

# 2021 Spring Outlook

For Northern & Central New Mexico



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NM Locust - Courtesy: George Miller NM Magazine



Rusby's goldenbush - Courtesy: George Miller NM Magazine



Showy Goldeneyes - Courtesy: George Miller NM Magazine



Mountain goldenbanner - Courtesy: George Miller NM Magazine



Taos Lilac Festival - FB

How might a weakening La Niña influence spring temperature and precipitation in New Mexico during March, April, and May (meteorological spring)? Find our here in the spring outlook for central and northern New Mexico.



## **Climate Prediction Center**

### **ENSO Alert System Status: La Niña Advisory**

**La Niña is currently present (2/15/2021).**

**Equatorial sea surface temperatures (SSTs) are below average from the west-central to eastern Pacific Ocean.**

**The tropical atmospheric circulation is consistent with La Niña.**

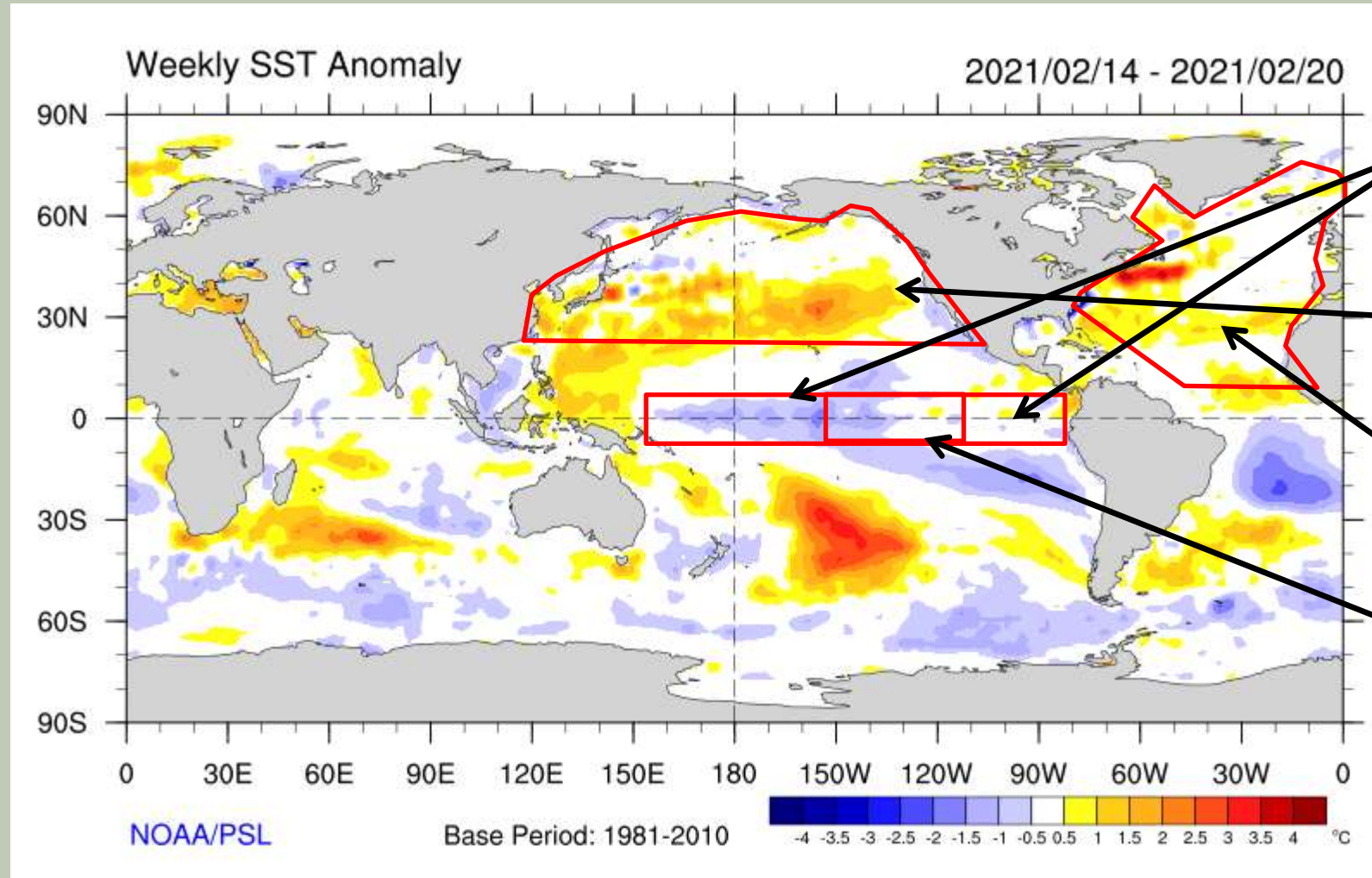
**There is a ~60% chance of a transition from La Niña to ENSO-Neutral during the Northern Hemisphere spring 2021 (April-June).**

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- Multivariate ENSO Index (MEI) for DEC\_JAN 2020-21: **-1.2**
- Pacific Decadal Oscillation (PDO) for JAN 2021: **-0.16**
- Atlantic Multidecadal Oscillation (AMO) for JAN 2021: **+0.14**
- Oceanic Niño Index (ONI) (uses Niño 3.4 region - inner rectangle) for NDJ 2020-21: **-1.2**

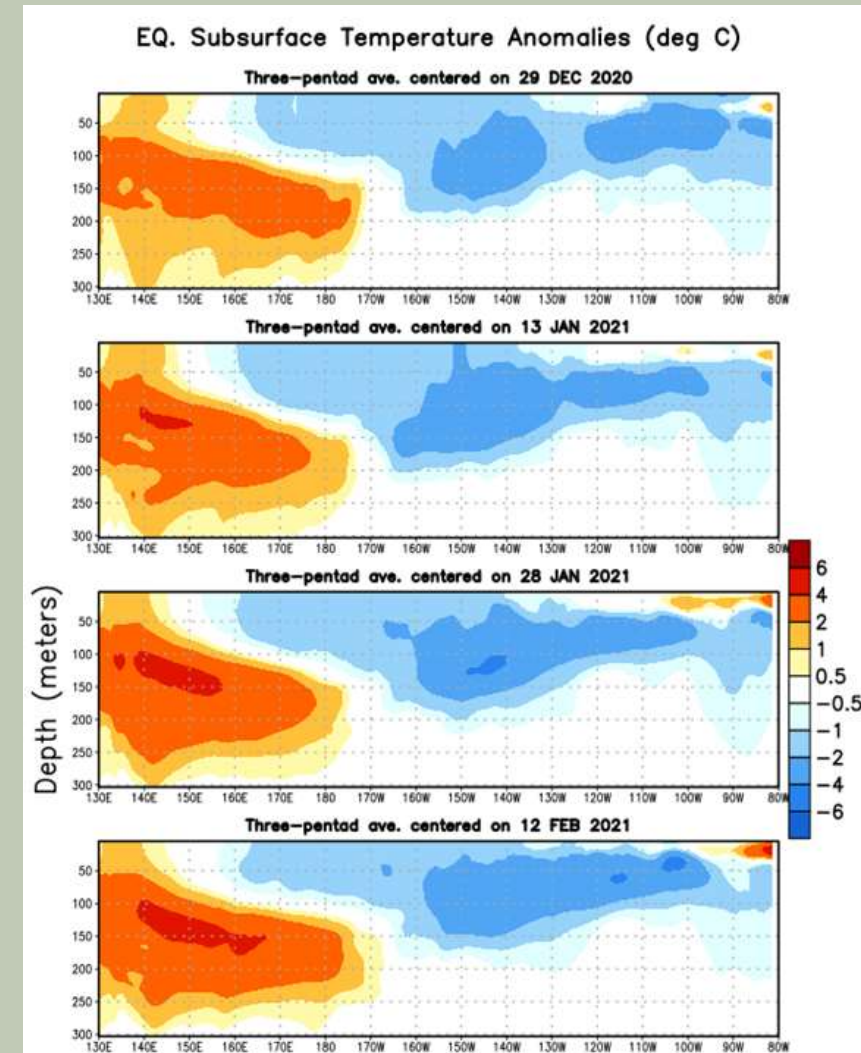
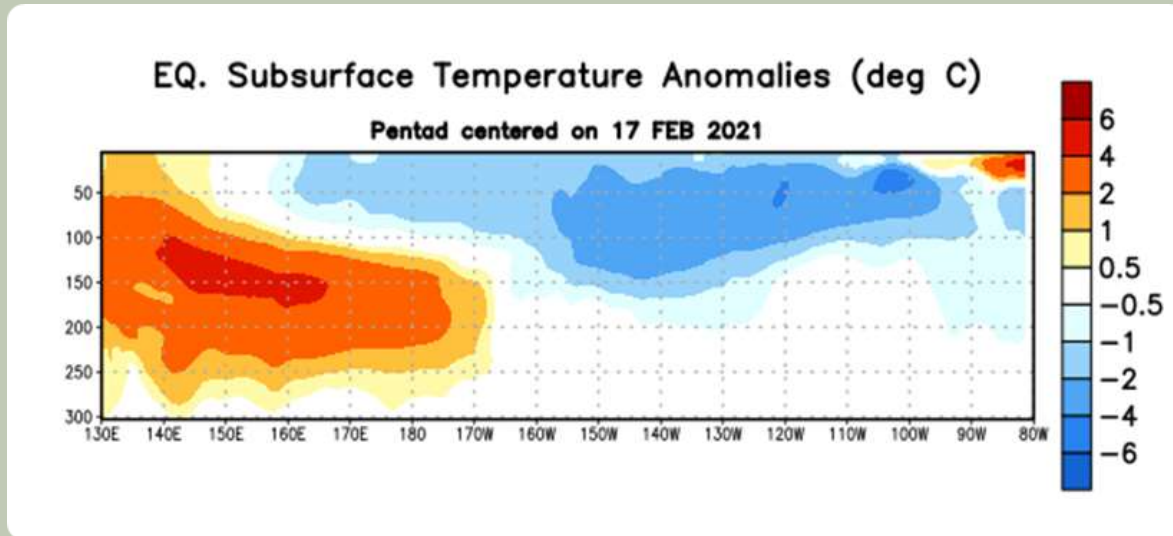
**Figure 1.** Latest weekly global SST anomalies showing slightly cooler than average temperatures across much of the central and eastern equatorial Pacific Ocean.

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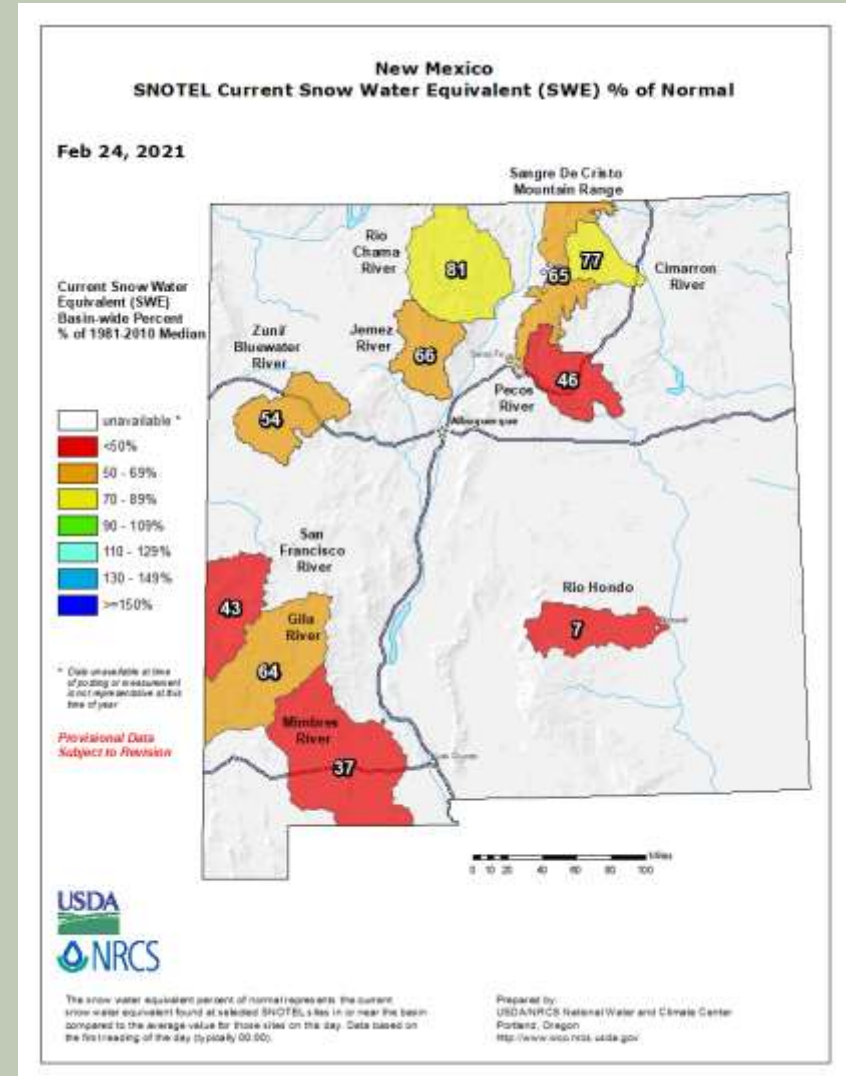
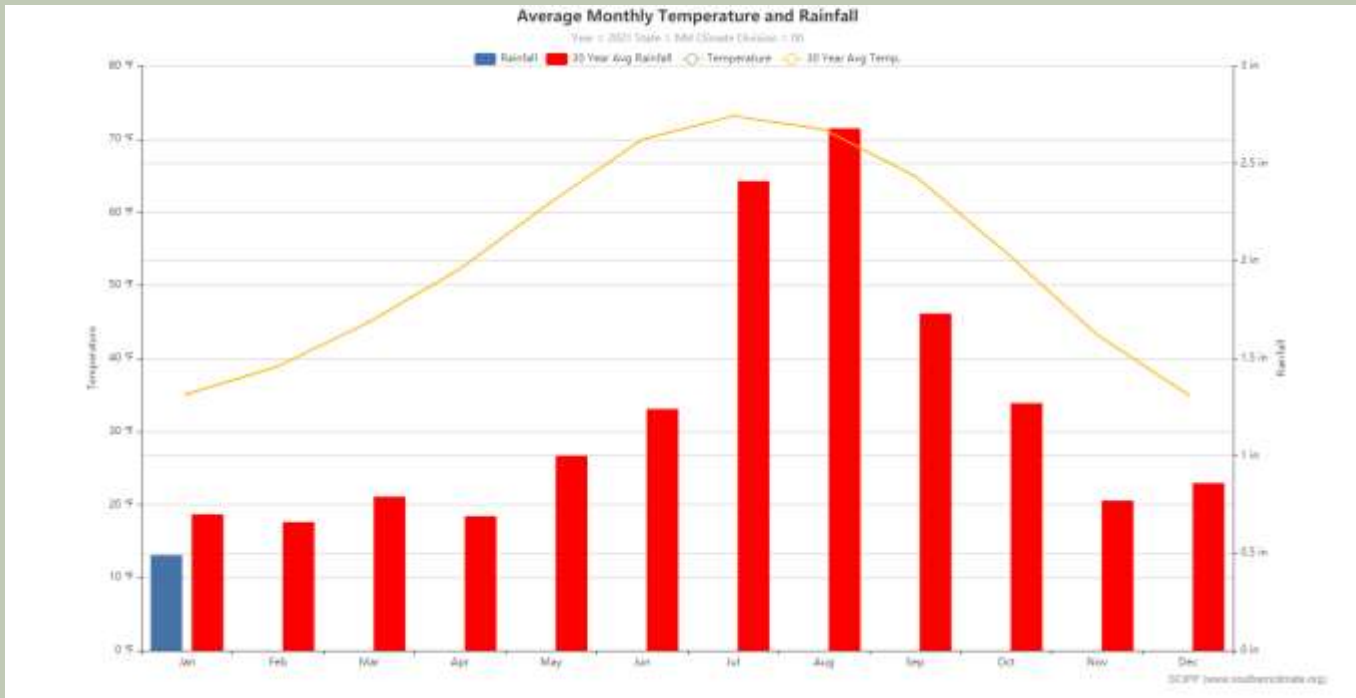
**Figures 2 and 3.** Positive sub-surface temperature anomalies in the western Pacific continue while negative anomalies in the central and eastern Pacific remain.

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Figures 4-5. Average monthly precipitation anomaly for New Mexico (blue bar) January 2021 (left) and current snow-water equivalent anomaly (%) as of 2/18/2020.

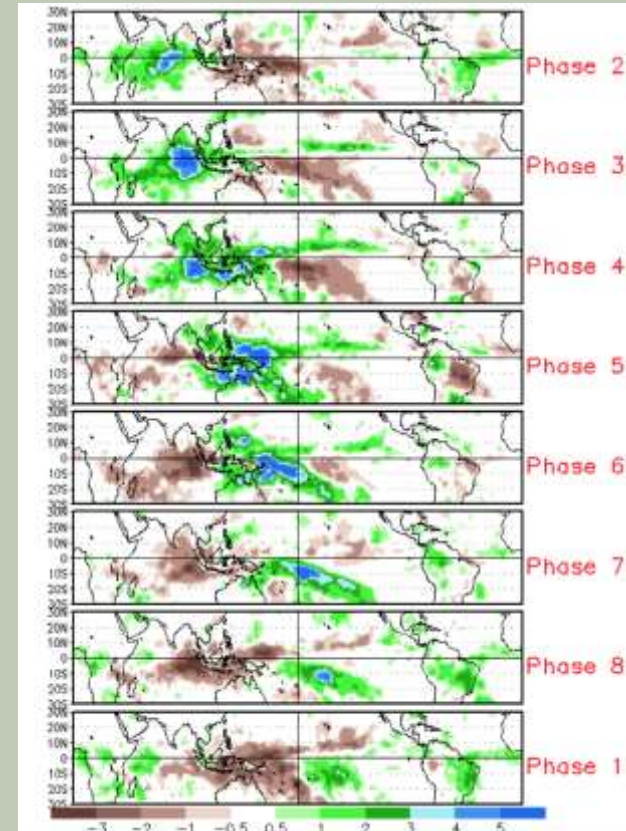
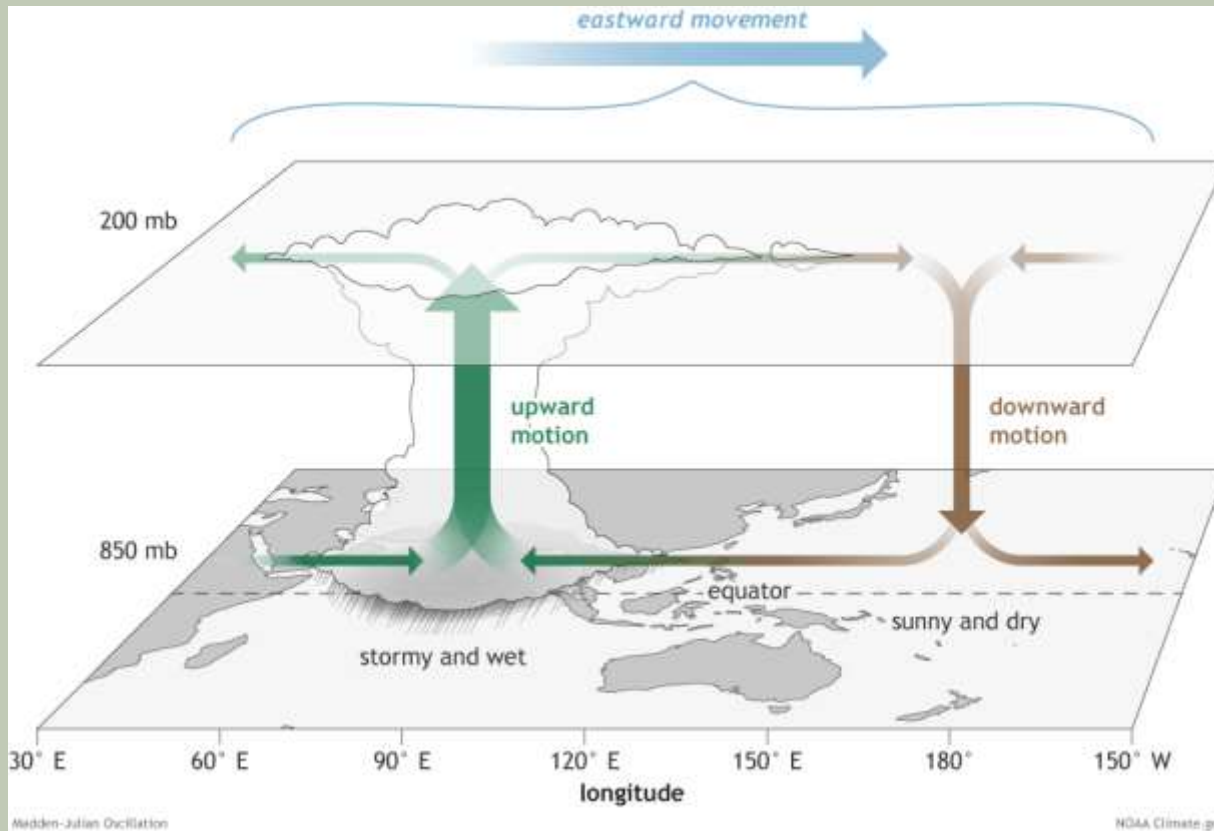
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**Figures 6-7.** The Madden-Julian Oscillation (MJO) is an area of enhanced thunderstorms that travels around the world every 30 to 60 days from west to east along/near the equator. In phases An active MJO's importance on the weather/climate impacts 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.

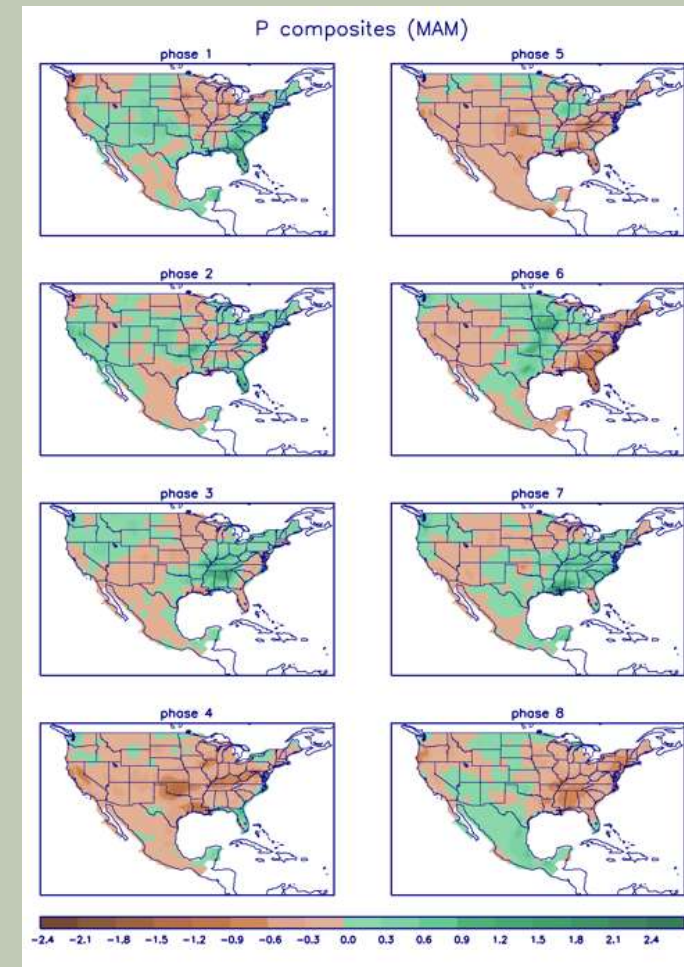
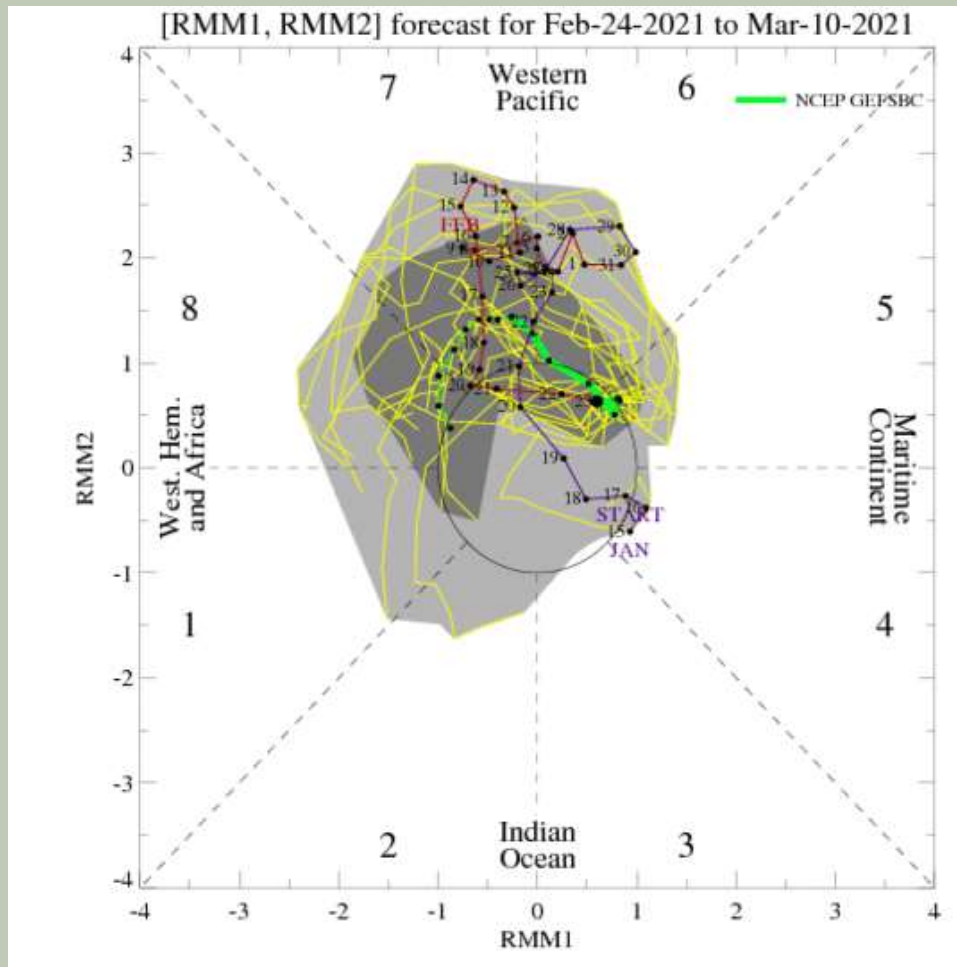
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**Figures 8-9.** Current state of the MJO on the left (large black dot signifies current MJO state in phase 7, yellow lines are each model run forecast for the next two weeks and green line is average of yellow lines) as well as precipitation composites on the right (green means above average precipitation correlations during each phase). MJO is forecast to weaken as it translates east into phase 8.

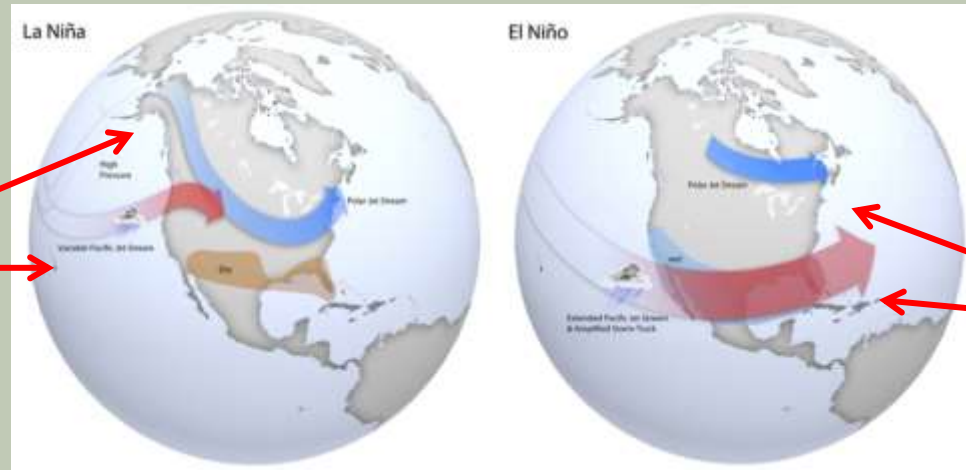
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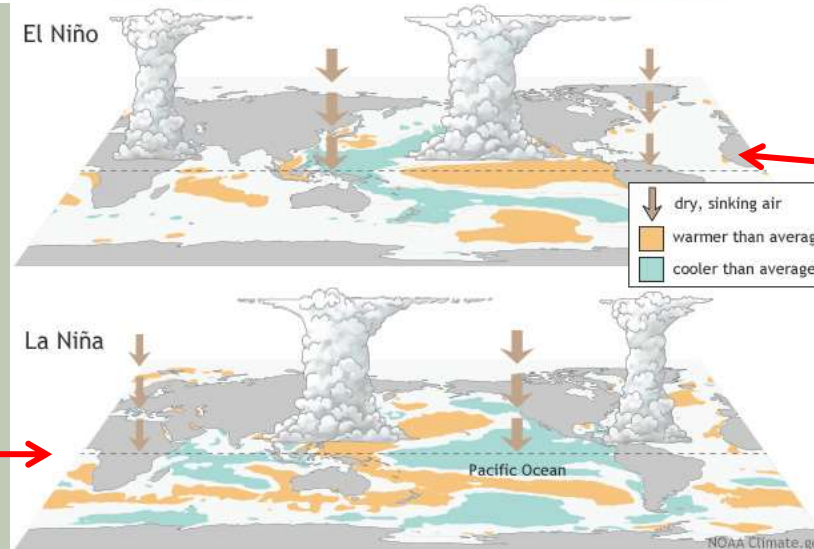
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Typical Jet Stream Pattern during La Niña



Typical Jet Stream Pattern during El Niño

Typical Tropical circulations during La Niña



Typical Tropical circulations during El Niño

**Figures 10-11.** 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.

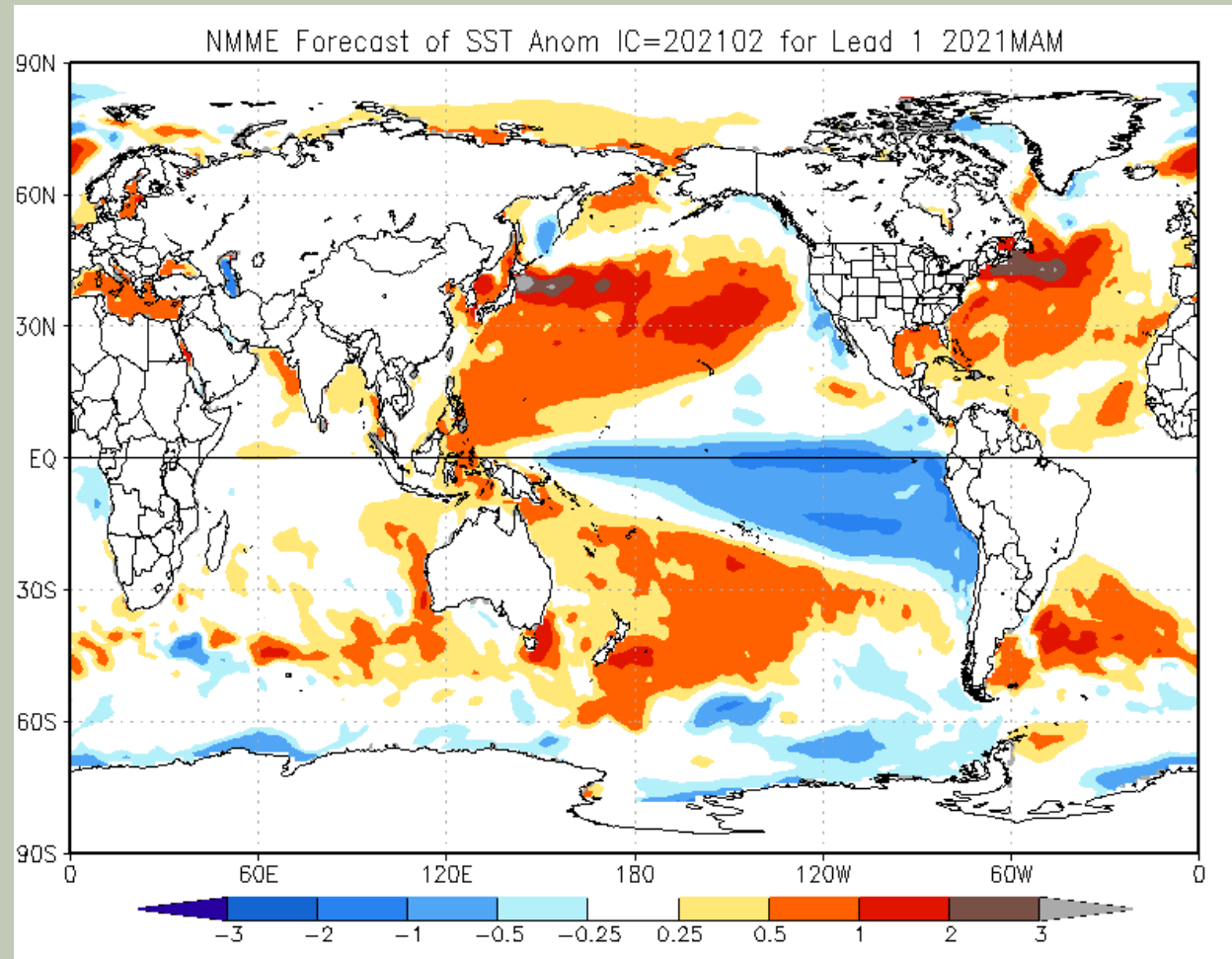


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**Figure 12.** North American Multi-Model Ensemble (NMME) SST Anomaly forecast for March, April, and May 2021. La Niña is forecast to continue through spring. What matters in climate forecasting for much of the country? It has a lot to do with where sea surface temperature gradients set up in the Pacific Ocean.

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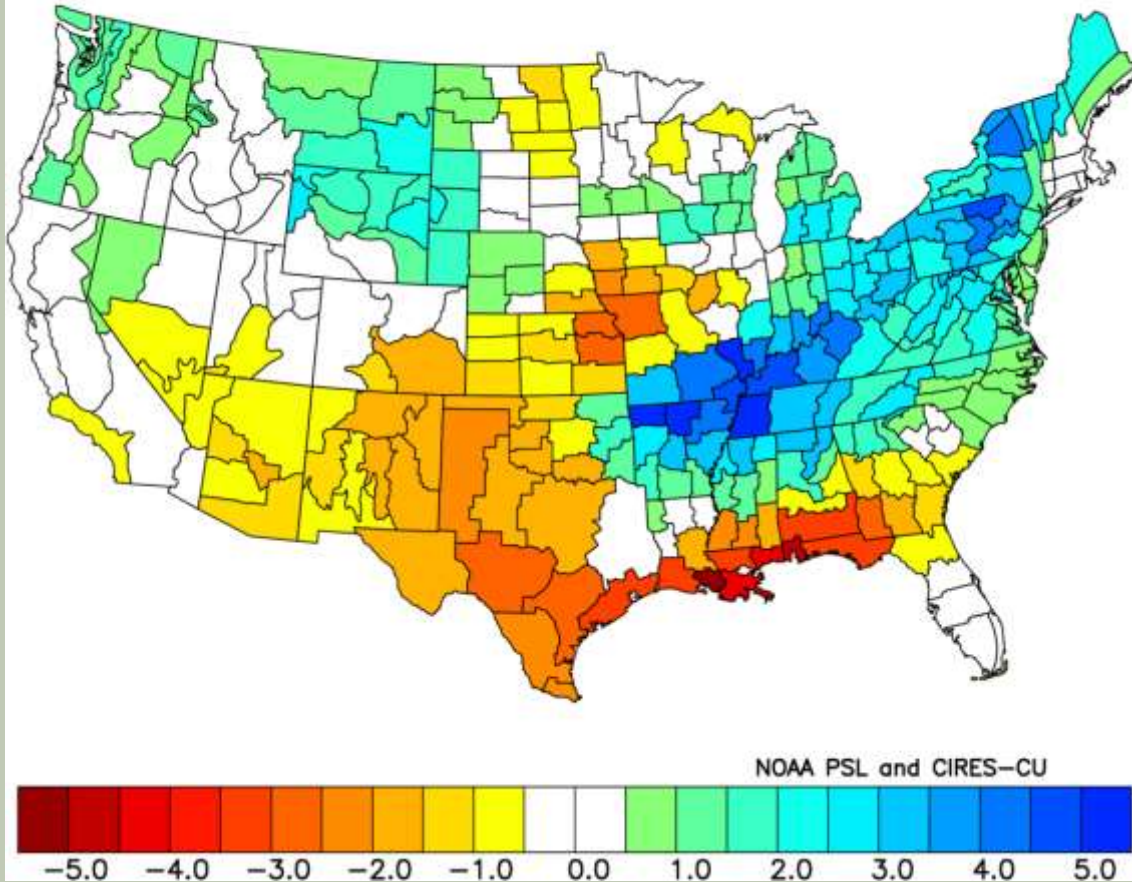
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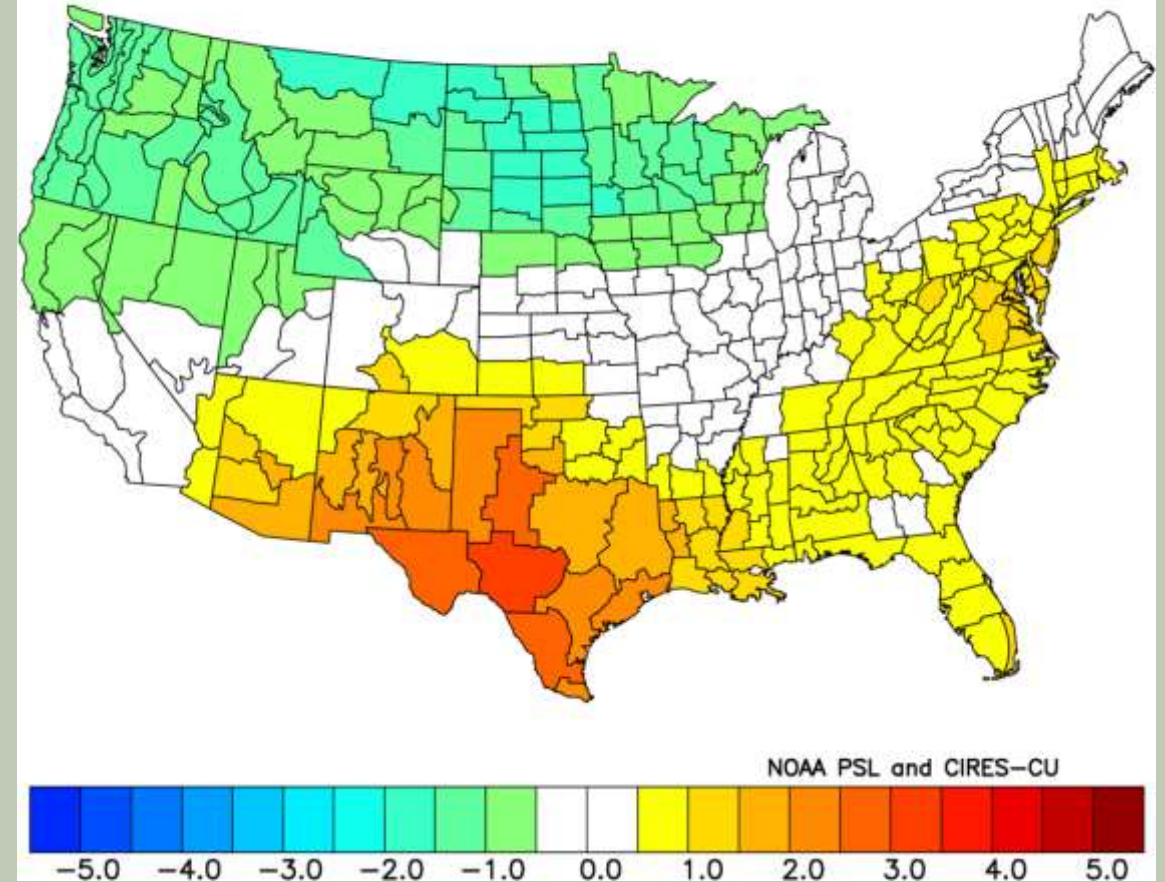
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NOAA/NCEI Climate Division Composite Precipitation Anomalies (in)  
Mar to May 2000,2008,2011,2018  
Versus 1981-2010 Longterm Average



NOAA/NCEI Climate Division Composite Temperature Anomalies (F)  
Mar to May 2000,2008,2011,2018  
Versus 1981-2010 Longterm Average



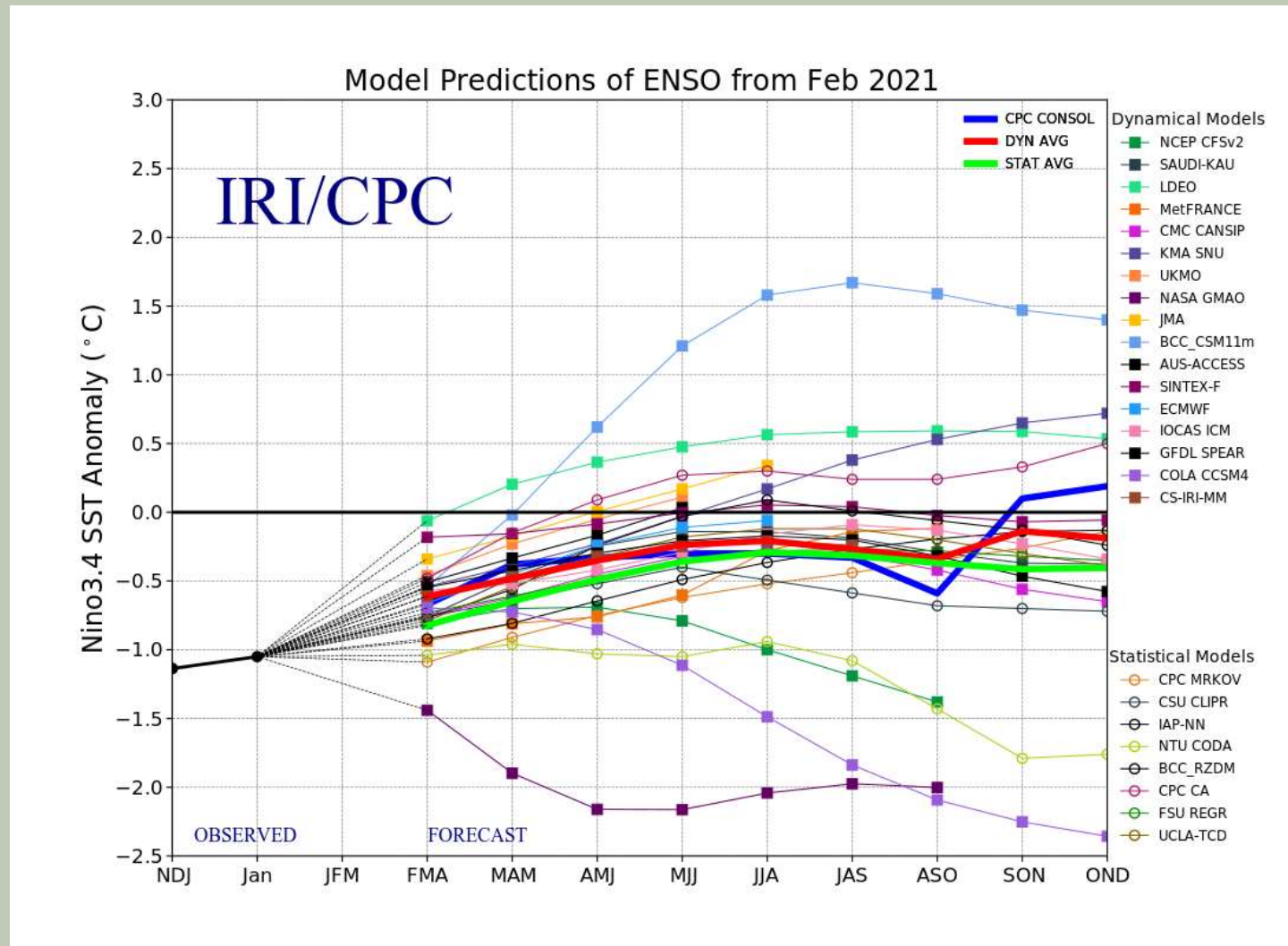
**Figures 13-14.** During four recent analog years, 2000, 2008, 2011, and 2018, precipitation was slightly below to below 1981-2010 averages (left) in NM while temperatures were slightly above to above average.

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**Figure 15.** A vast majority of climate model forecasts keep SSTAs in the eastern equatorial Pacific in weak La Niña territory ( $\sim -0.5^{\circ}\text{C}$ ) during the northern hemisphere spring (MAM) 2021.

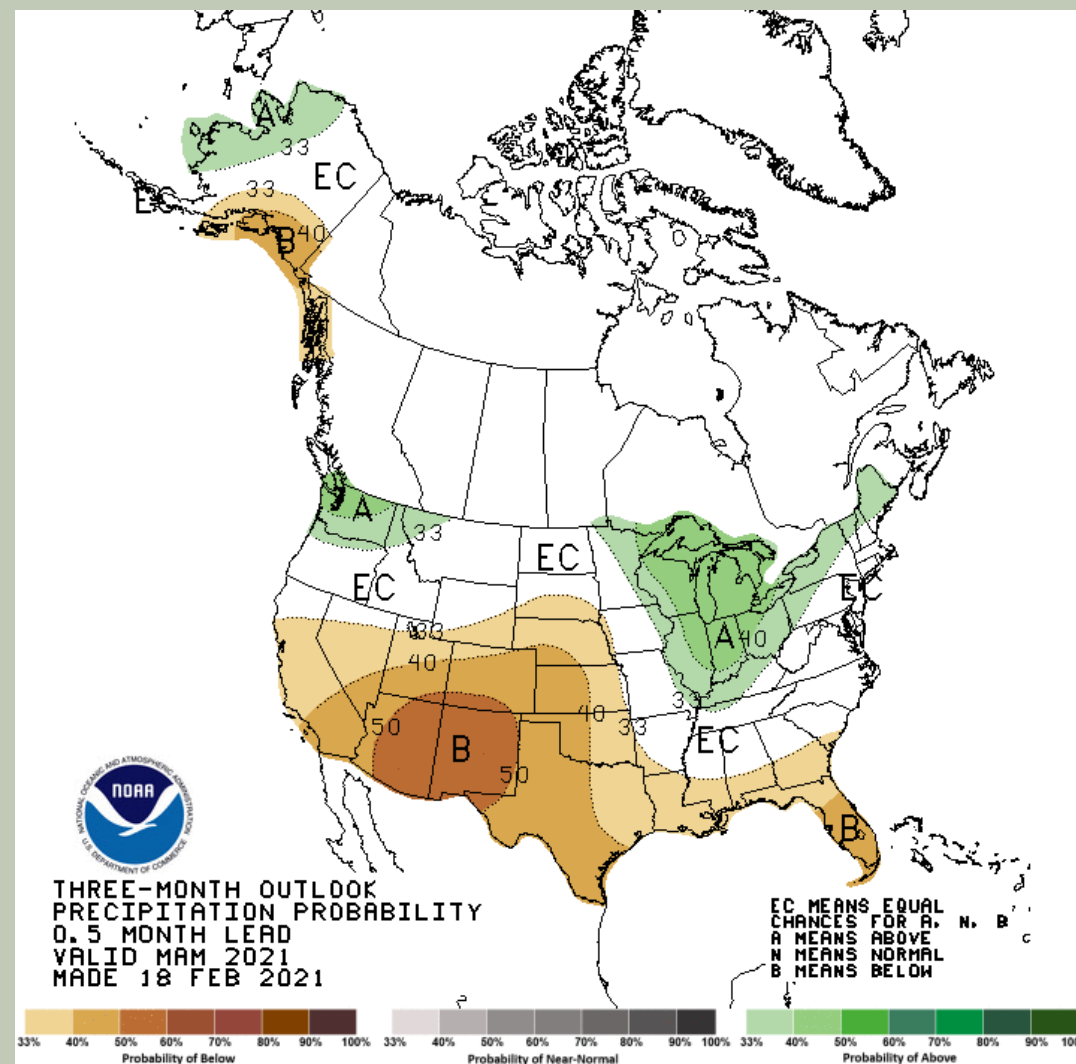
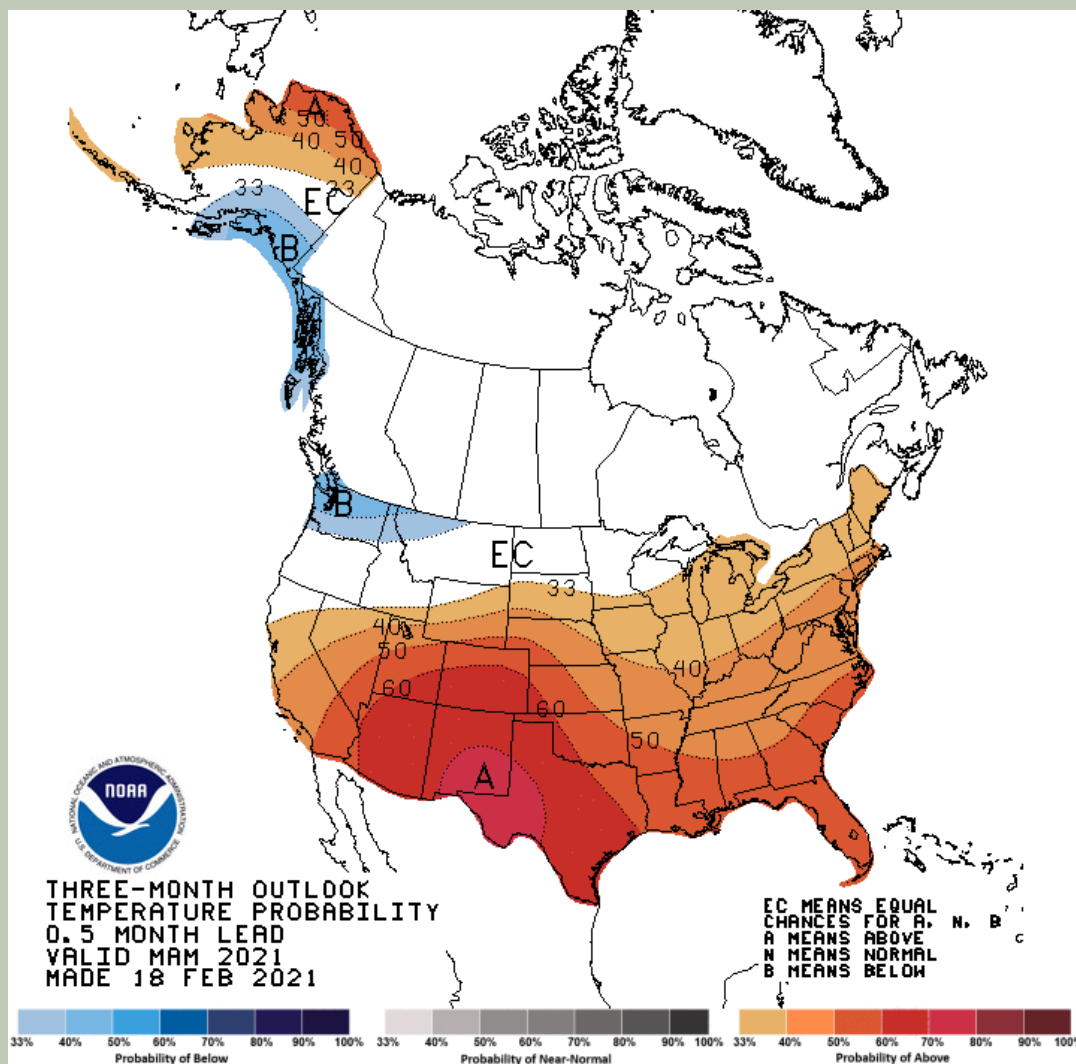
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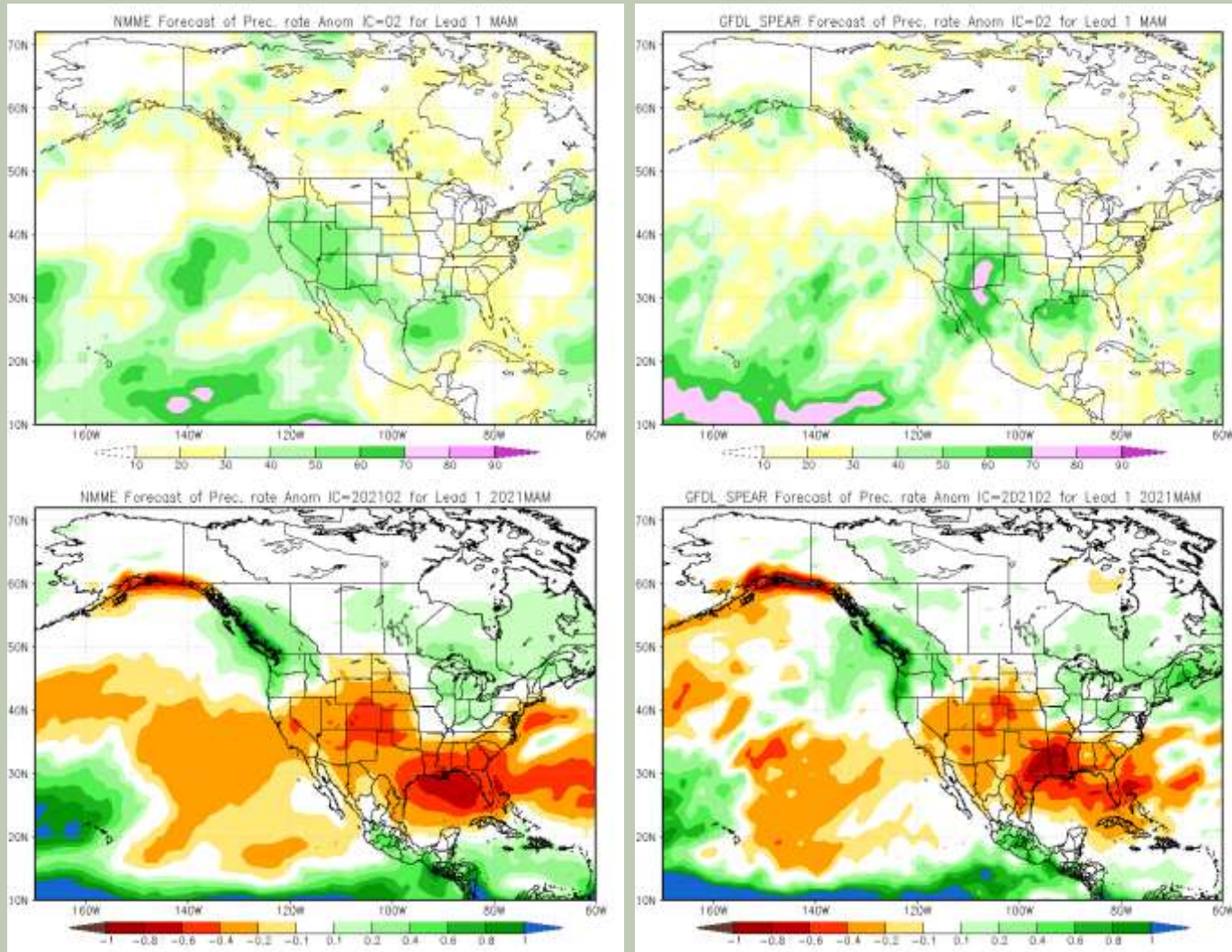
Figures 16-17. Climate Prediction Center's Official Meteorological Spring (MAM) 2021 Outlook.

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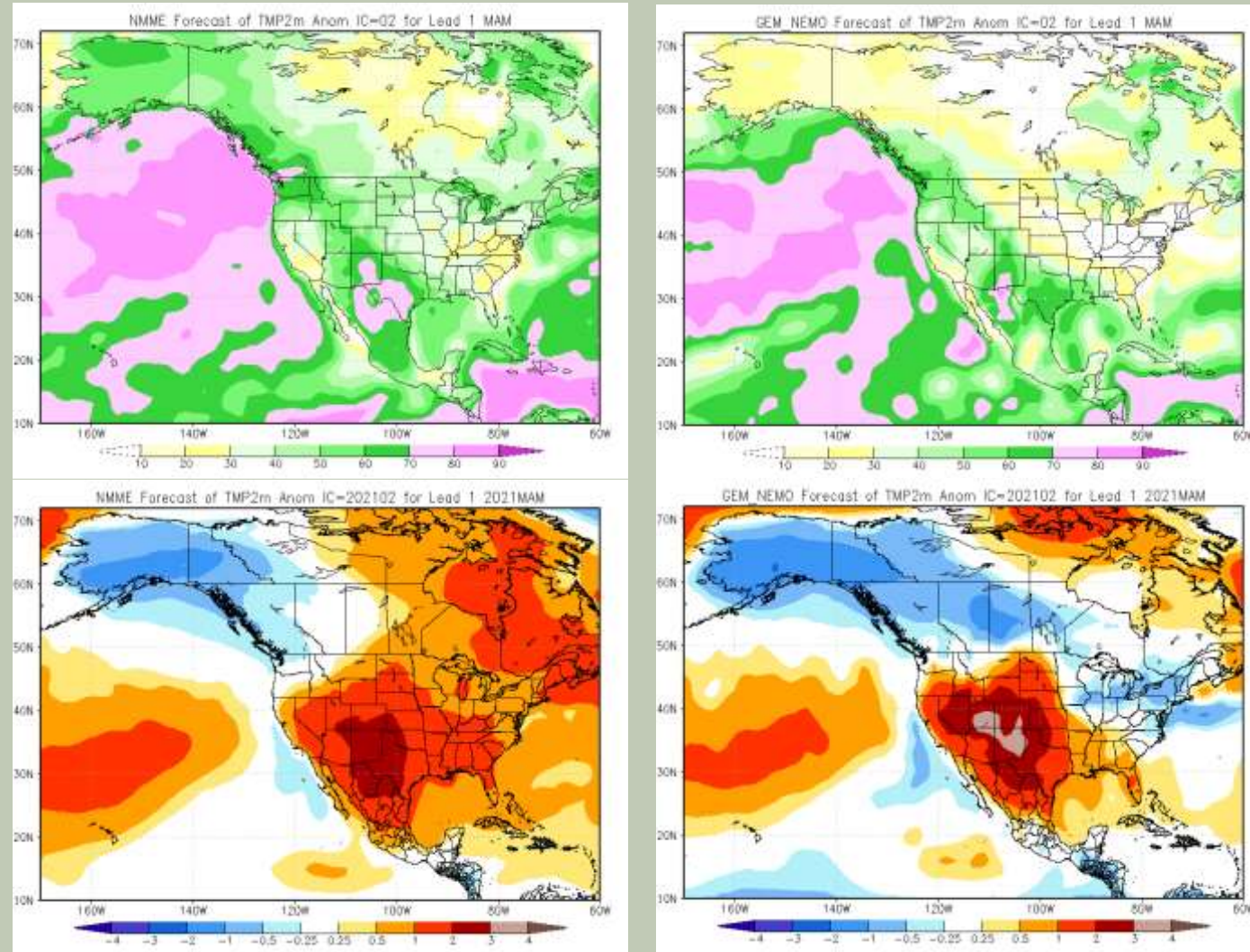
**Figures 18-21.** Model precipitation rate anomaly from the two climate models that have the highest forecast skill percentages (top two images), the North American Multi-Model Ensemble (NMME) and the Geophysical Fluid Dynamics Laboratory (GFDL SPEAR) model. Both model forecasts are predicting slightly below to below average precipitation for MAM 2021.

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**Figures 22-25.** Model temperature anomaly from the two climate models which have the highest forecast skill percentages (top two images), the North American Multi-Model Ensemble (NMME) and the Geophysical Fluid Dynamics Laboratory (GFDL\_NEMO) model. Both models are predicting above to well above average temperatures for MAM 2021.

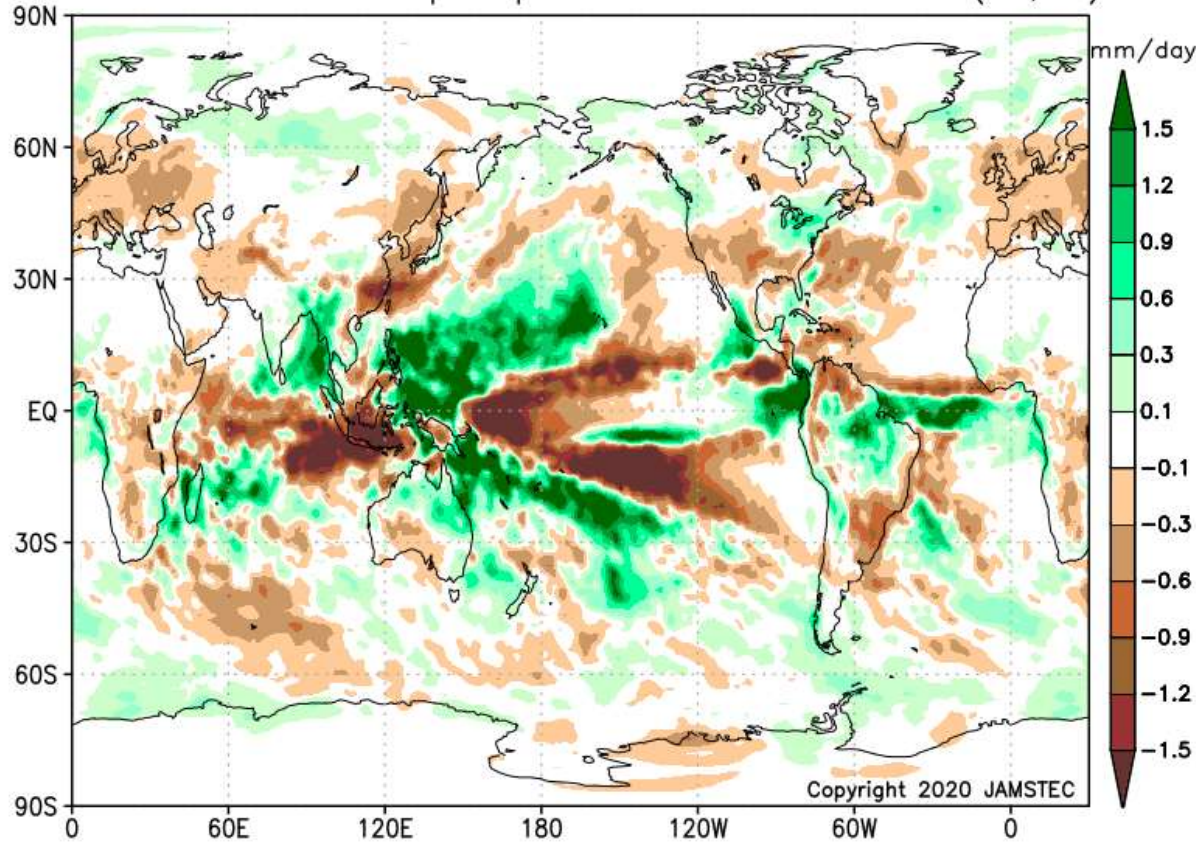
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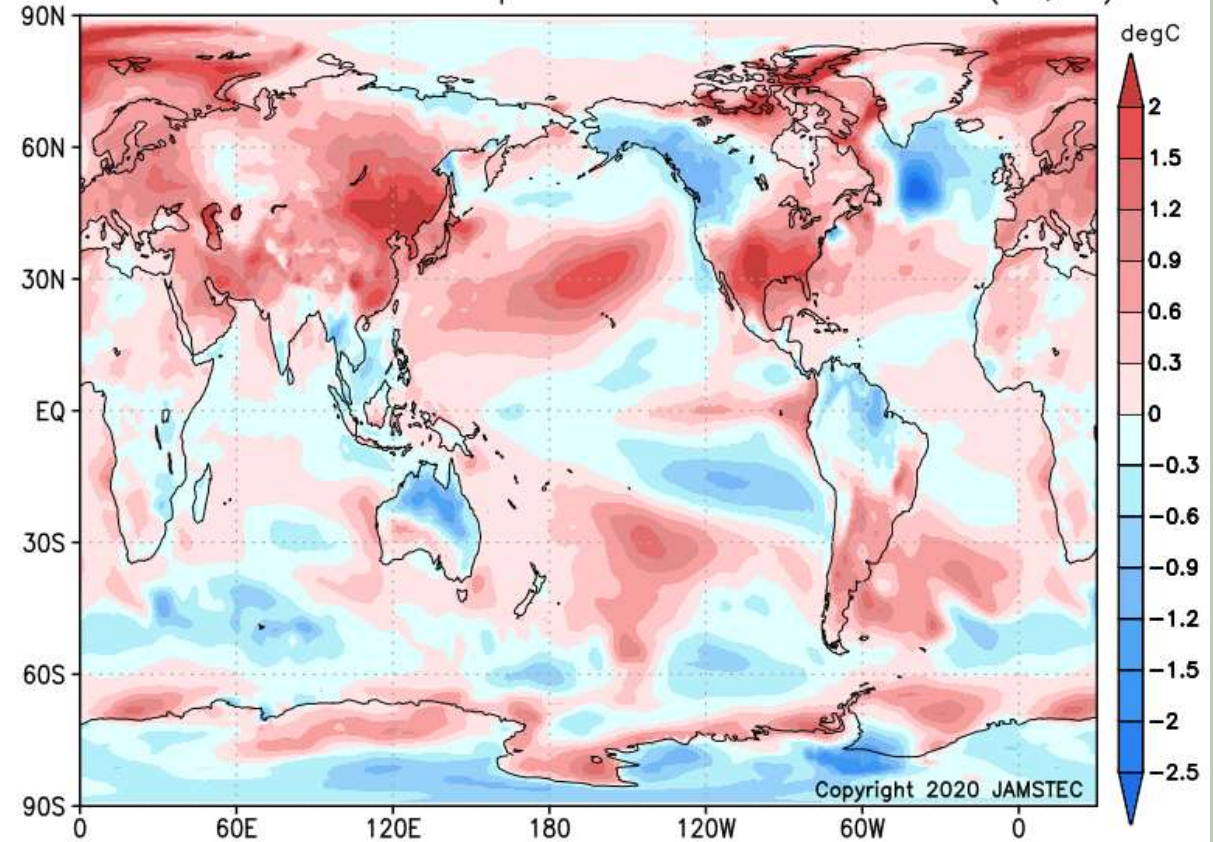


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Predicted MAM2021 precip.anom. from 1feb2021 (F1,N9)



Predicted MAM2021 temp2 anom. from 1feb2021 (F1,N9)



**Figures 26-27.** Japan Agency for Marine Earth-Science and Technology (JAMSTEC) SINTEX-F model forecast for MAM showing a similar forecast with below average precipitation and above average temperatures for NM.

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- Forecasts from the most highly skilled climate forecast models along with recent analog years indicate that **precipitation** in central and northern New Mexico during March, April, and May (MAM) 2021 will most likely range from slightly below to below 1981-2010 climatological averages.

Forecasts from the most highly skilled climate models suggest **temperature** will be above to well above average in MAM 2021.



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