2022 Spring Outlook

For Northern & Central New Mexico

Albuquerque
WEATHER FORECAST OFFICE

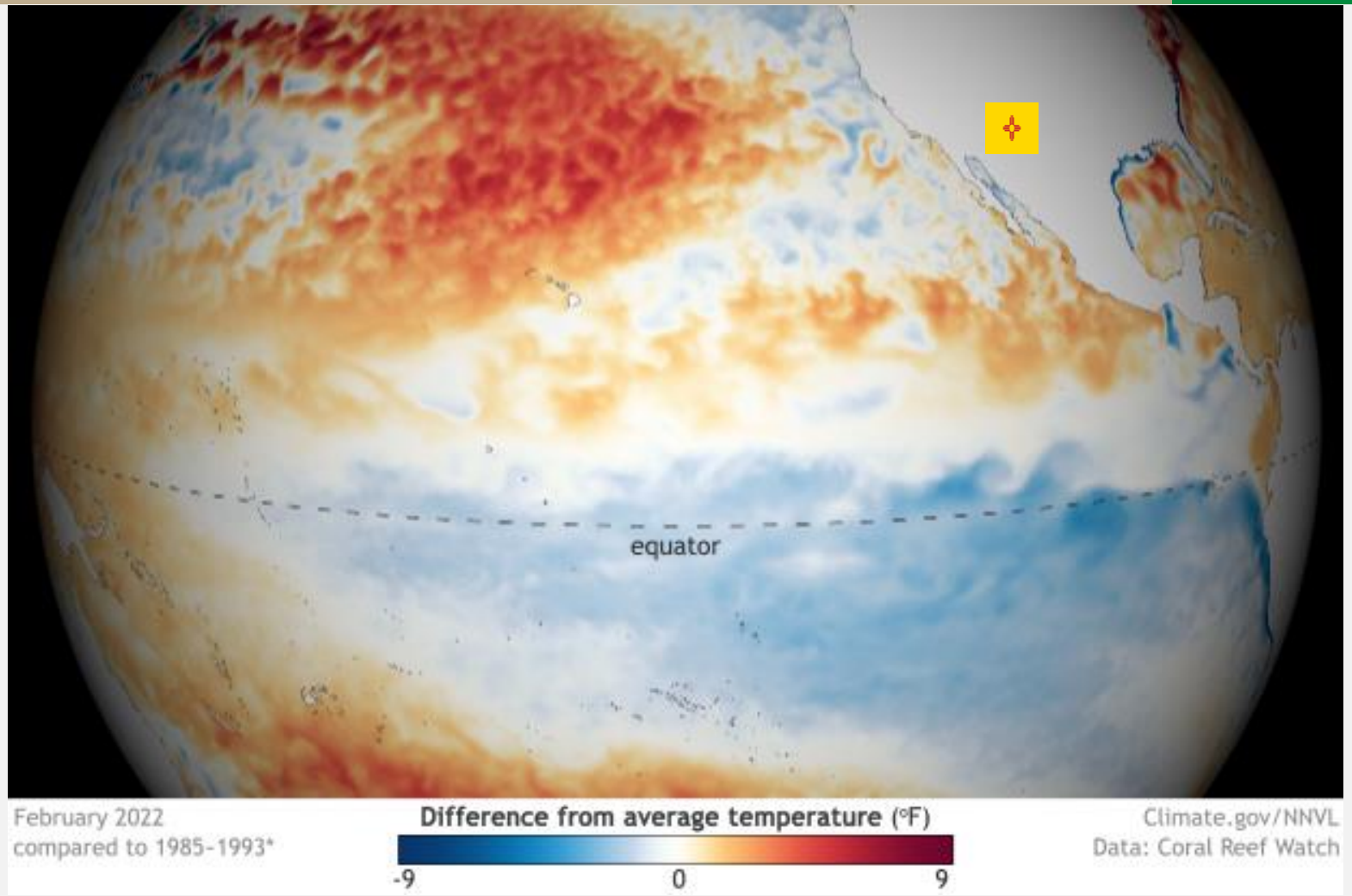

Figure 1. Sea Surface Temperature (SST) differences from average in February 2022. What will the end of a "double-dip" (two cool seasons in a row) La Niña this spring (April, May and June/AMJ) mean for temperatures and precipitation in central and northern New Mexico?

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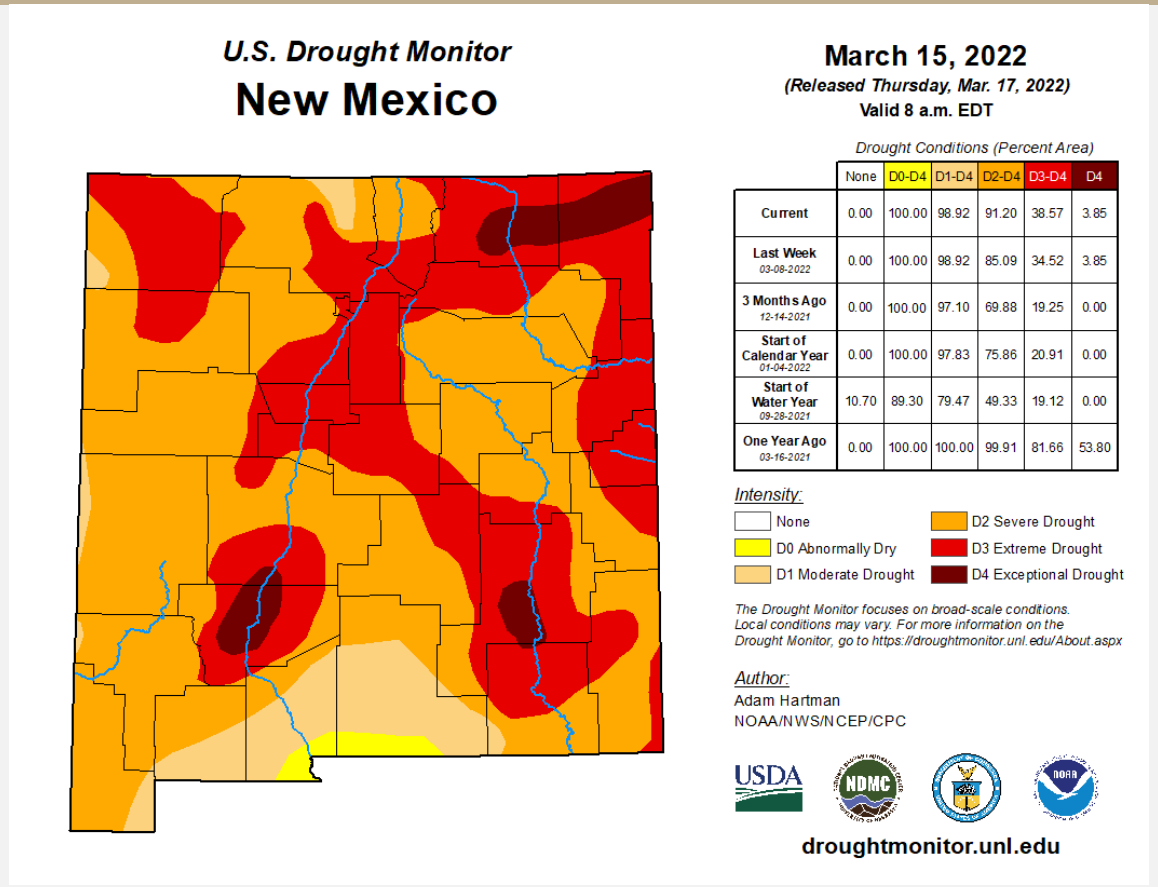

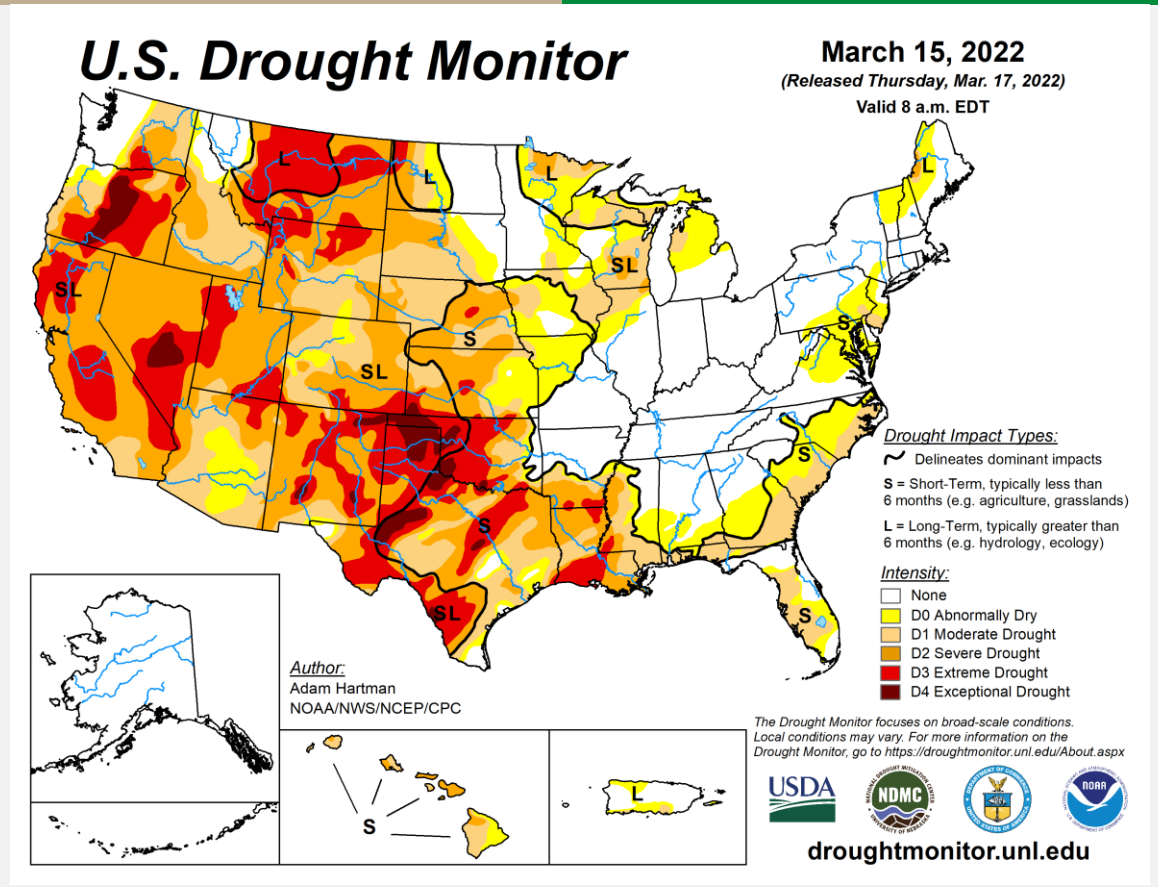

Figures 2-3. U.S. Drought Monitor showing that much of New Mexico remains in Moderate drought with areas of Extreme and localized Exceptional drought. New Mexico and much of the western half of the country are in a two decade-long megadrought. It's considered the most extreme drought in at least the past 1,200 years. By examining tree ring data from Montana to northern Mexico and from the Pacific Ocean to the Rocky Mountains, climate scientists concluded that this is no ordinary drought. Soil moisture deficits doubled since 2000 when compared with levels in the1900s. The study also found that anthropogenic warming contributed to a 42% increase in drought severity.

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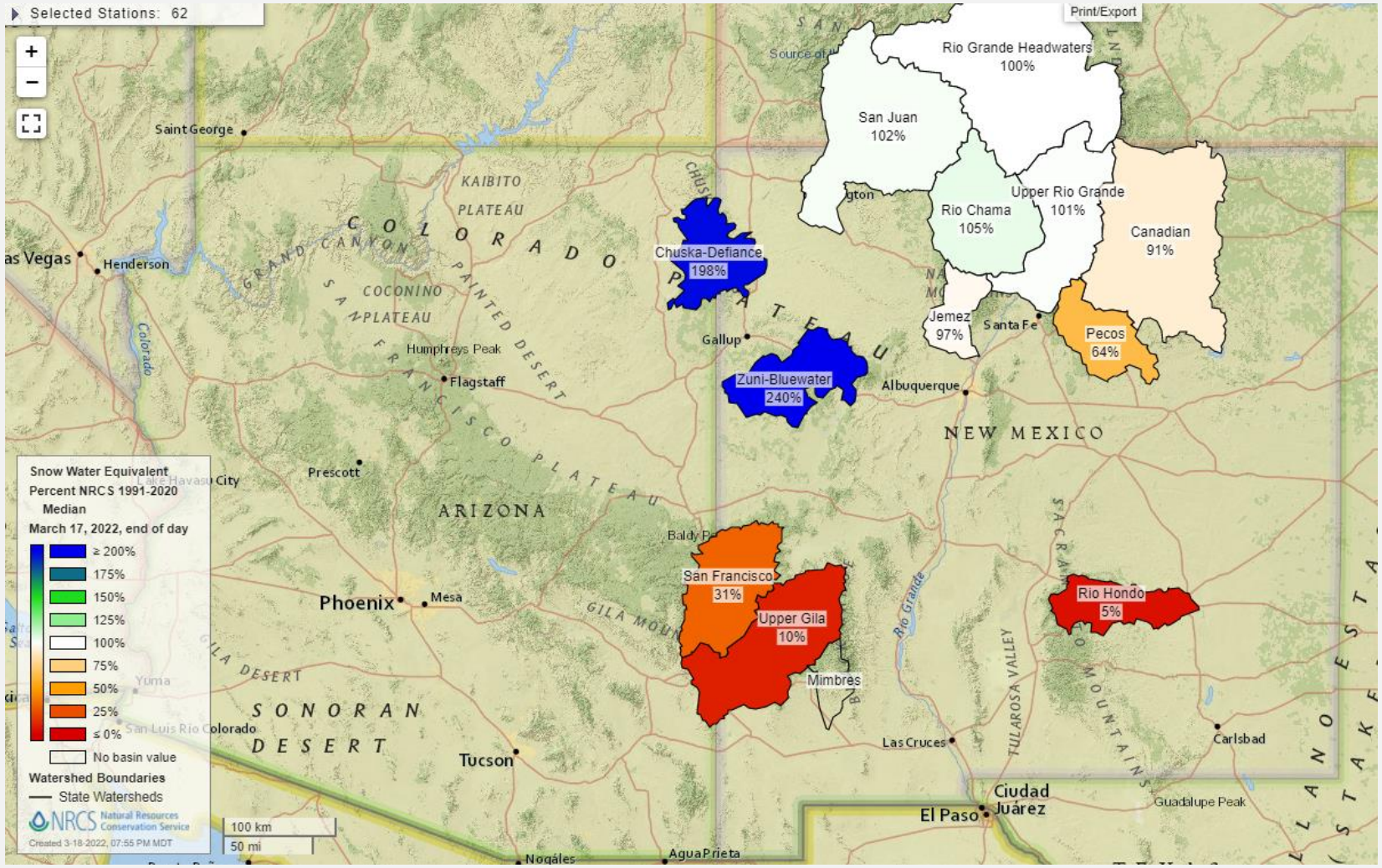

Figure 4. Snow water equivalent (SWE) percentage of normal or average. Chuska-Defiance and Zuni/Bluewater river watersheds are well above average with all other watersheds ranging from slightly above to well below average.

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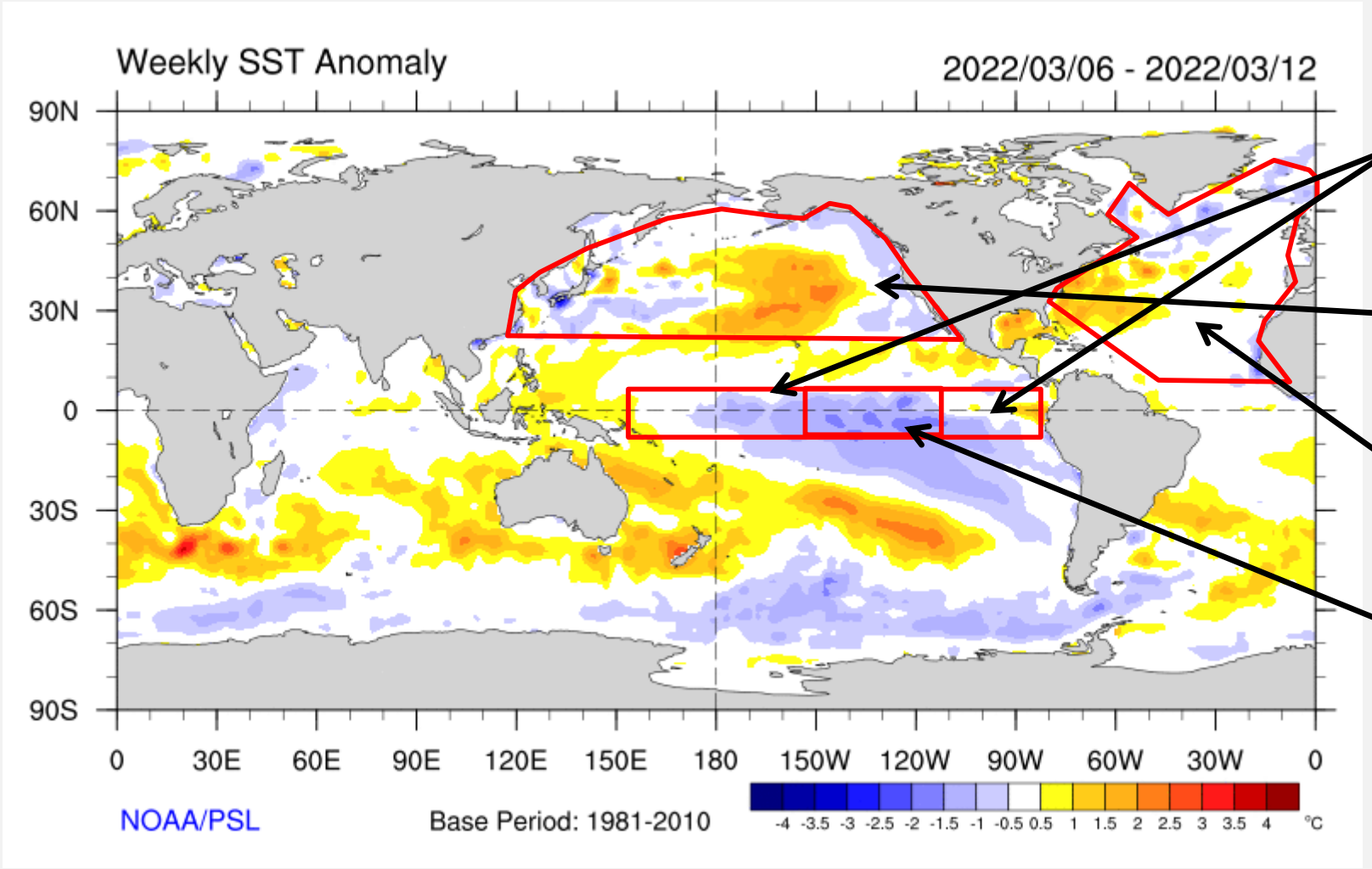
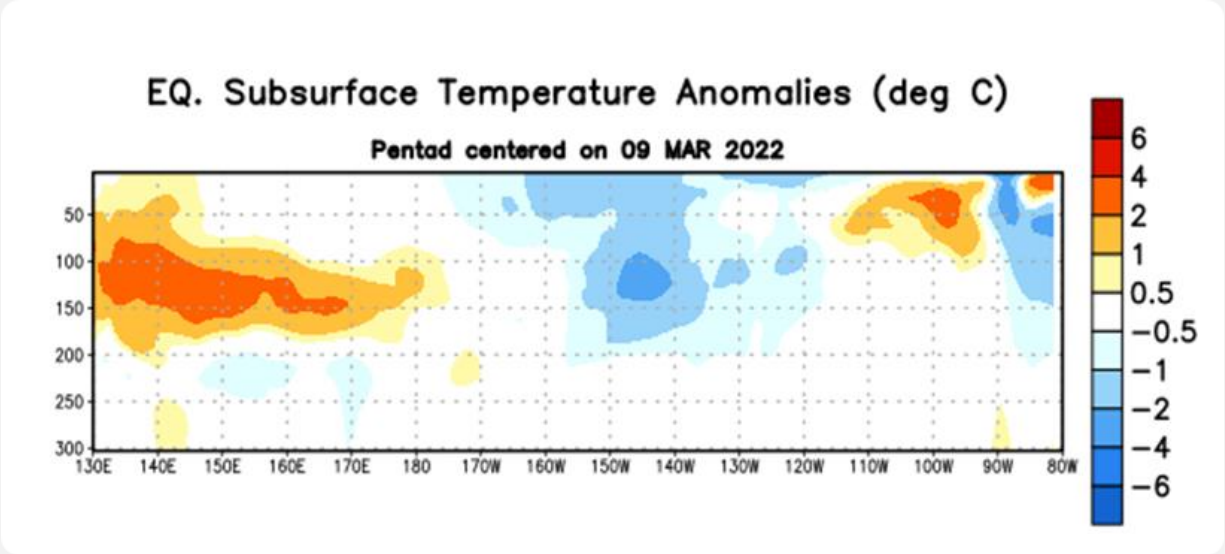


- Multivariate ENSO Index (**MEI**) for JAN-FEB 2022: **-1.0**
- Pacific Decadal Oscillation (**PDO**) for FEB 2022: **-1.08**
- Atlantic Multidecadal Oscillation (**AMO**) for FEB 2022: **+0.139**
- Oceanic Niño Index (**ONI**) (uses Niño 3.4 region - inner rectangle) for DJF 2021-22: **-1.0**

Figure 5. Latest weekly global SST anomalies showing the area of cooler than average temperatures in the eastern Equatorial Pacific continue to hang on.



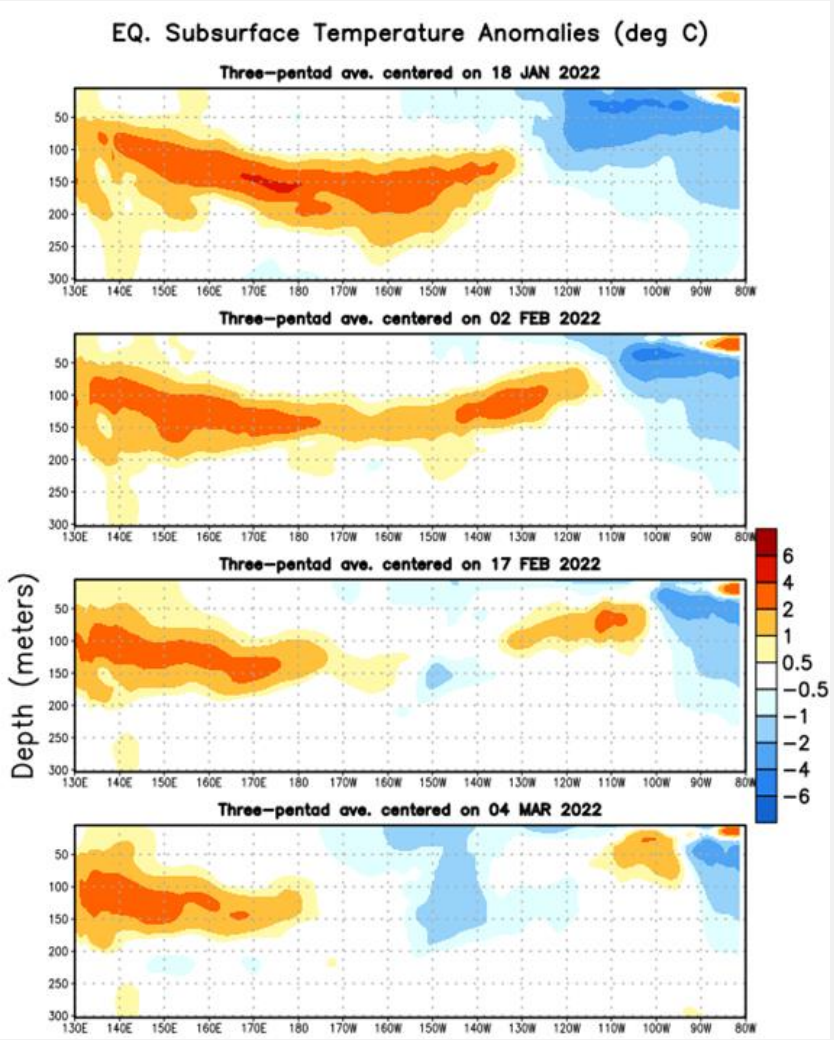


Figure 6-7. Negative subsurface temperature anomalies have re-emerged in the Central Pacific, and have expanded across a shallow layer near the surface in the central and east-central Pacific. Could a "triple-dip" La Niña be in the cards in fall?

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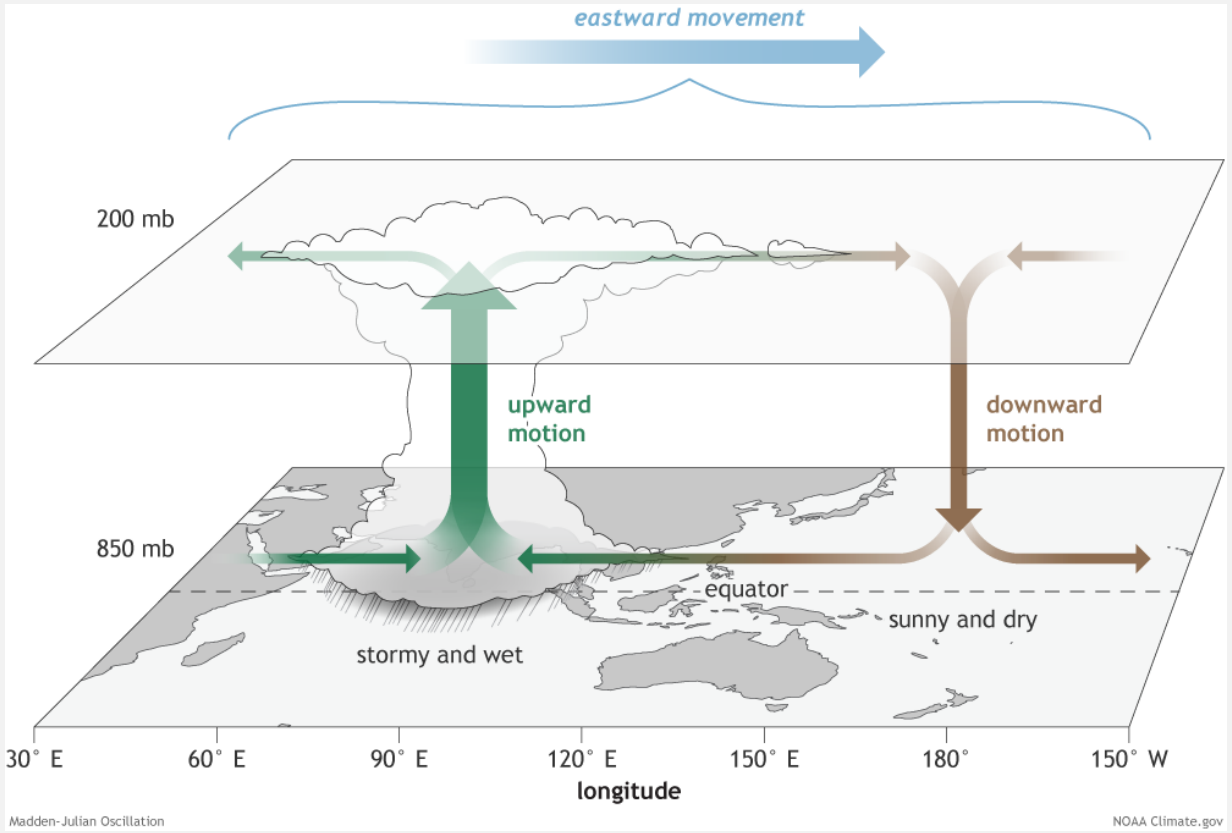

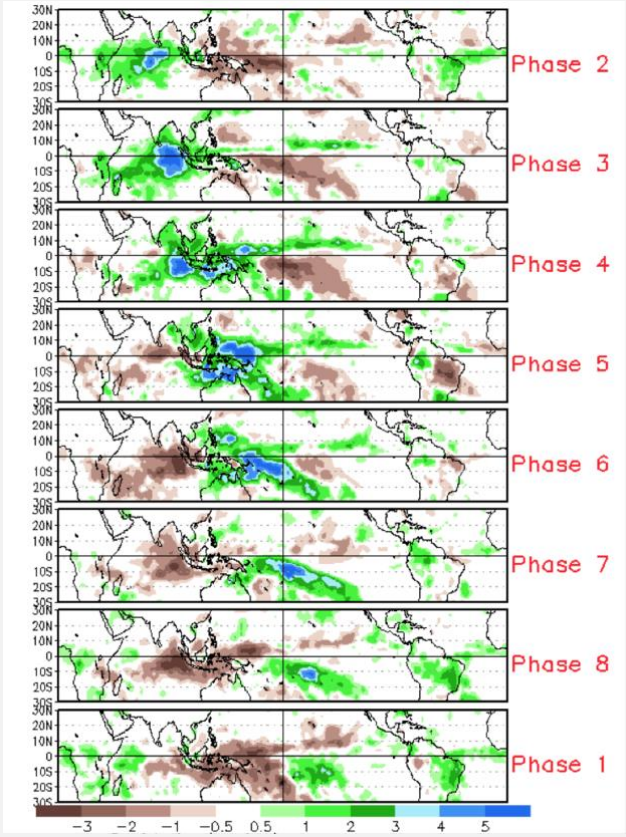

Figures 8-9. The Madden-Julian Oscillation (MJO) is an area of enhanced thunderstorms that travels around the world every 30 to 60 days from west to east along/near the equator. In phases An active MJO's importance on the weather/climate impacts for the Southwest U.S. cannot be overstated. Ahead and 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 this area. During El Niño, the trade winds are weaker than average, allowing surface waters to warm (vice versa during La Niña). If the MJO is active, it typically changes the wind patterns temporarily. The MJO has been essentially a non-factor during winter thanks to La Niña but is already showing signs of strengthening in late March 2022.

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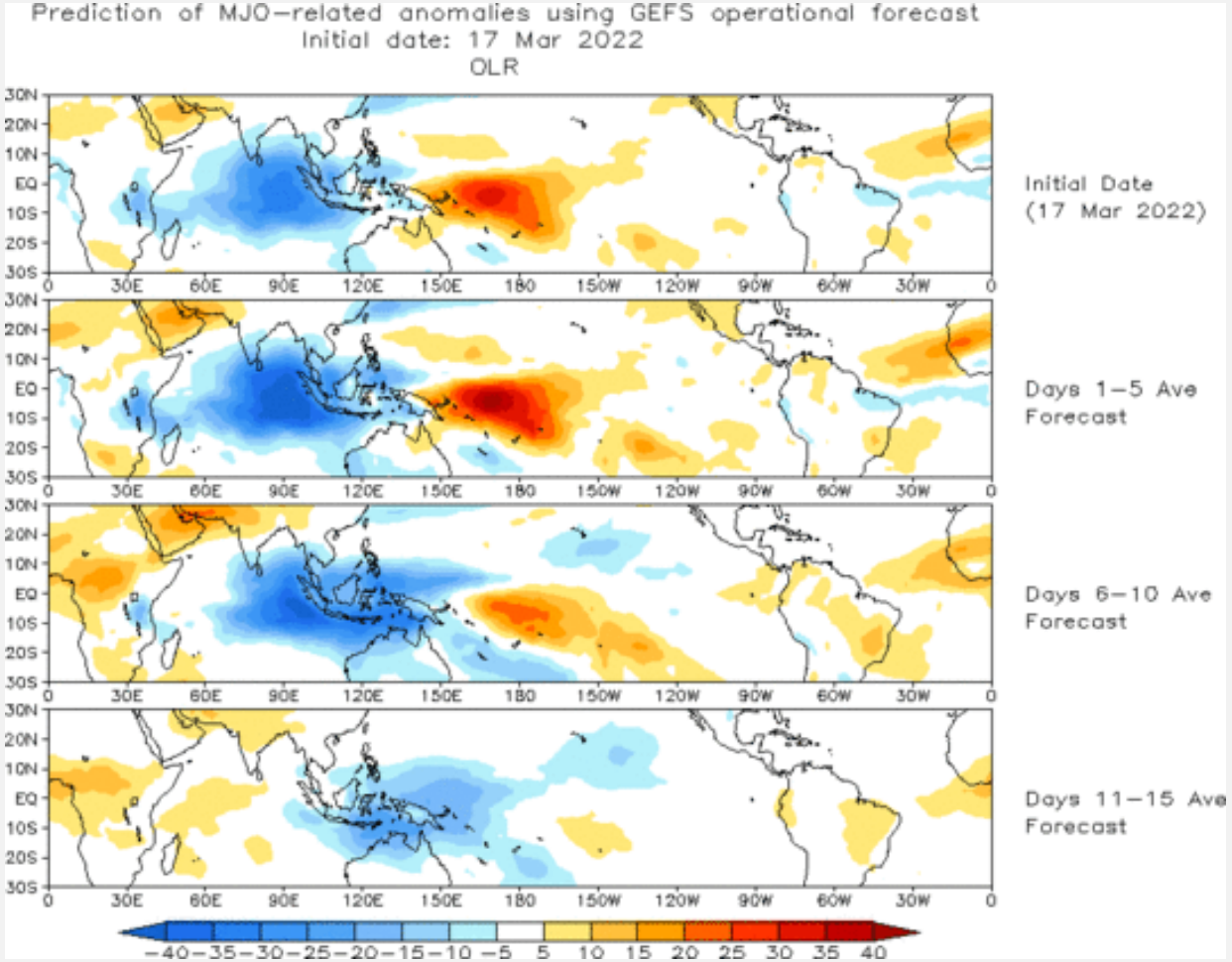

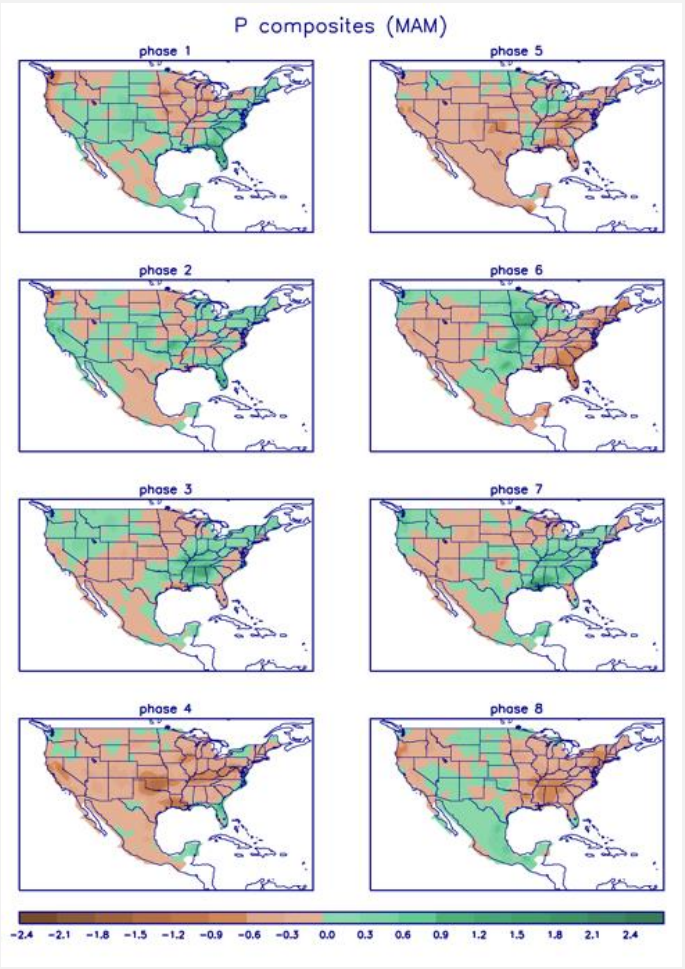

Figures 10-11. Current state of the MJO along with a two week forecast (blue signifies anomalous thunderstorm activity in the west Pacific and Maritime Continent during the past two weeks or an MJO somewhat stuck in phases 3/4) as well as precipitation correlation composites on the right (green means above average precipitation correlations during each phase for March, April and May).

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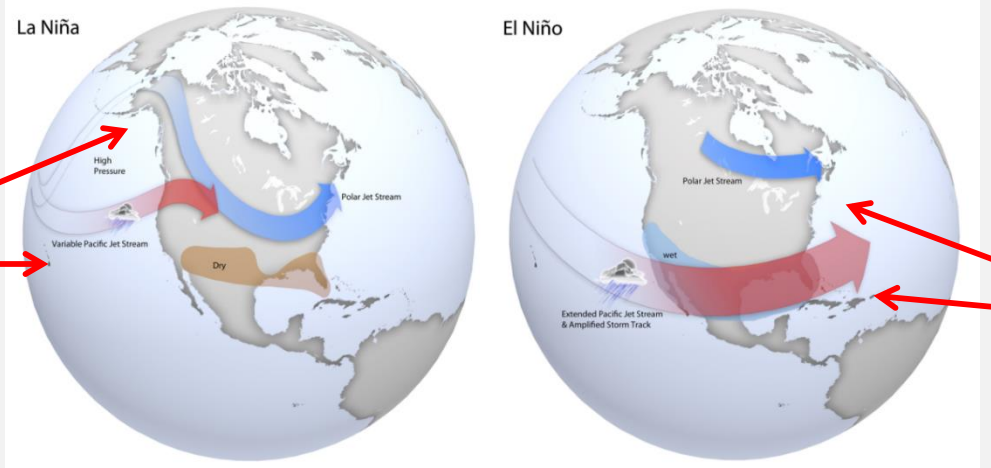
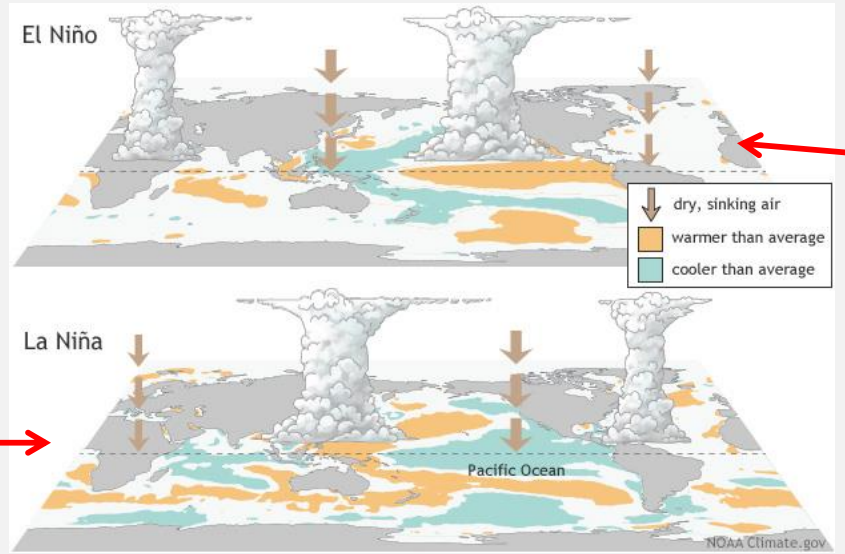
Typical Jet Stream Pattern during La Niña



Typical Jet Stream Pattern during El Niño



Typical Tropical circulations during El Niño

Typical Tropical circulations during La Niña

Figures 12-13. Warmer SSTs support deep tropical and subtropical convection farther east than average. This deep convection draws the jet stream farther south into the far eastern Pacific Ocean and southwestern United States during El Niño. The opposite is true during moderate to strong La Niñas and the polar jet stream generally remains north of New Mexico. Weak La Niñas are sometimes wetter and cooler than average.

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Pacific North American Pattern (PNA

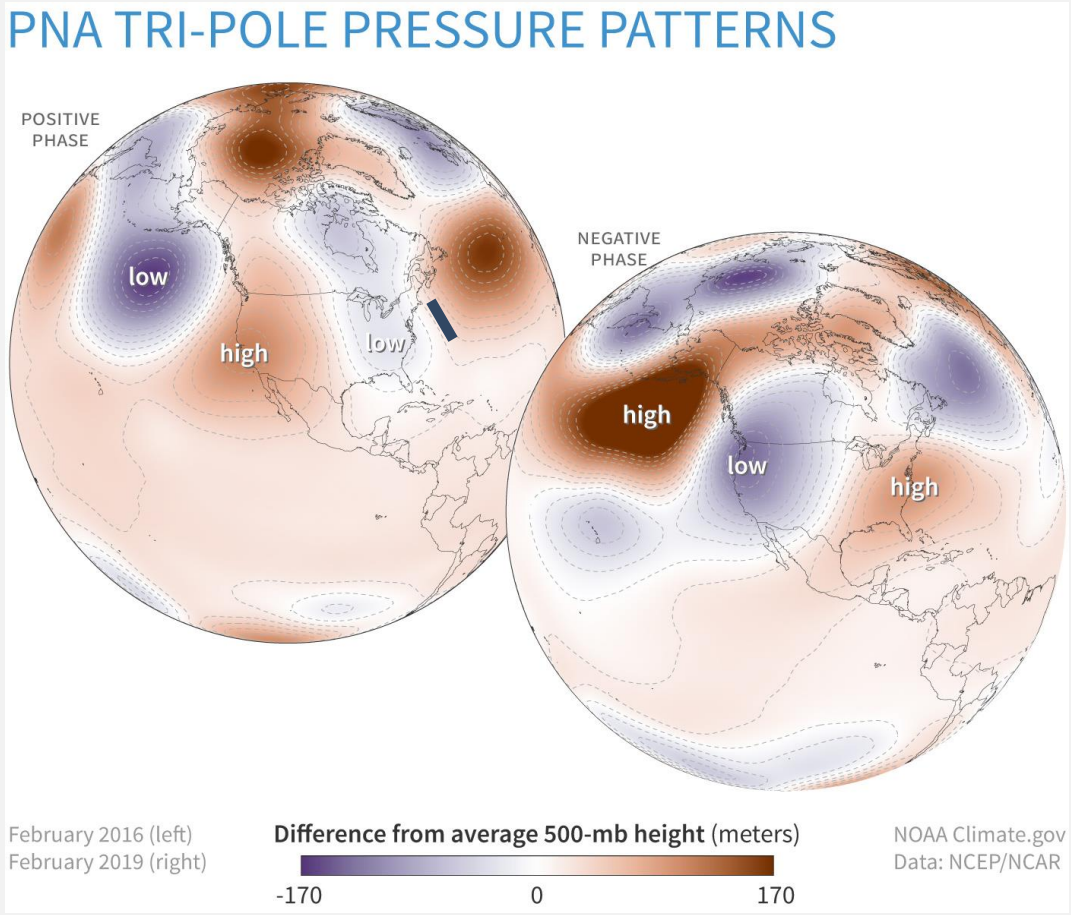

Figure 14. Air pressure in the lower atmosphere compared to the 1981-2010 average during February 2016 (top), when the PNA was positive, and in February 2019 (bottom), when it was negative. The location of highs and lows and the flow of the jet stream around them often produce a sharp warm-cold split in temperatures in the western and eastern halves of the United States. For New Mexico, often times a negative phase of the PNA leads to upper-level low pressure systems digging southward through the Great Basin, often times accompanied by strong backdoor cold fronts.

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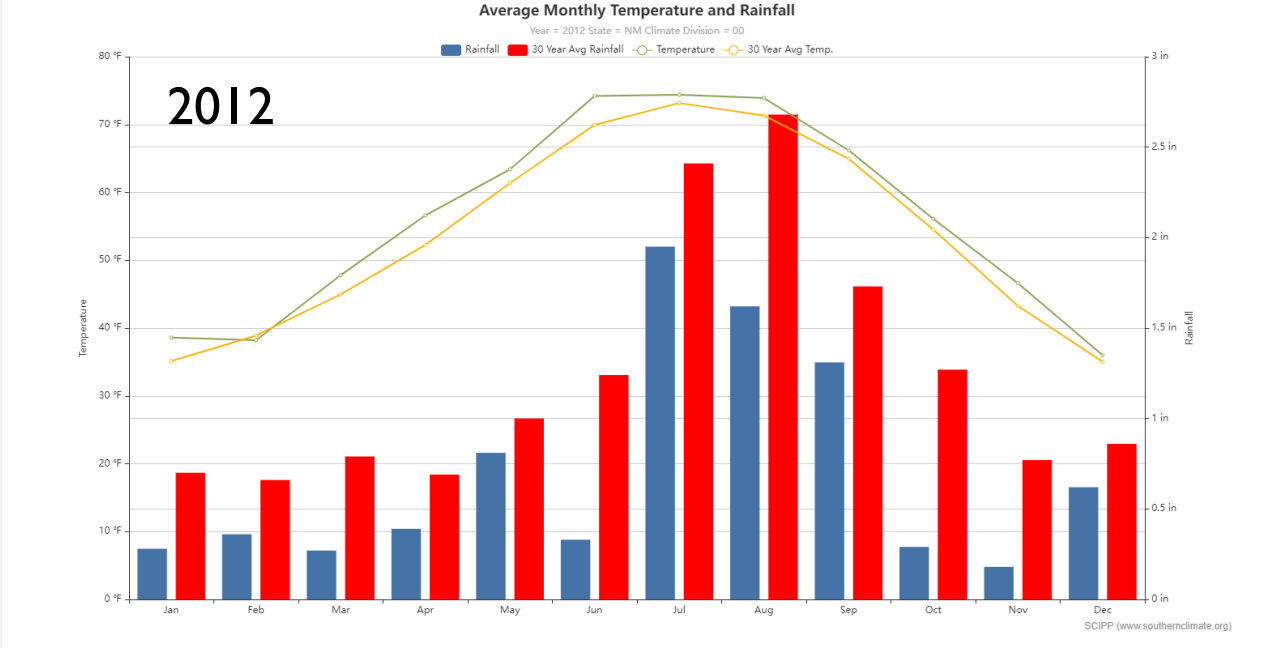

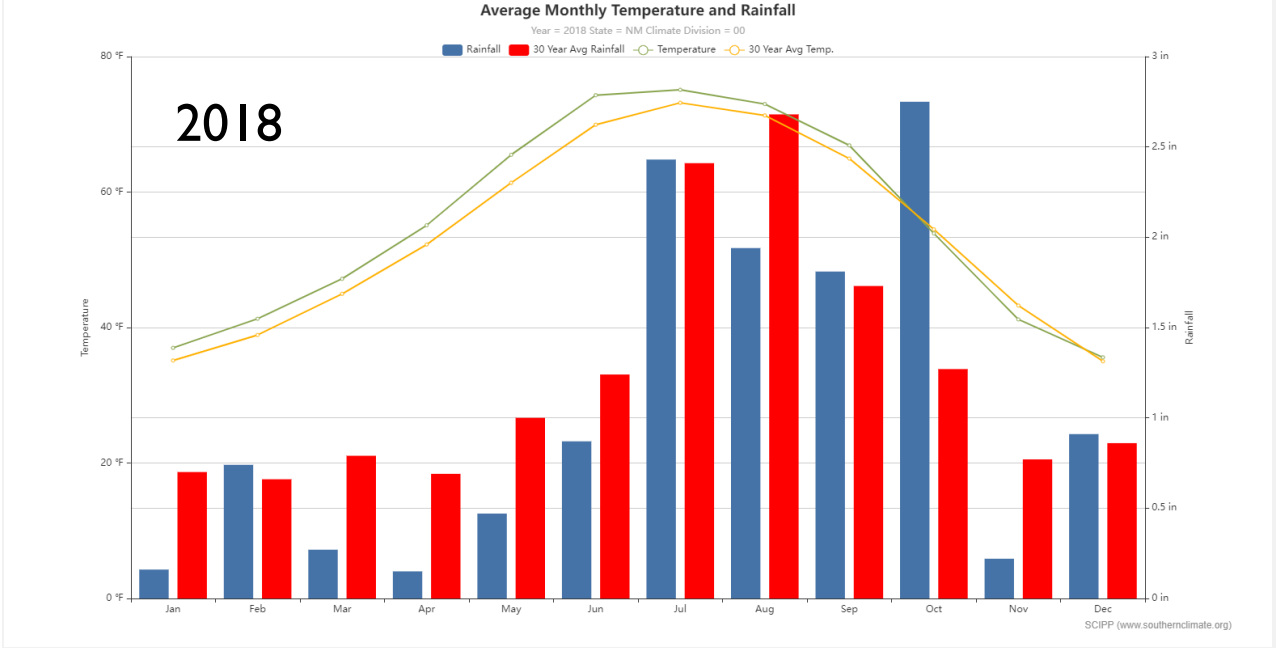

Figures 15-16. There were two double dip La Niña events between 2000 and 2021. Statewide precipitation and temperature data for spring show that in 2012 temperatures were above average with below average precipitation. In 2018, temperatures were above average with well below average precipitation. 2022 so far is trending more like 2012.

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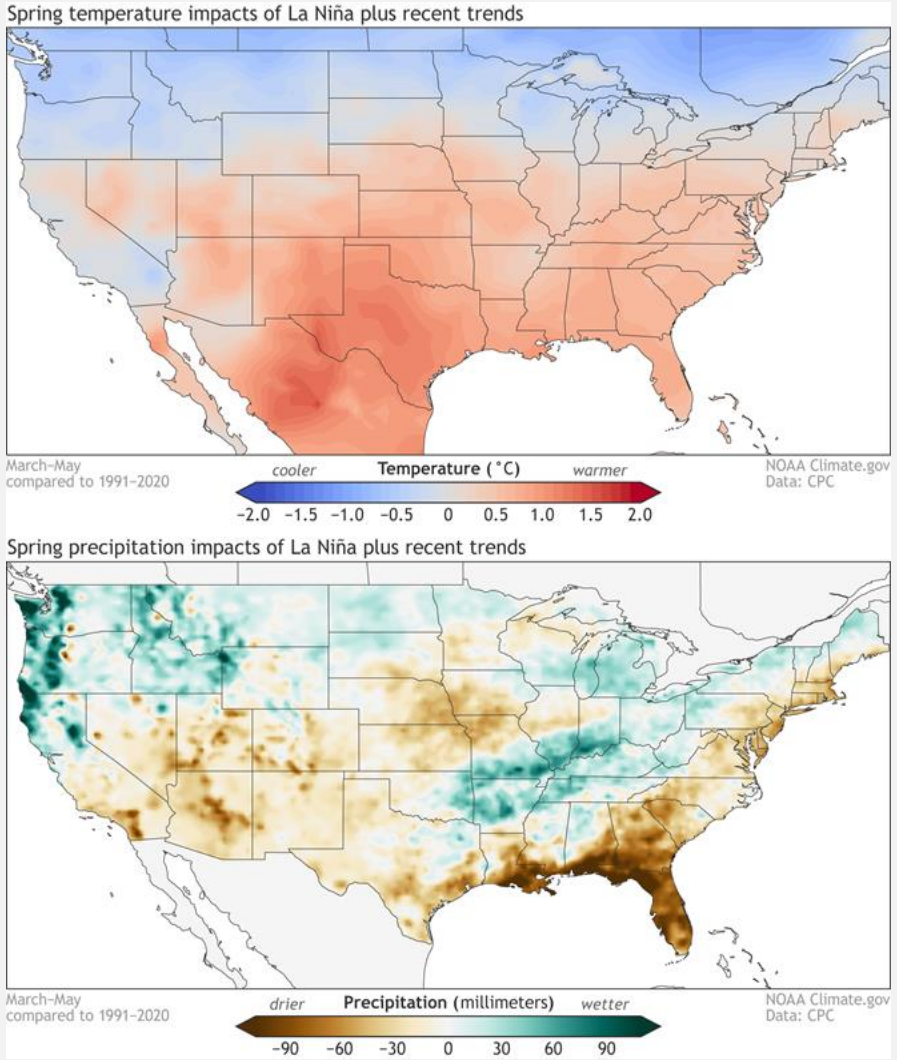

Figures 17. March-May average temperature (top) and precipitation (bottom) compared to the long-term average for the combination of historical La Niña events and climate trends. Data is based on the CPC ENSO composites and modified by Climate.gov. Spring seasons in NM have trended drier and warmer.

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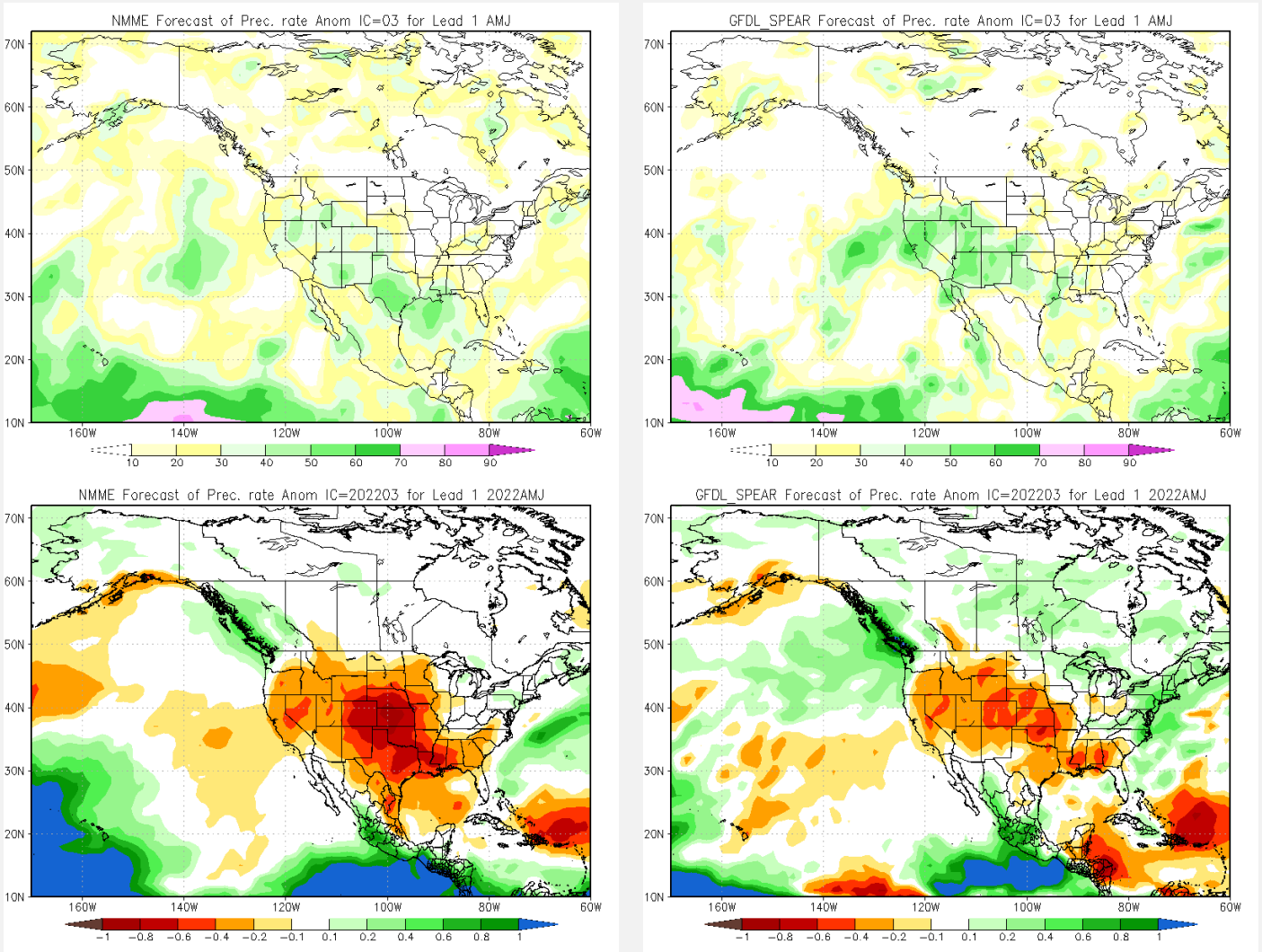

Figures 18-21. Model precipitation rate anomaly from the two climate models that have the highest forecast skill percentages (top two images), the North American Multi-Model Ensemble (NMME) and the Geophysical Fluid Dynamics Laboratory (GFDL SPEAR) model. Both model forecasts are predicting below to well below average precipitation for **AMJ 2022**.

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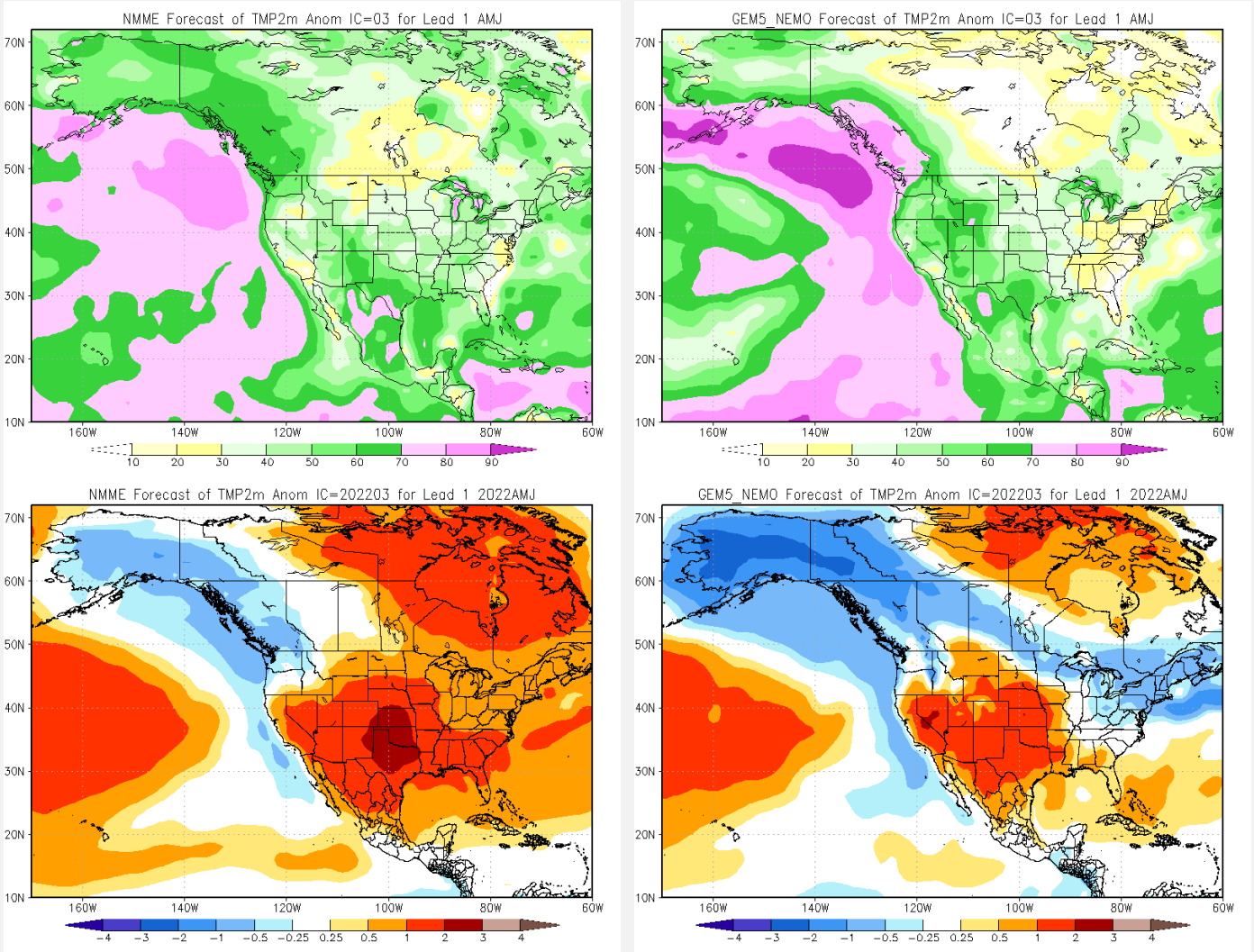

Figures 22-25. Model temperature anomaly forecasts from the two climate models that have the highest forecast skill percentages (top row), the North American Multi-Model Ensemble (NMME) and the GEM5_NEMO (Canadian) model. Both model forecasts are predicting above to well below average temperatures for **AMJ 2022**.

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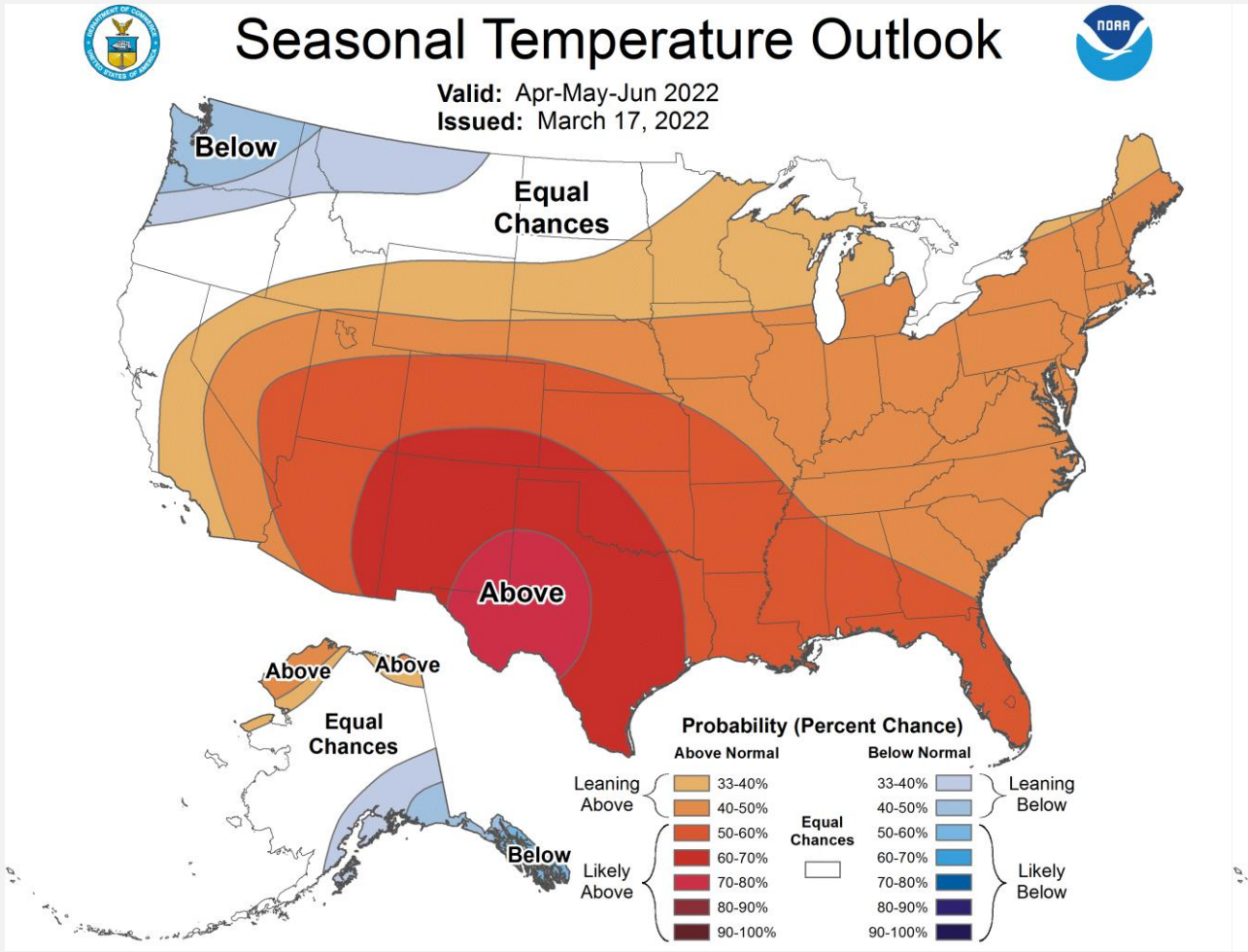

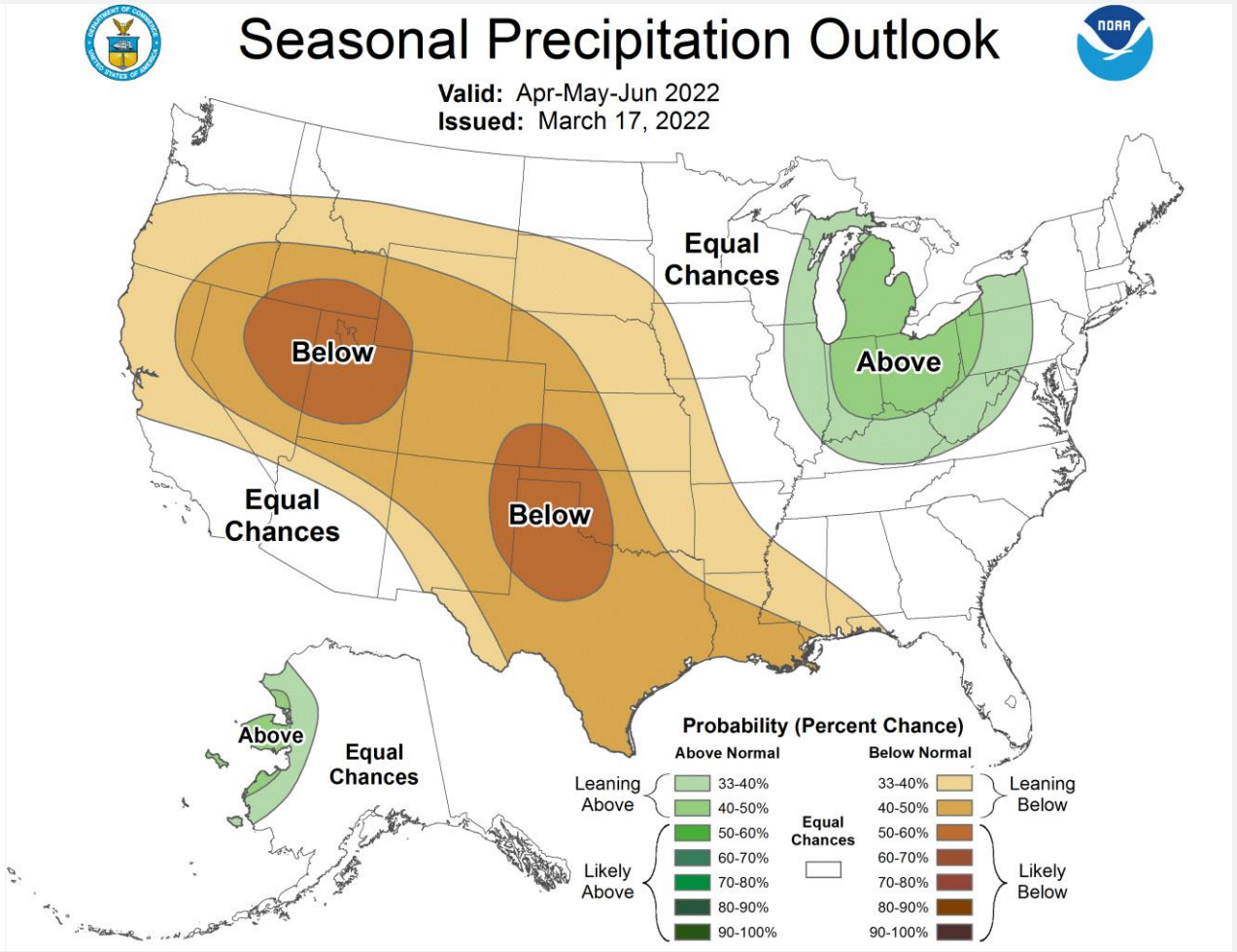

Figures 23-24. Climate Prediction Center's Official 2022 Climate Outlook for April, May and June showing probabilities favor above average temperatures and below average precipitation.

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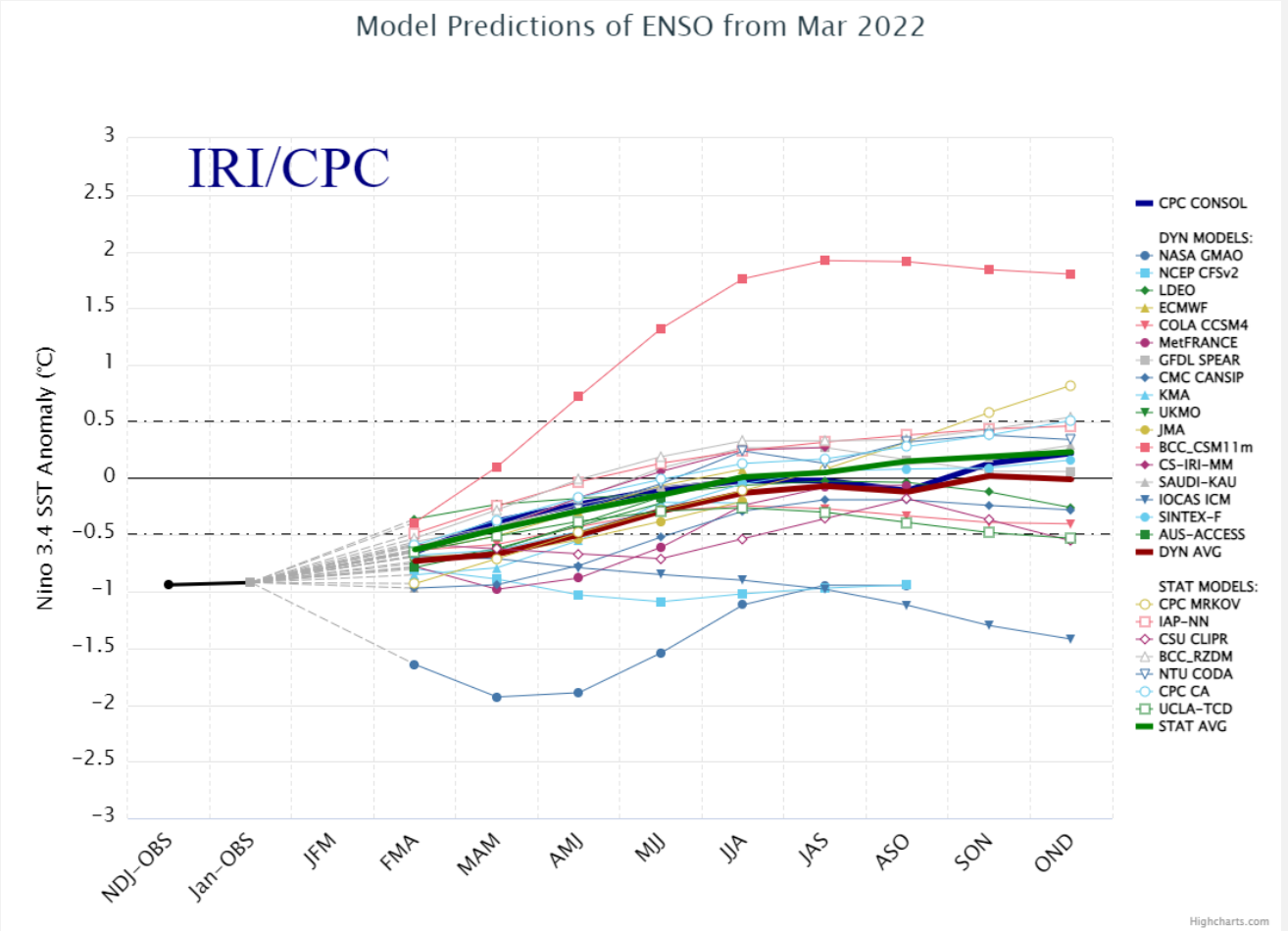

Figure 25. The vast majority of climate model forecasts keep SSTAs in the eastern equatorial Pacific in La Niña territory (-0.5°C or below) during the northern hemisphere spring, transitioning to neutral conditions by summer. Is a triple-dip in the cards next fall? Triple dips are a rare occurrence. There have only been 2 "triple-dip" La Niña events since 1950 so probabilities are quite low.

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- Forecasts from the most highly skilled climate forecast models along with two analog years indicate that precipitation in central and northern New Mexico during AMJ will be below 1991-2020 climatological averages.

  Forecasts from the most highly skilled climate models along with two analog years suggest temperatures during AMJ will be above average.

  *Things to watch for in early April that may indicate a change to drier and warmer conditions: Does the PNA go positive more than temporarily (next slide) or trend back negative in early April. Going back negative could result in temperatures and precipitation that are closer to average during April and possibly into early May 2022.

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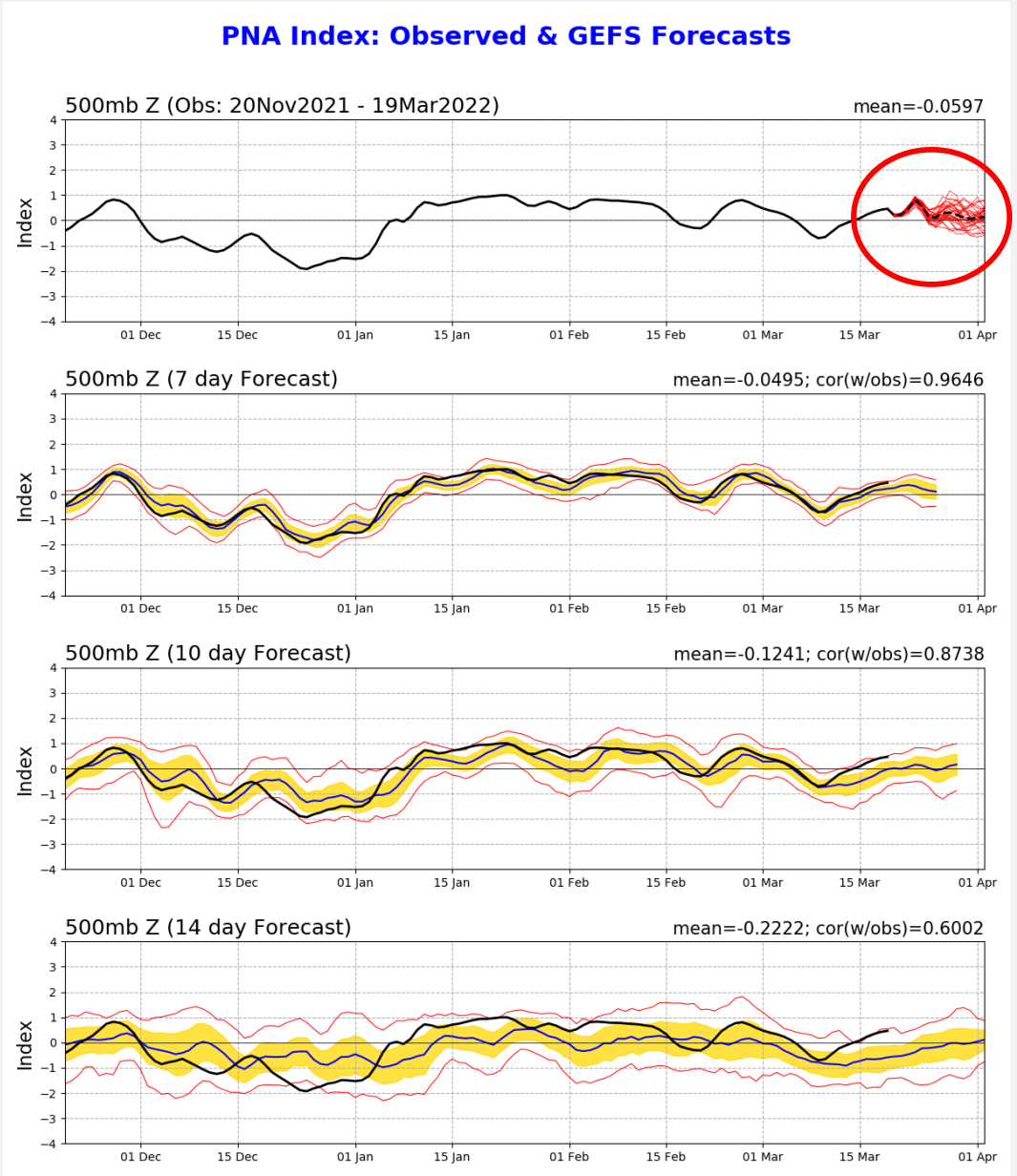
PNA index values observed along with ensemble forecasts from the GFS during the next 14 days. Large variations in model forecasts are present (red lines) into early April which is an indicator of high uncertainty.



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- **Outlook provided by National Weather Service Forecast Office Albuquerque, NM.**

- **For further information contact Andrew Church: andrew.church@noaa.gov (505) 244-9150**