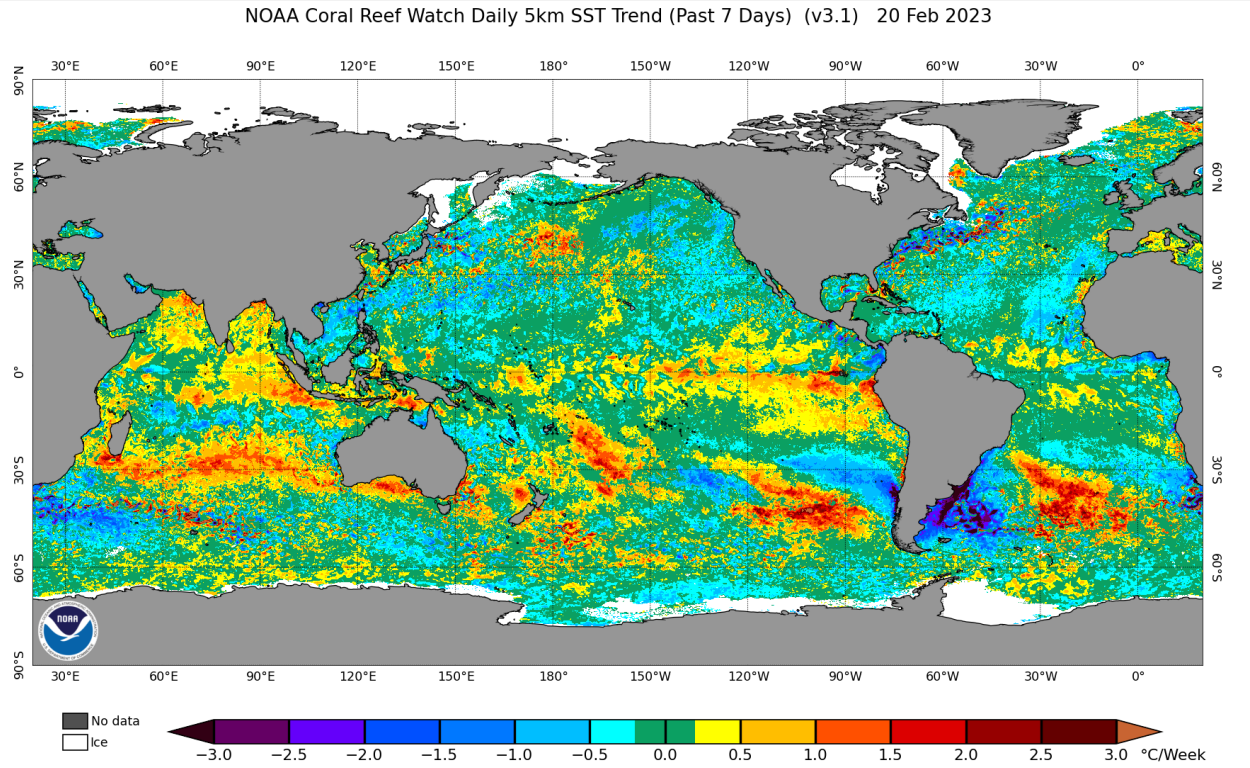

Sea Surface Temperature (SST) differences from average and SST trend in February 2023. Equatorial Eastern Pacific is warming rapidly.

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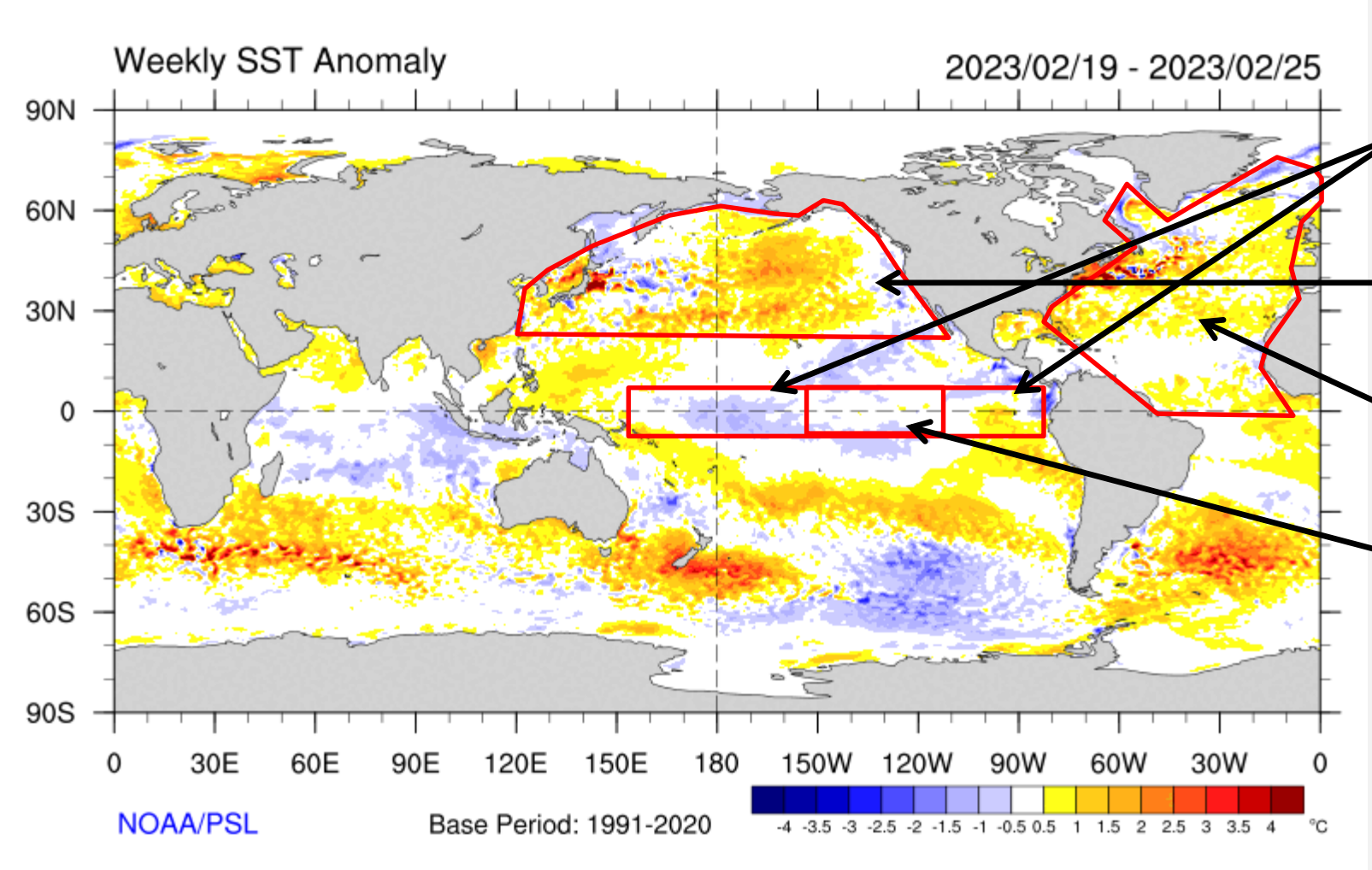

- Multivariate ENSO Index (**MEI**) for DEC-JAN 2023: **-1.1**
- Pacific Decadal Oscillation (**PDO**) for DEC 2022: **-1.52**
- Atlantic Multidecadal Oscillation (**AMO**) for JAN 2023: **+0.192**
- Oceanic Niño Index (**ONI**) (uses Niño 3.4 region - inner rectangle) for NDJ 2022-23: **-0.8**

Latest weekly global SST anomalies showing the area of cooler than average temperatures in the eastern Equatorial Pacific shrinking over the past couple of months.

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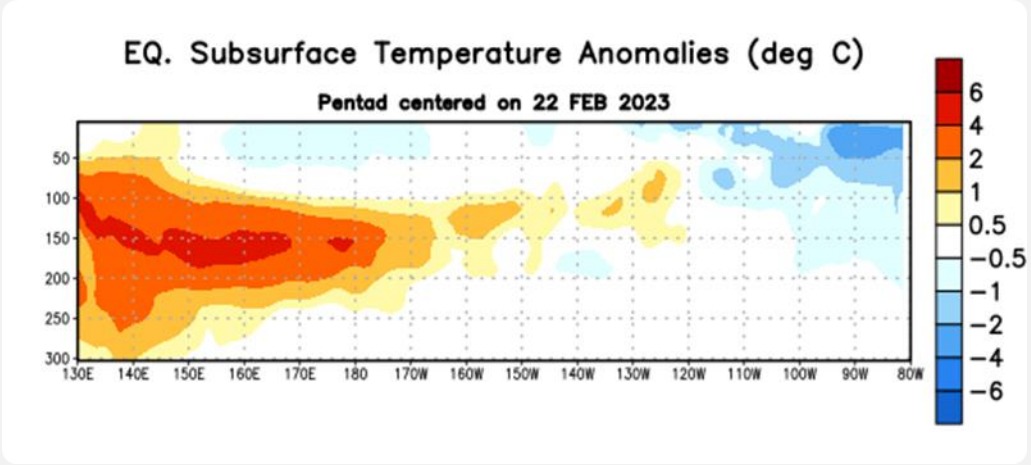

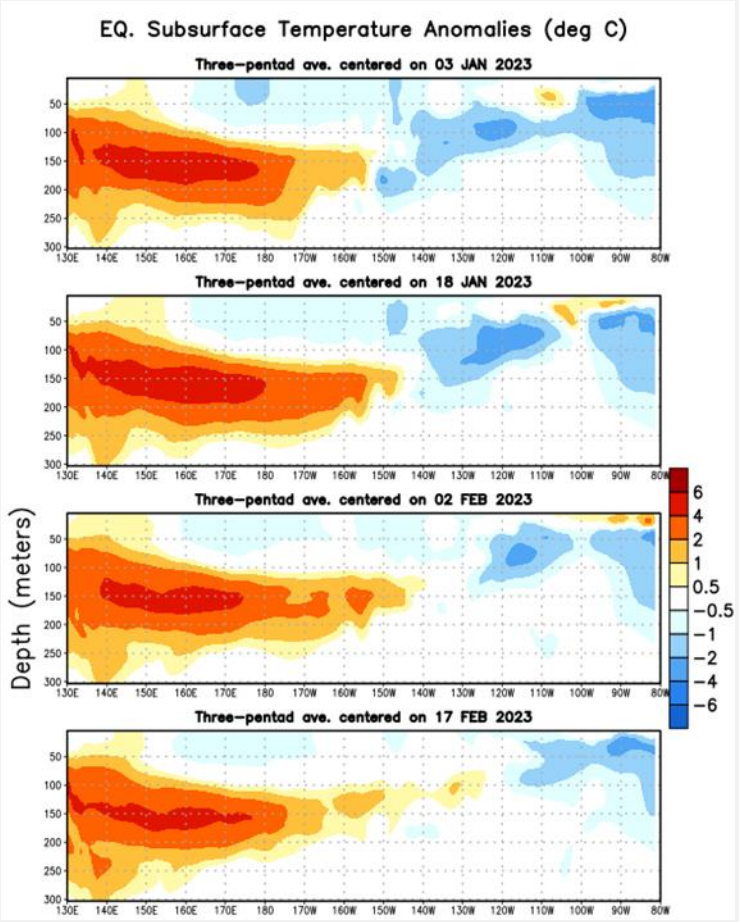

Negative subsurface temperature anomalies are disappearing in the Central Pacific, and continue to shrink in the Eastern Pacific. Warming at depth continues to spread eastward.

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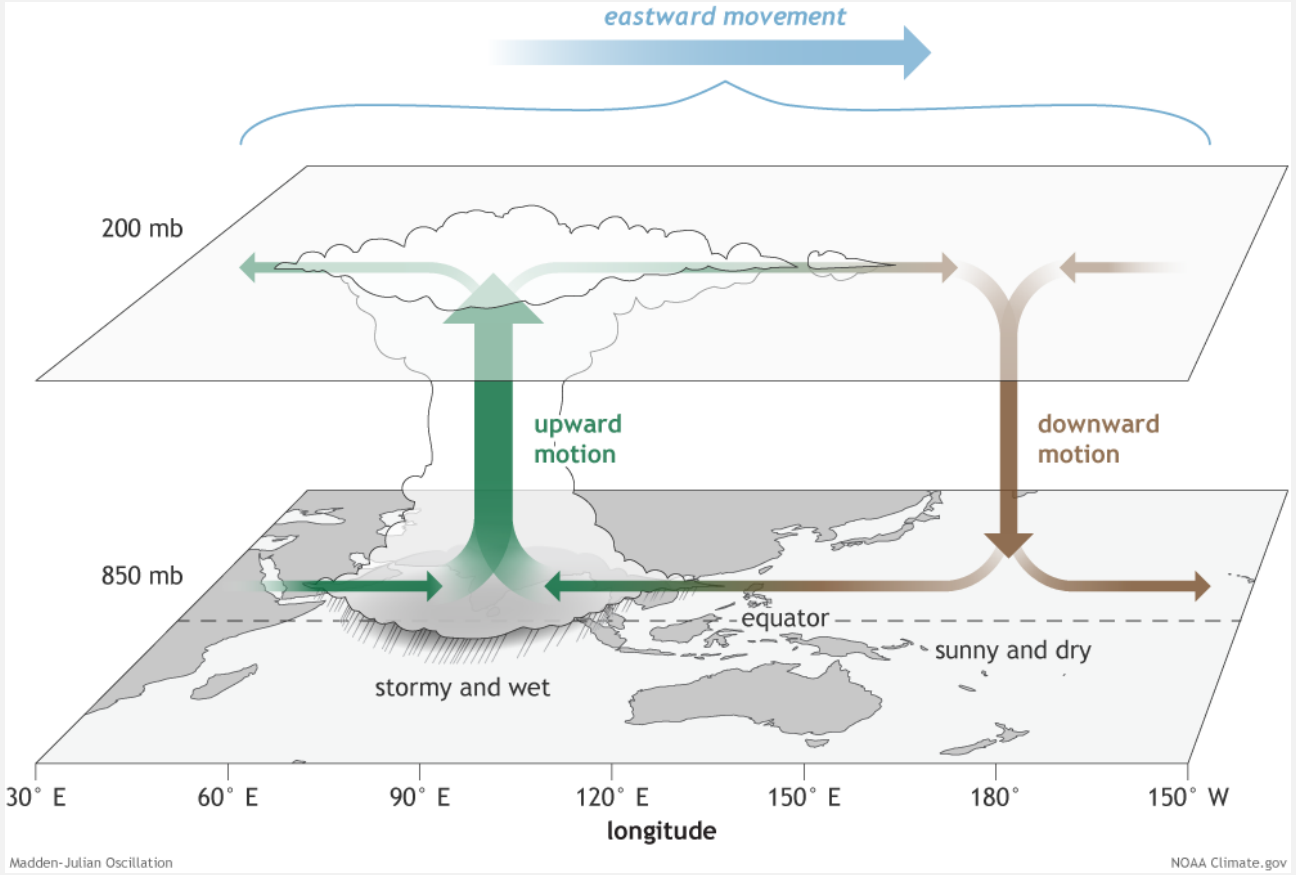

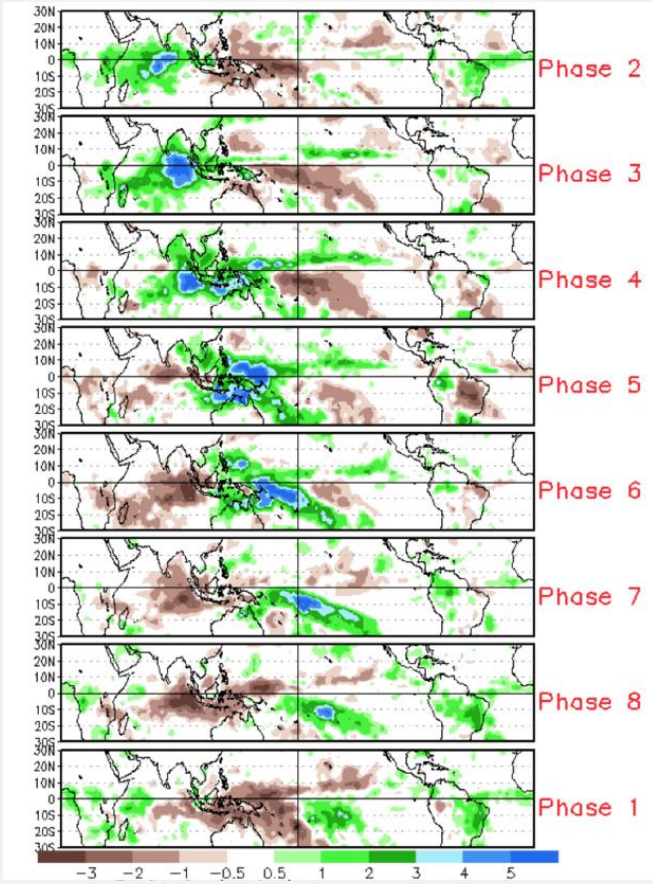

The Madden-Julian Oscillation (MJO) is an area of enhanced thunderstorms that travels around the world every 30 to 60 days from west to east along/near the equator. Ahead and behind the active stormy area are areas of suppressed convection and drier conditions. The MJO affects near-surface wind patterns, because the rising air in the stormy area causes surface winds to blow toward the active area. During a developing La Niña, the trade winds are stronger than average, helping to bring cooler waters up to the surface. If the MJO is active/strong, it typically changes the wind patterns temporarily and helps La Niña develop. When La Niña comes to an end, the enhanced trade winds weaken, allowing warmer water to return to the eastern Pacific. This warmer water allow thunderstorms related to the MJO to continue eastward into the EPAC, influencing the jet stream.

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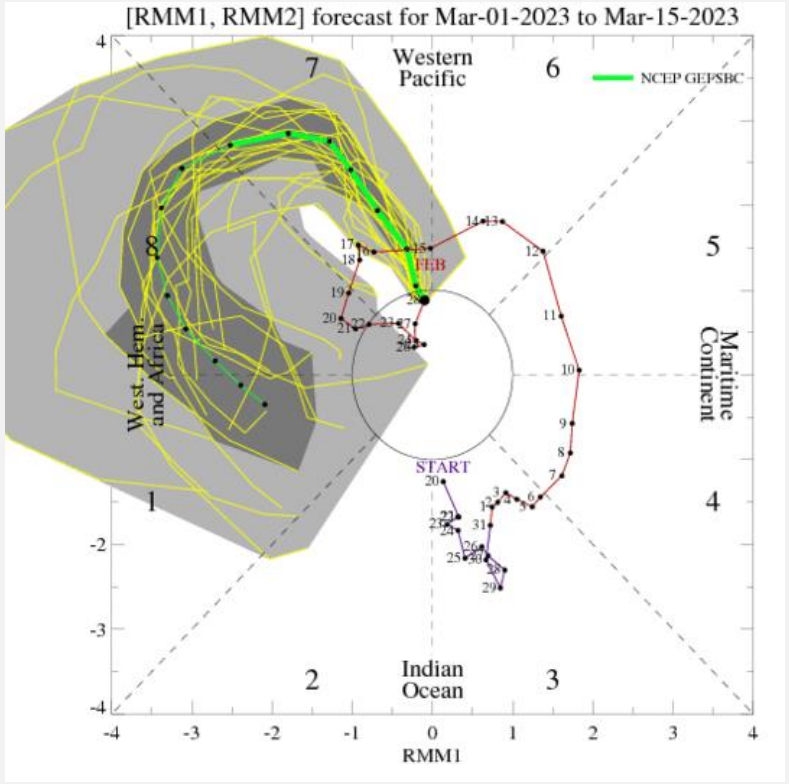

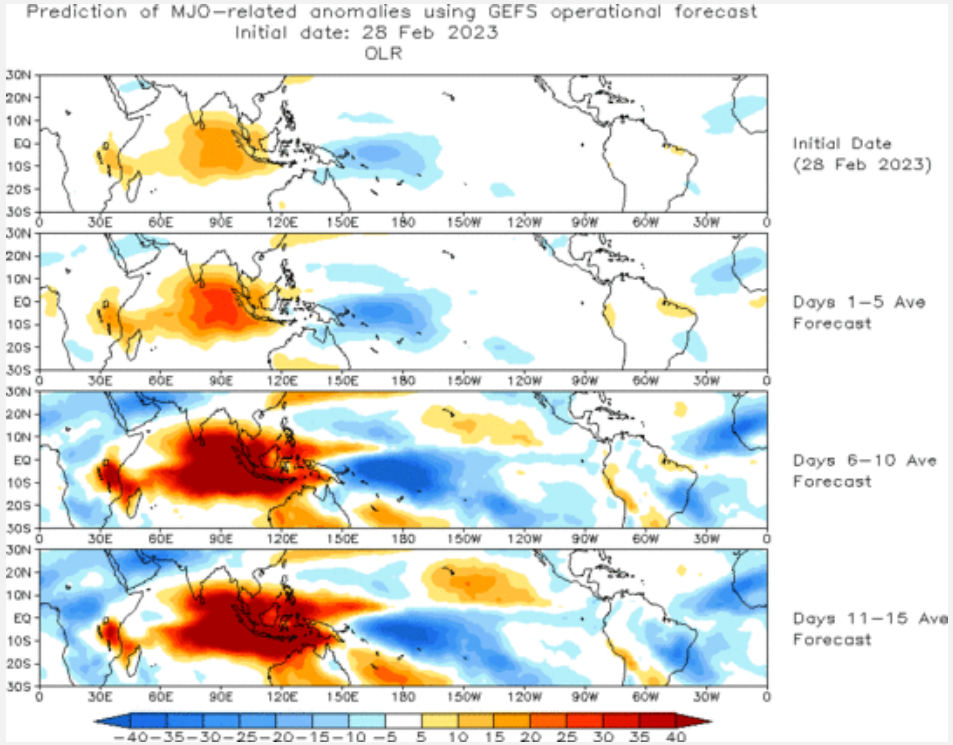

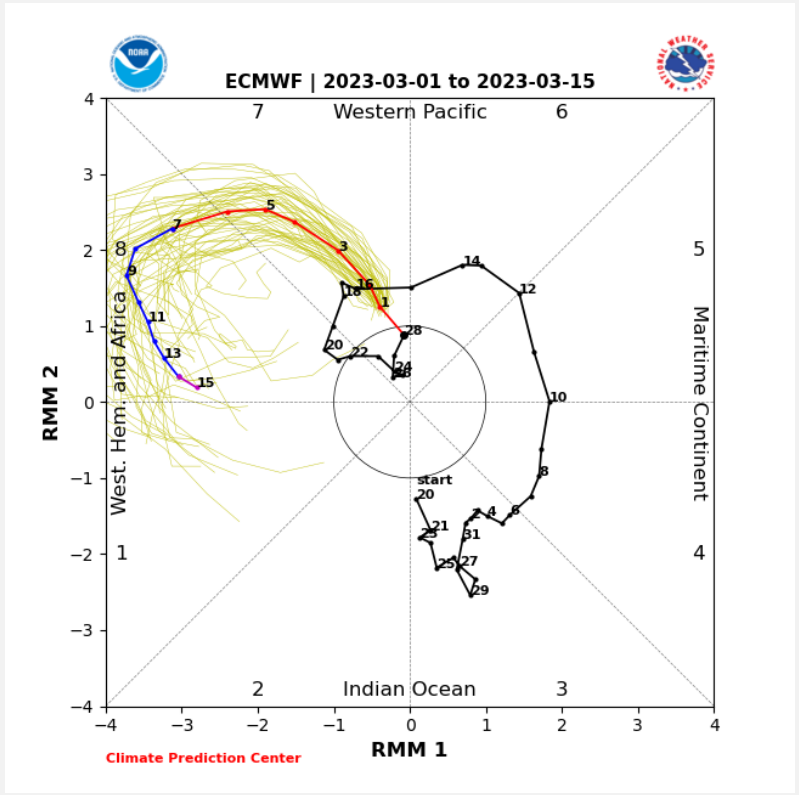

Forecasts for the MJO during the first two weeks in March 2023. The forecast is quite remarkable for March with a few runs of the GFS literally off the charts with the strength of the MJO in phase 8 later this month. The middle graphic shows the GEFS forecasts over time. The blue colors equate to below average outgoing longwave radiation or the tops of clouds from thunderstorms compared to average. The blue means more thunderstorms than normal. Red and orange colors equate to below average thunderstorm activity or the sinking side of the oscillation. Thunderstorms that extend through a good portion of the Pacific can result in a stronger than average subtropical jet stream. The thunderstorms also act draw the polar jet stream farther south, phasing with the subtropical jet and providing more moisture and lift to the Southwest U.S.

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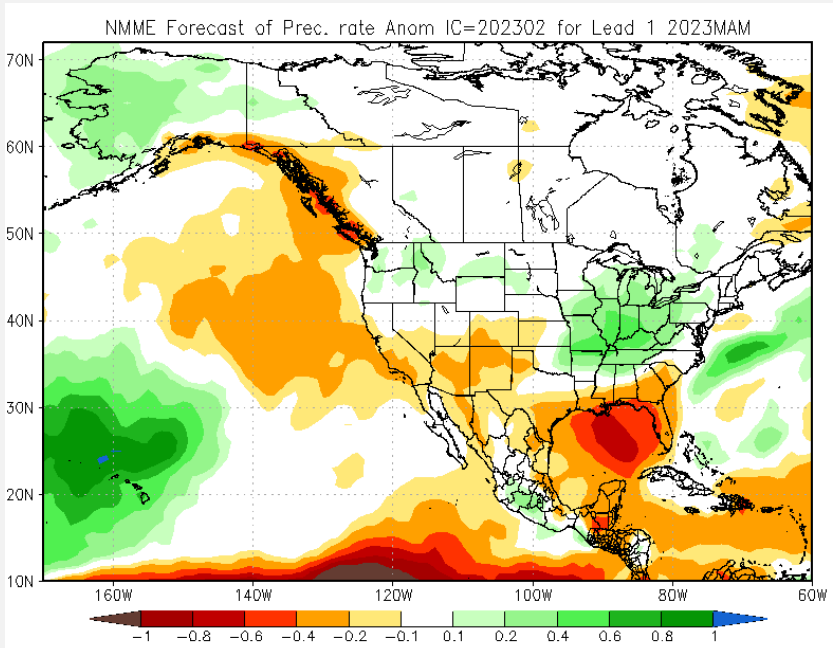

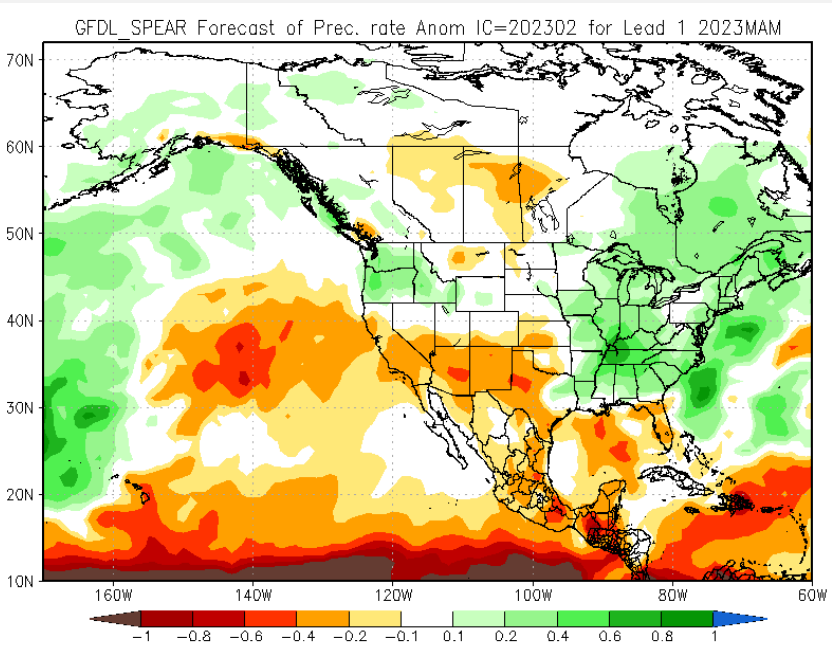

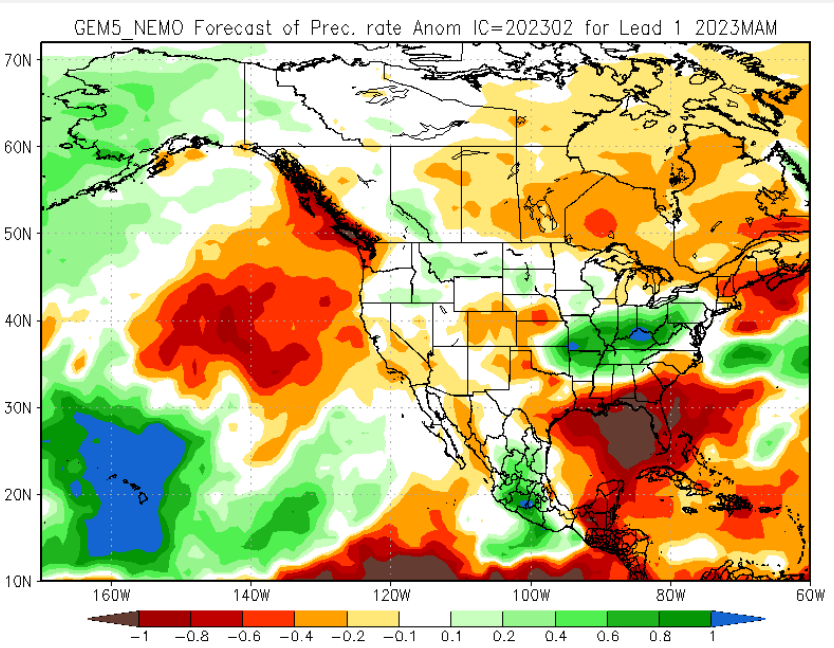

Model precipitation rate anomaly from the three climate models that have the highest forecast skill percentages, the North American Multi-Model Ensemble (NMME), Geophysical Fluid Dynamics Laboratory (GFDL_SPEAR) and the Canadian GEM5 NEMO models. All models show at least a portion of NM with below average precipitation.

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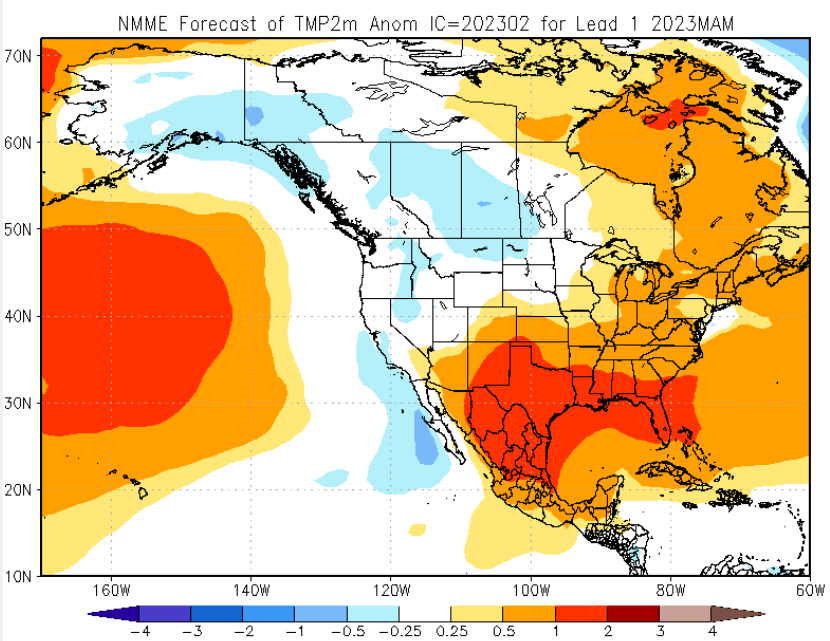

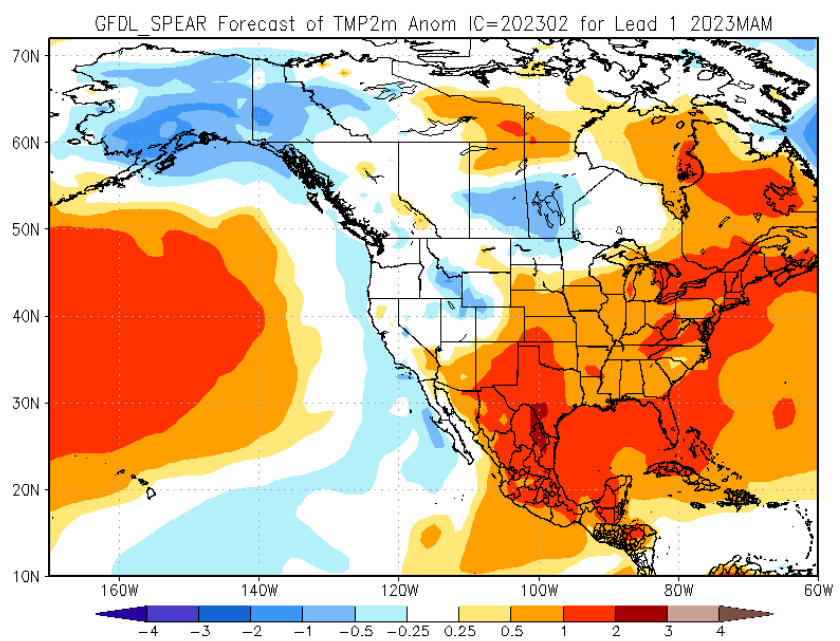

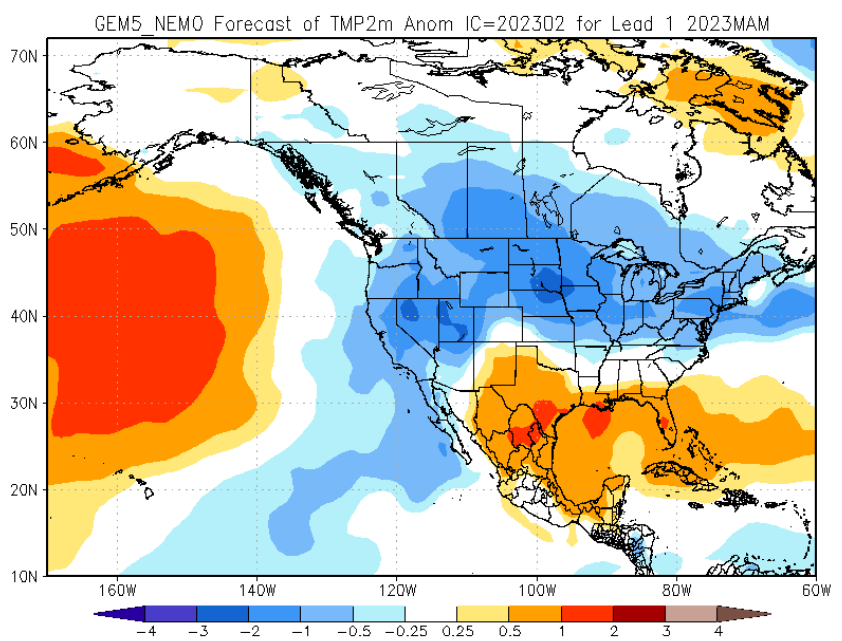

Temperature anomaly forecasts from the three climate models that have the highest forecast skill (top row), the North American Multi-Model Ensemble (NMME), GFDL_ SPEAR, GEM5_NEMO (Canadian) models. All three model forecasts are predicting above to well above average temperatures for the southeast half with near average temperatures northwest.

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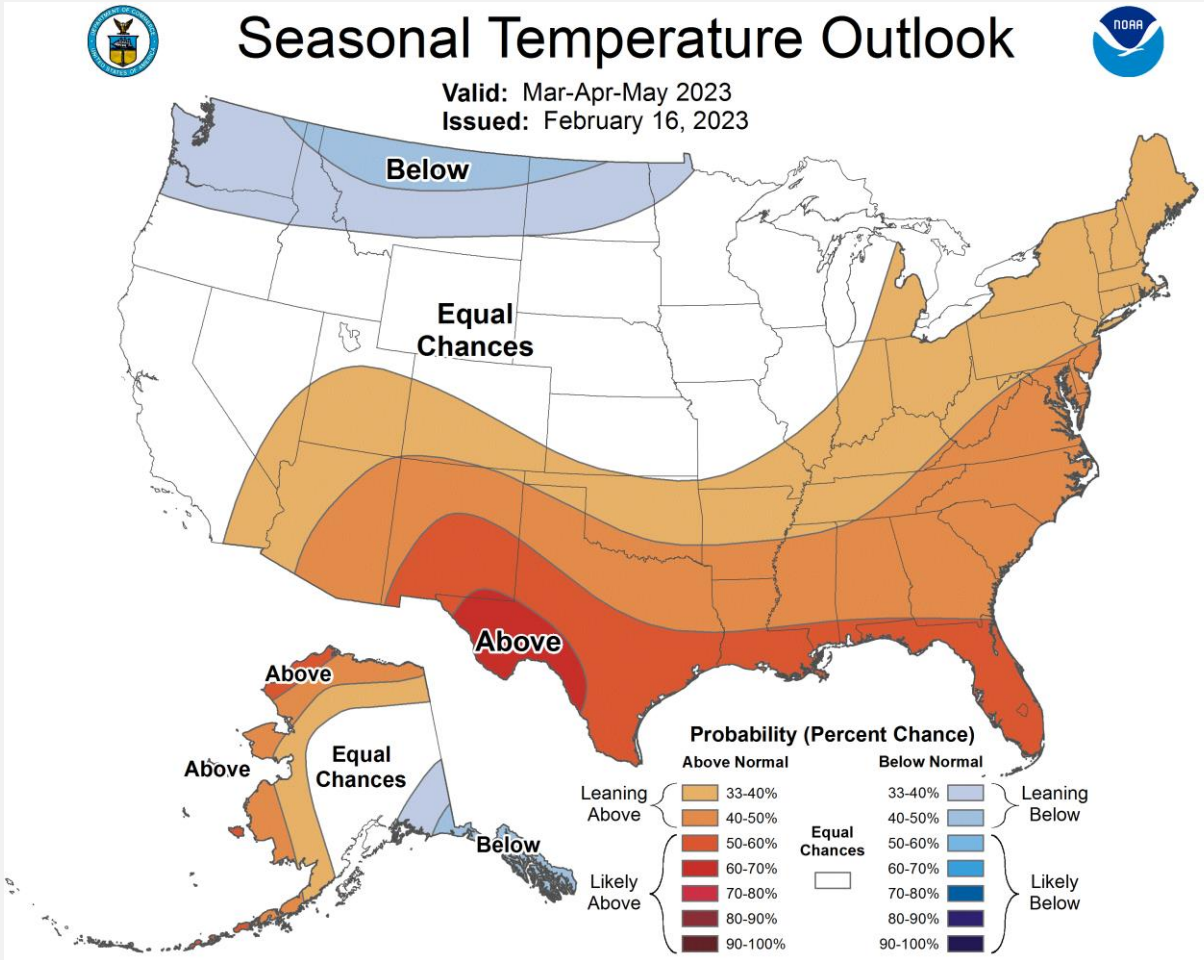

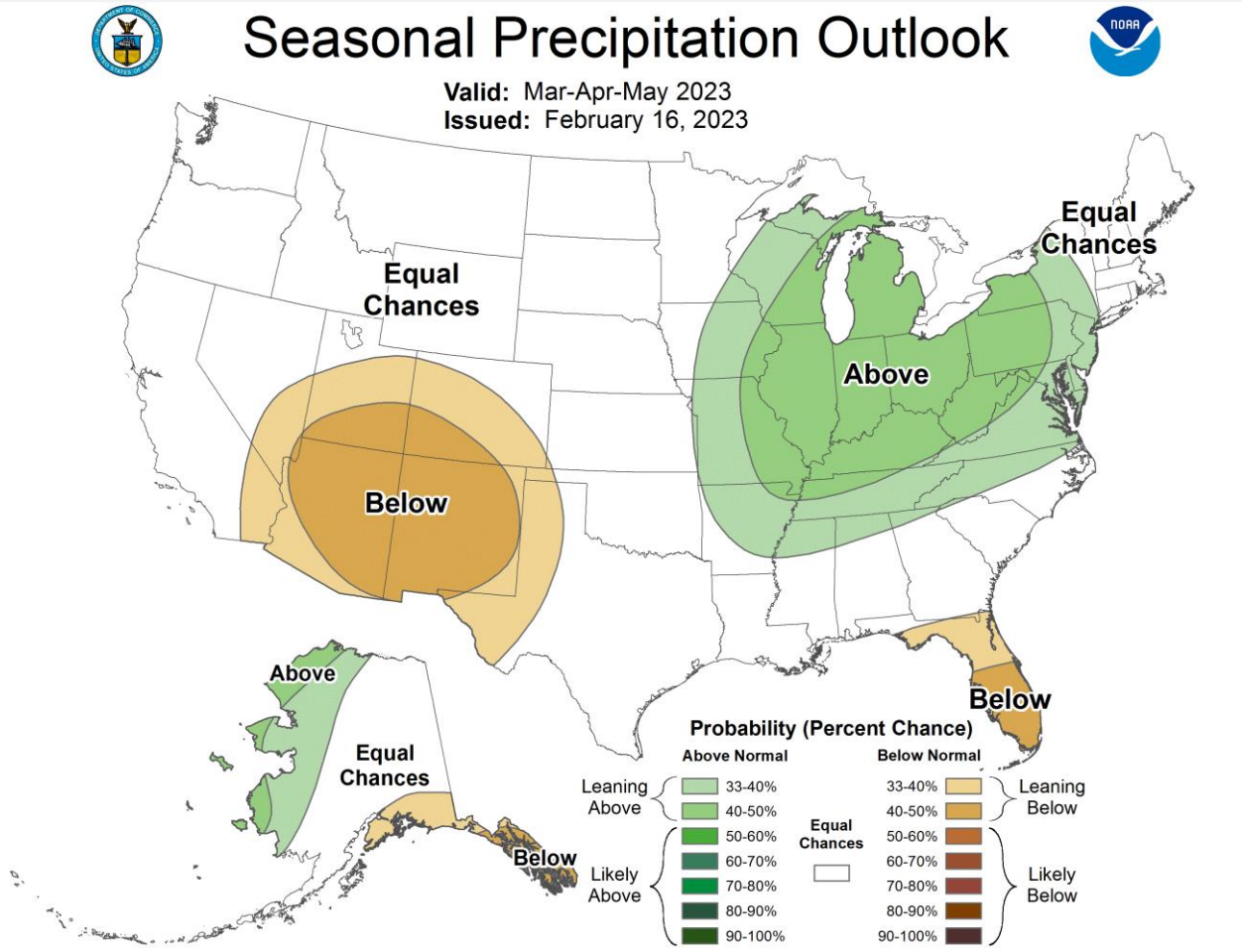

Climate Prediction Center's Official 2023 Climate Outlook for March, April and May showing probabilities favor above average temperatures and below average precipitation.

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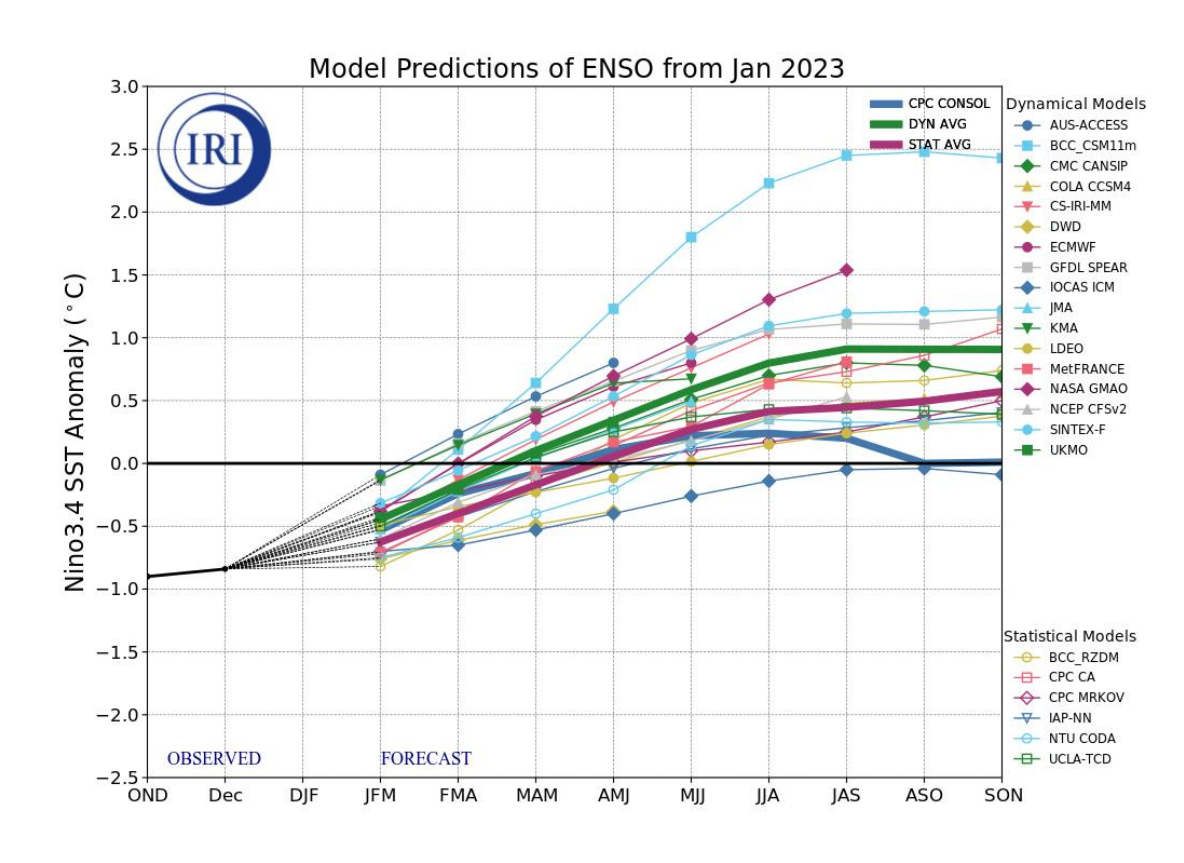

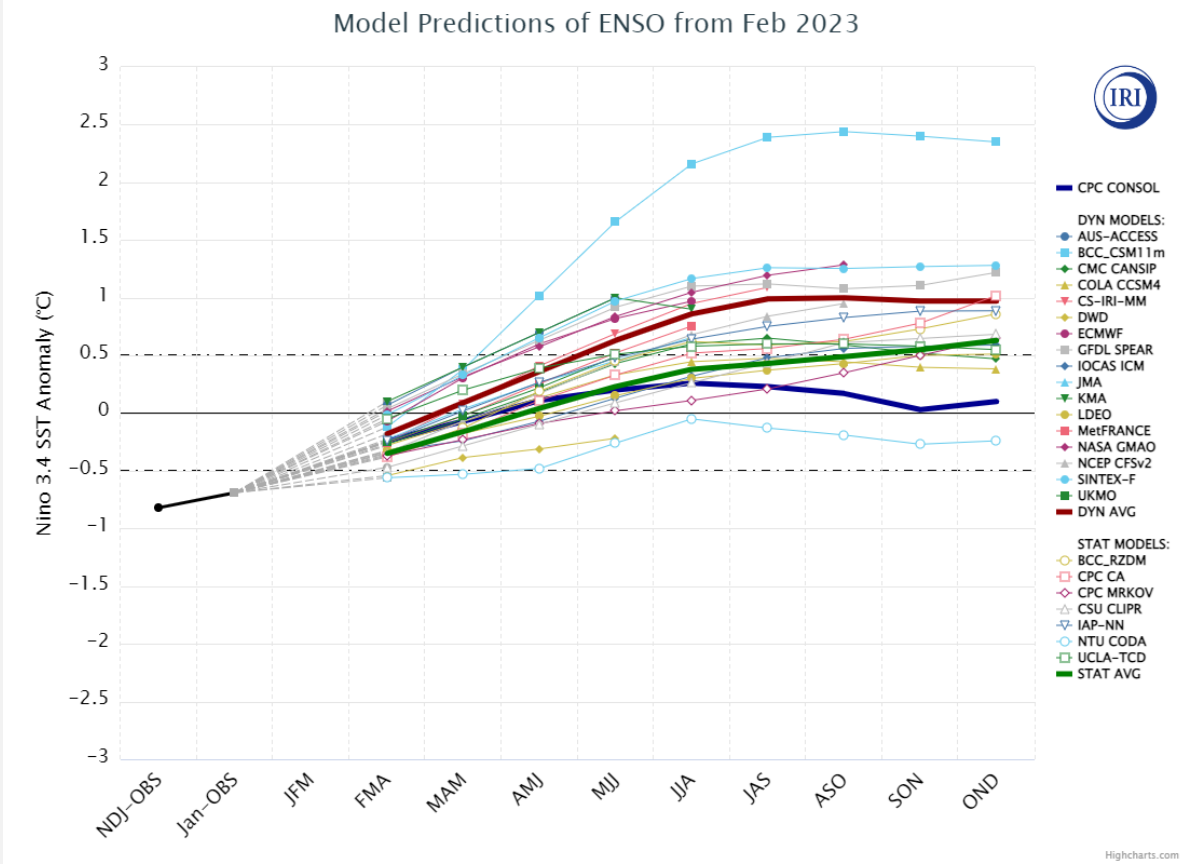

The vast majority of climate model forecasts continue to warm the eastern equatorial Pacific Ocean in boreal spring but not quite at the rate as previous runs did. Transitioning to an El Niño by summer remains possible and would likely spell a below average monsoon.

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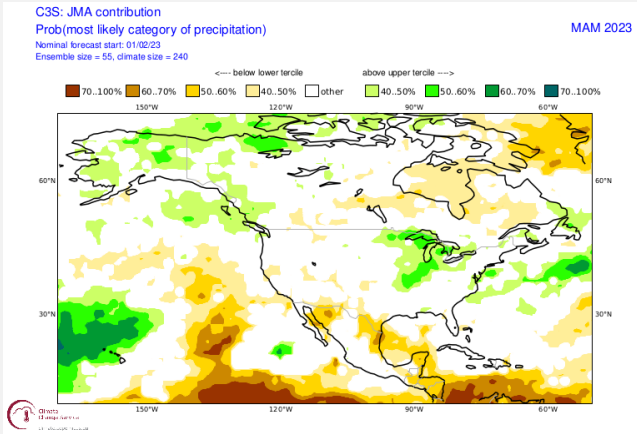

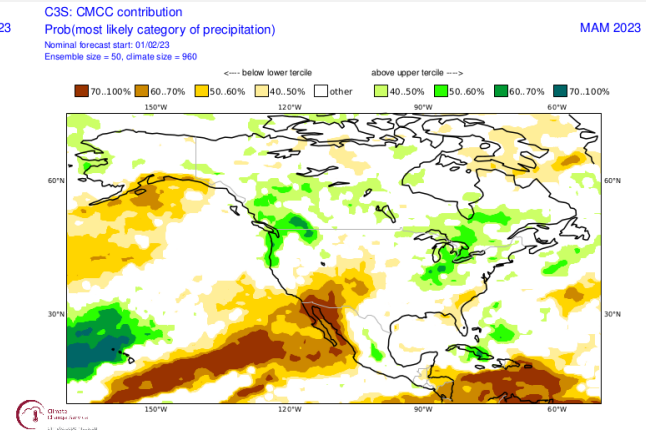

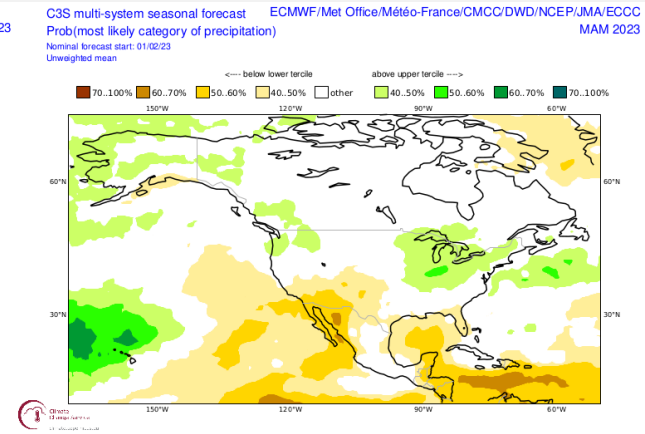

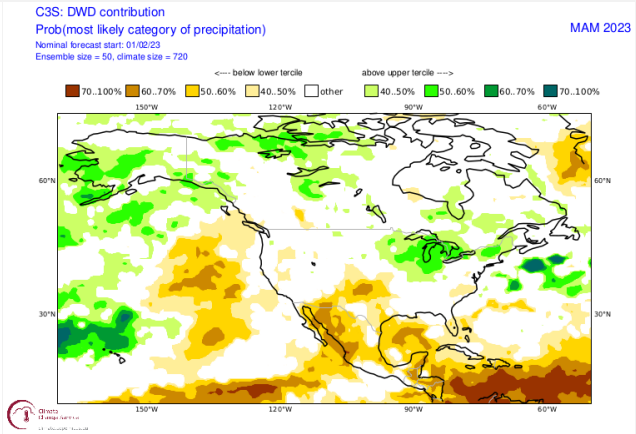

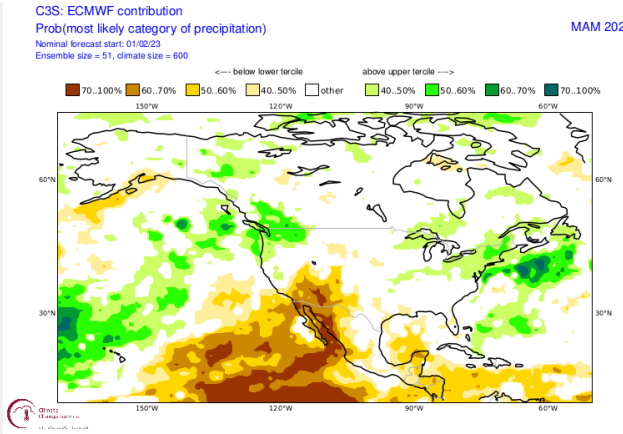

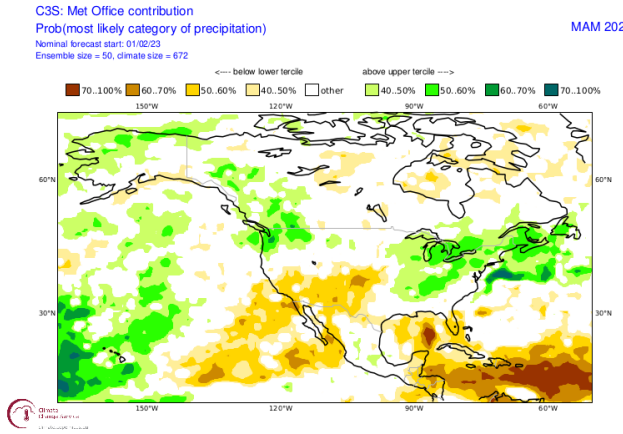

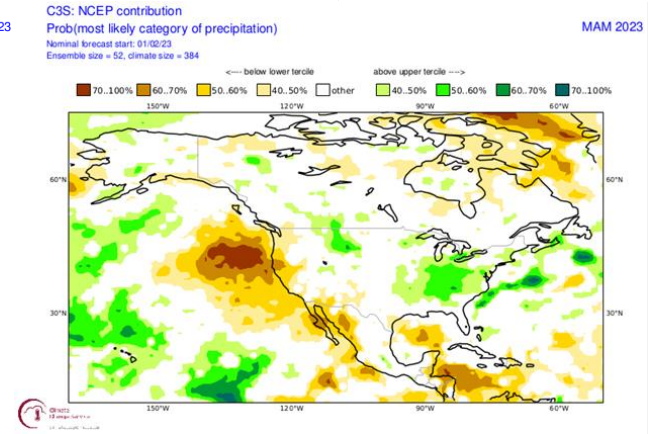

All available seasonal precipitation forecasts from meteorology/climatology agencies from around the globe for meteorological spring MAM 2023. Most models keep the southwest drier than average but also keep in mind, the date used to initialize these models was prior to dynamical weather forecast ensemble models picking up on the strong MJO. An active March could easily change these forecasts.

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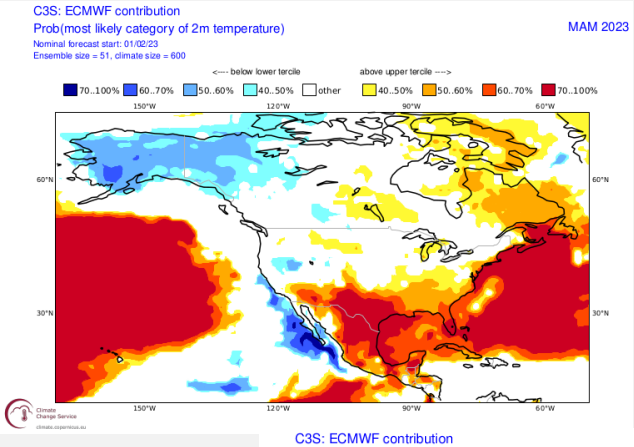

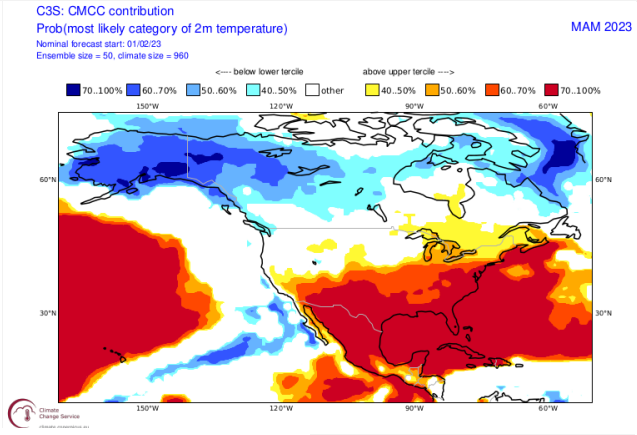

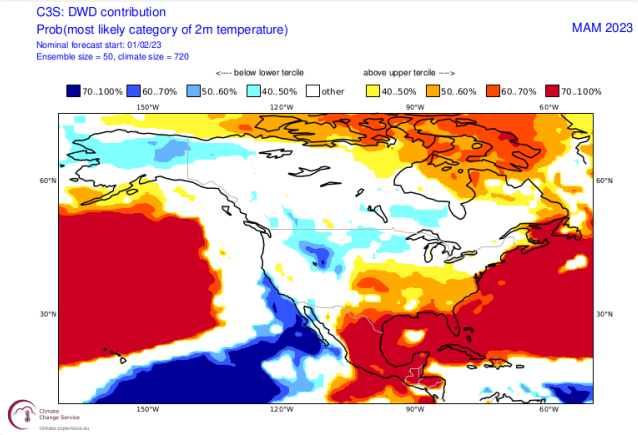

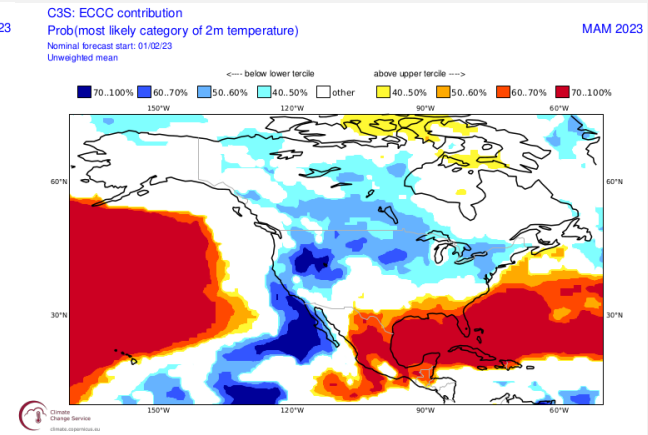

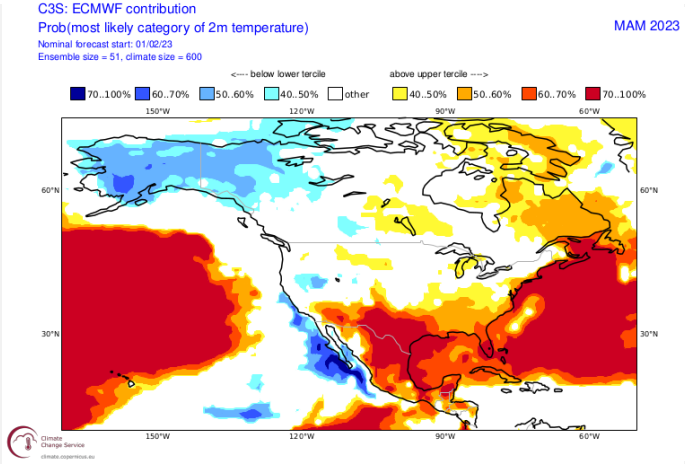

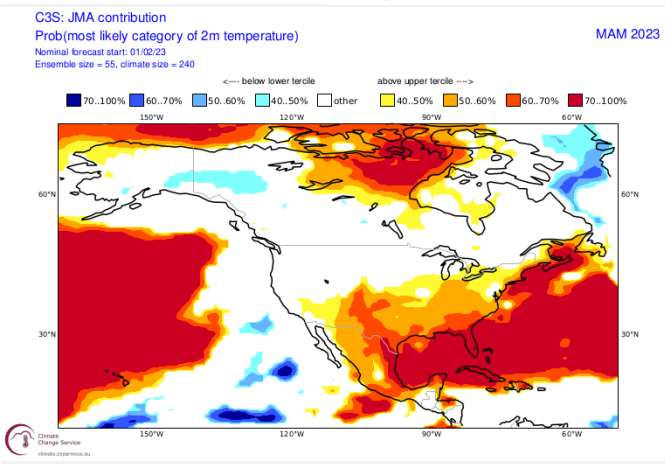

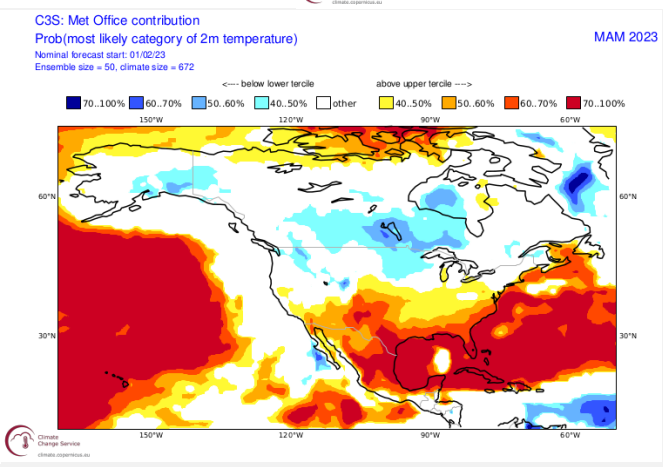

All available seasonal temperature forecasts from meteorology/climatology agencies from around the globe for meteorological spring MAM 2023. Most models keep the southwest warmer than average but also keep in mind, the date used to initialize these models was prior to dynamical weather forecast ensemble models picking up on a strong MJO. An active March would easily change these forecasts.

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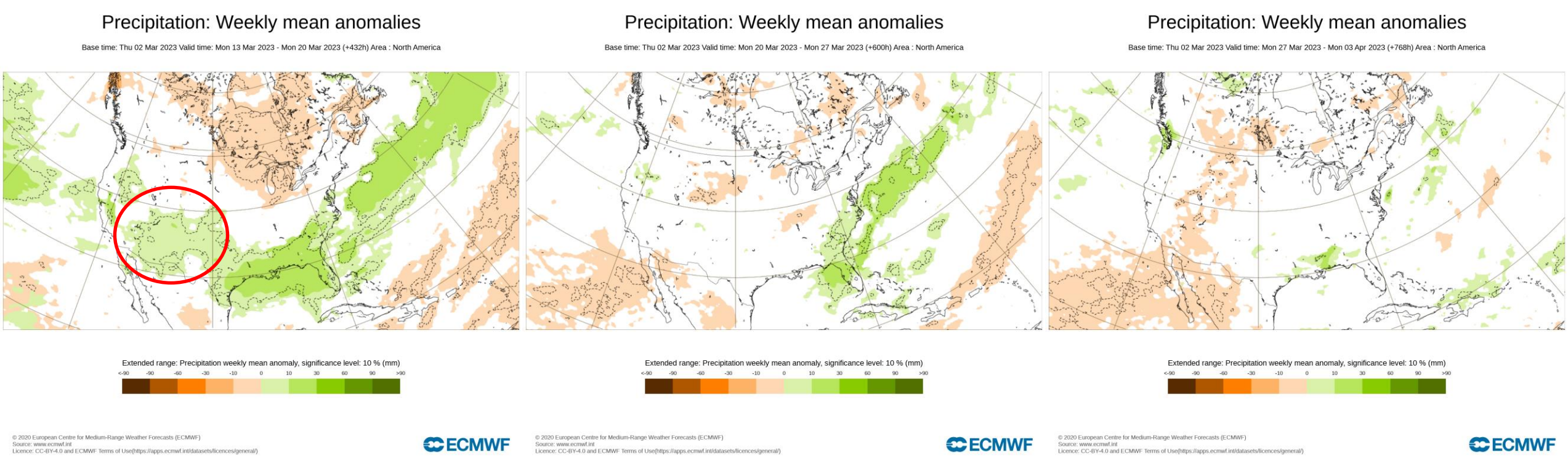
For Northern & Central New Mexico

Albuquerque
WEATHER FORECAST OFFICE



The new European Centre for Medium-Range Weather Forecasts (ECWMF) Extended Range Ensemble Forecasts (ENS) which has shown superior forecast accuracy compared to other extended weather models (Prein et al., 2022). The week of March 13-20 looks especially active with above average precipitation forecast in much of NM. Why? The short answer is the MJO but the overall answer is the end of a three year-long La Niña climate pattern and a return to a "neutral" climate pattern.

2023 Spring Outlook

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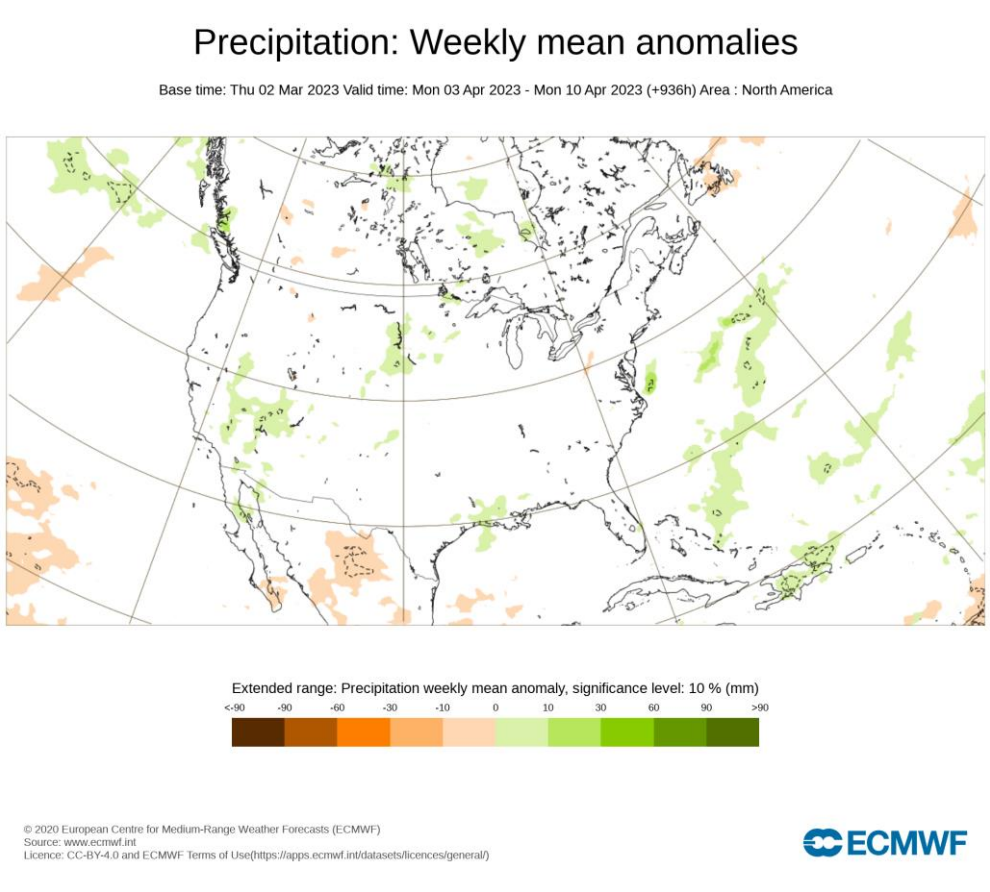

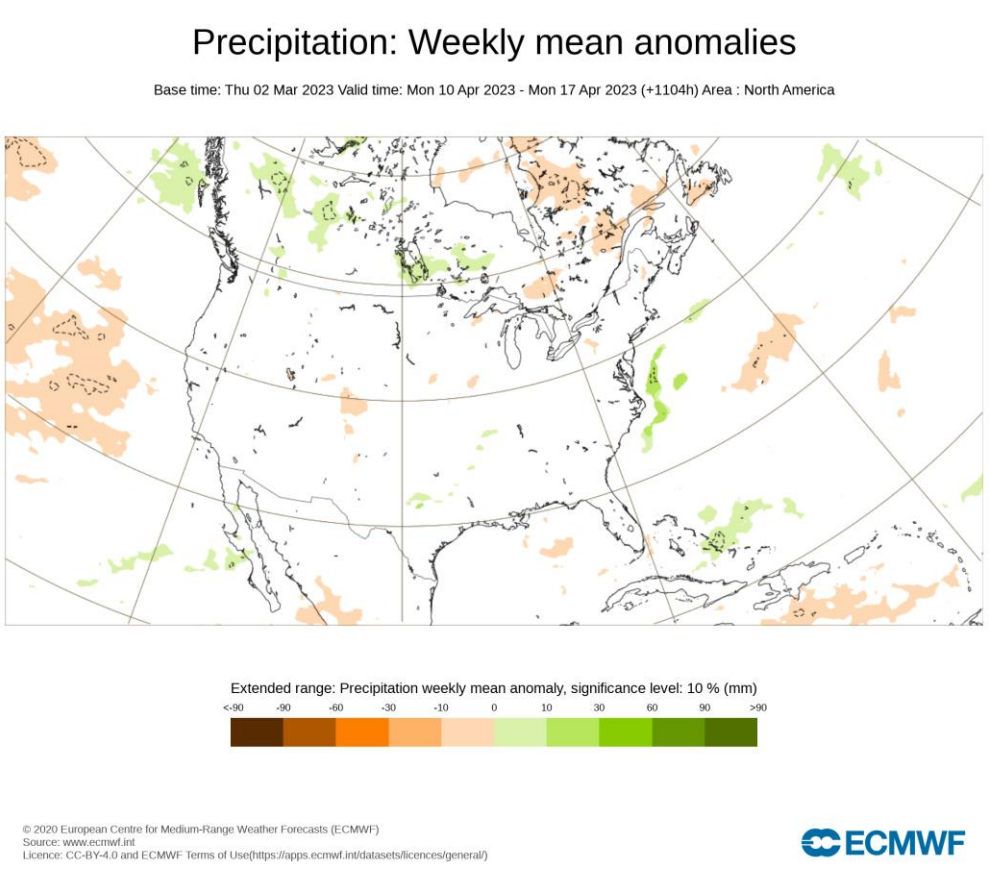

The first two weeks in April are forecast by the ECMWF ENS model to be near average precipitation. Average will seem downright soggy compared to April 2022 when the entire state recorded just 0.05".

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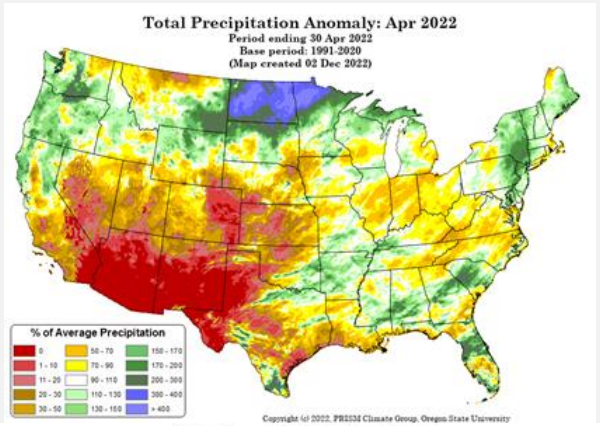

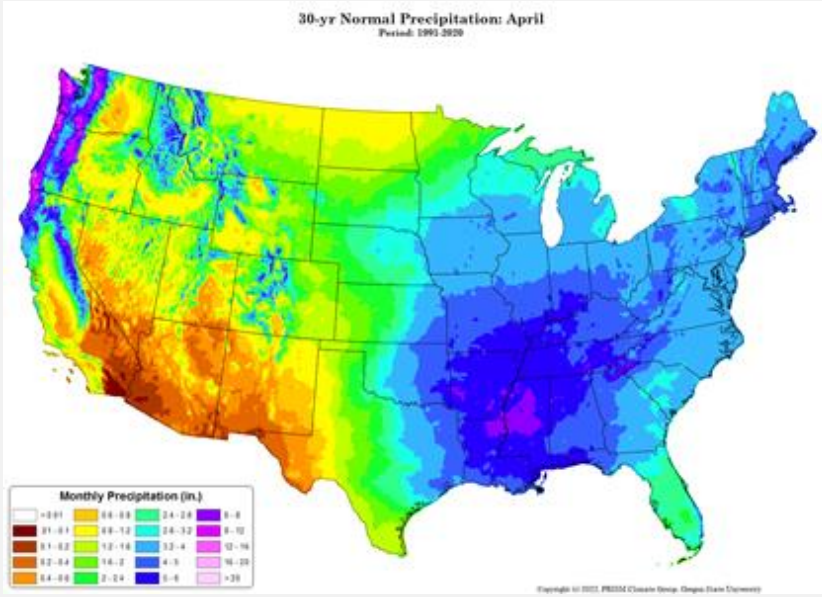

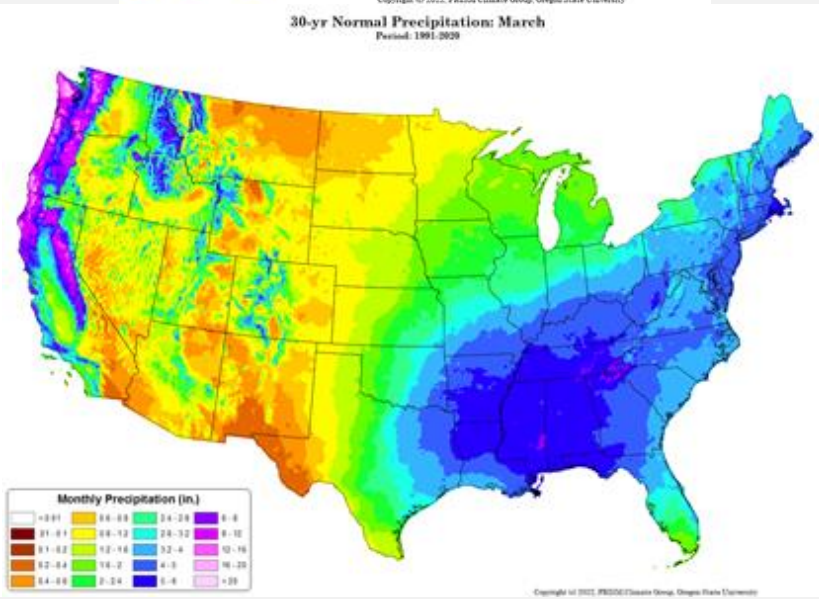

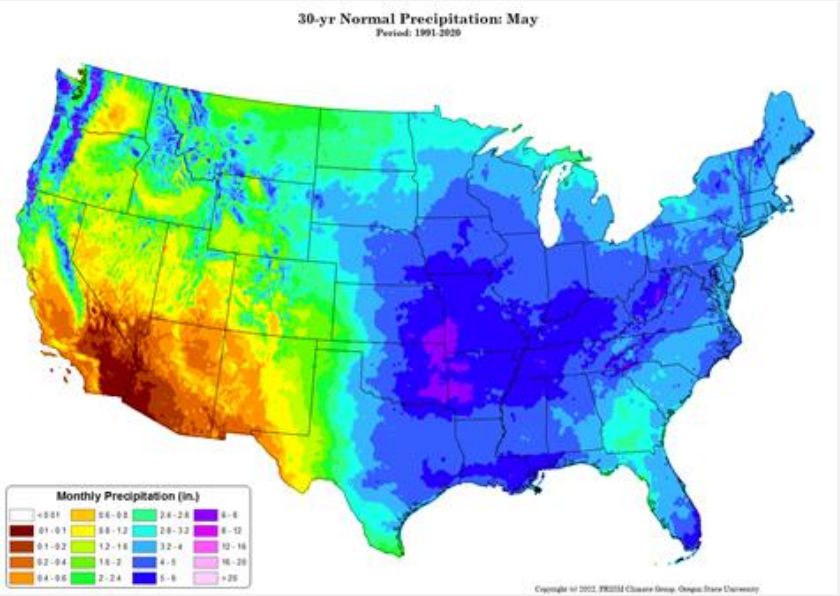

What is average or normal precipitation? These charts show normal or average precipitation for each month during meteorological spring. The bottom plot is the precipitation that fell in April 2022. Much of NM did not have any measurable precipitation for the entire month.

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- March: Forecast confidence is high for above average precipitation and near to slightly below average temperatures

  April: Forecast confidence is moderate for average to slightly above average precipitation and slightly above average temperatures

  May: Forecast confidence is moderate for near average precipitation and slightly above to above average temperatures

  Severe Weather: Confidence is moderate to high severe thunderstorm activity will be near average, and well above last year's amount

  Wind: There will still be plenty of wind in spring but a neutral climate pattern typically results in below average wind speeds in NM during MAM.

2023 Spring Outlook

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