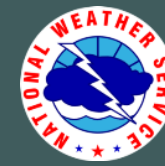


2023 Spring Outlook

For Northern & Central New Mexico



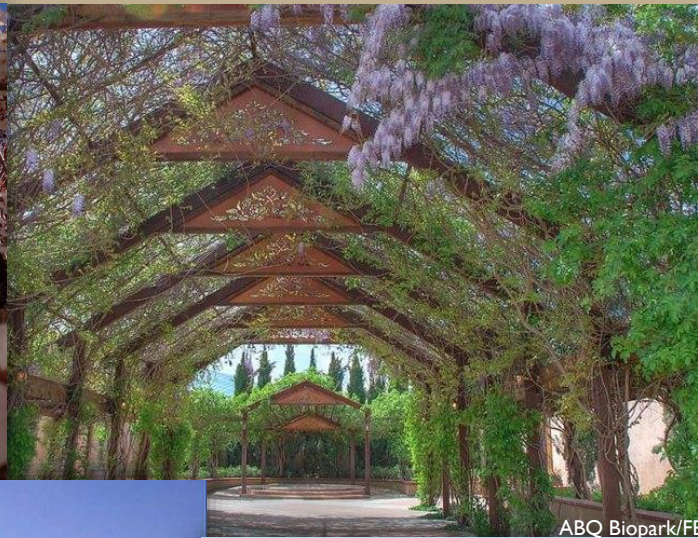
Albuquerque

WEATHER FORECAST OFFICE

Issued March 3, 2023



ABQ Journal



ABQ Biopark/FB



Justin Anderson



Thomas Shahan



Kent Kanouse



New Mexico Tourism Dept.

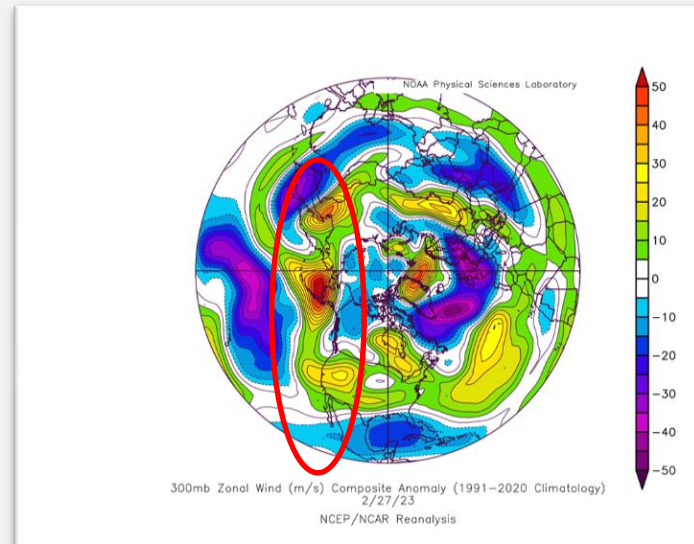
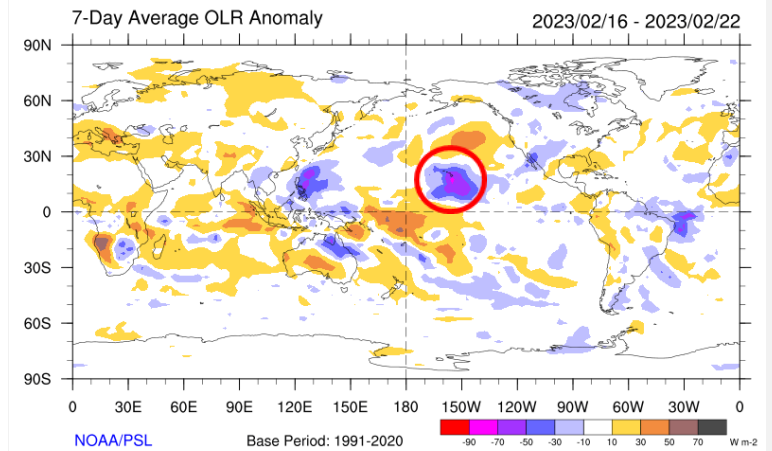
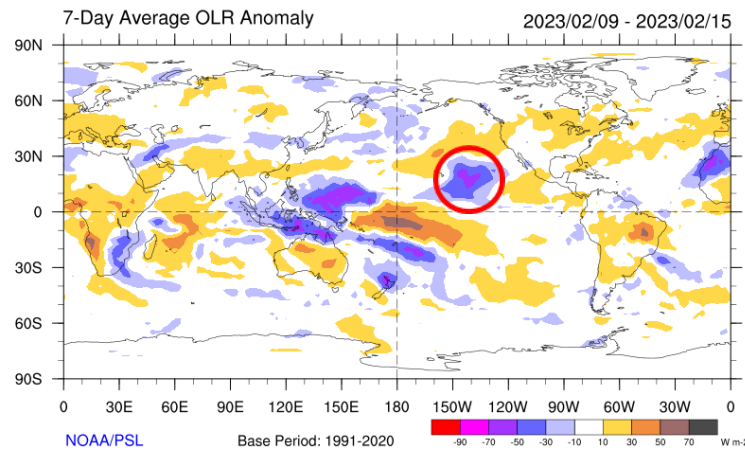
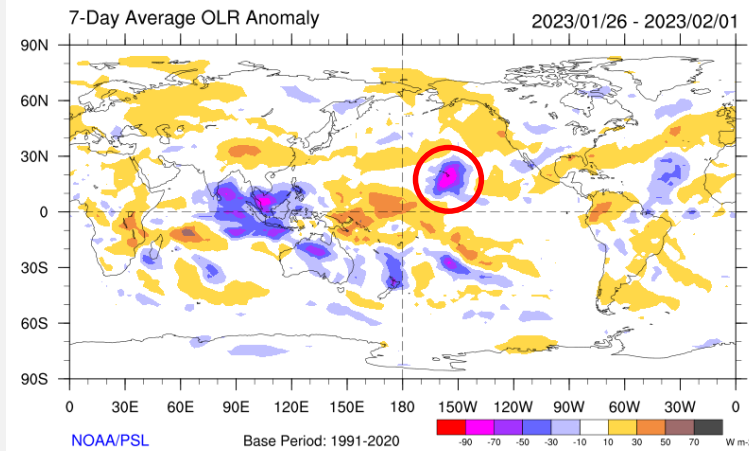
Despite well-above normal snowpack in the mountains of northern and western New Mexico this past winter season, vegetation on the eastern plains remains critically dry. A rapid end to the triple-dip La Niña climate pattern will likely change the dry conditions in eastern NM during spring.

2023 Spring Outlook

For Northern & Central New Mexico



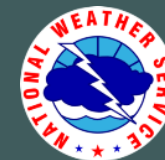
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First off, a slide is necessary to discuss the recent extraordinarily strong wind events and blizzard conditions in western NM in February. After a three year-long La Niña climate pattern, the Pacific Ocean decided it was time to warm up rapidly during 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).

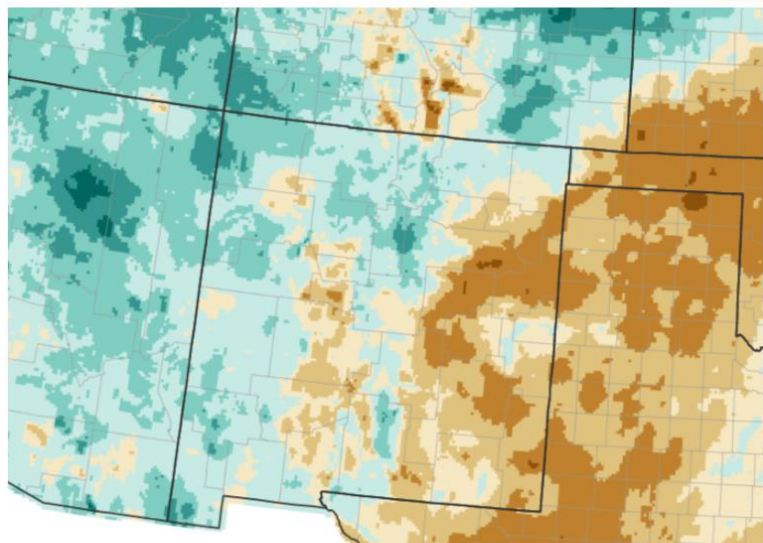
2023 Spring Outlook

For Northern & Central New Mexico

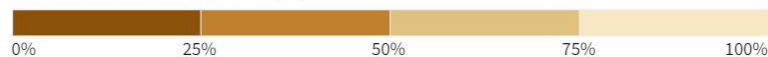


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60-Day Percent of Normal Precipitation



Percent of Normal Precipitation (%)

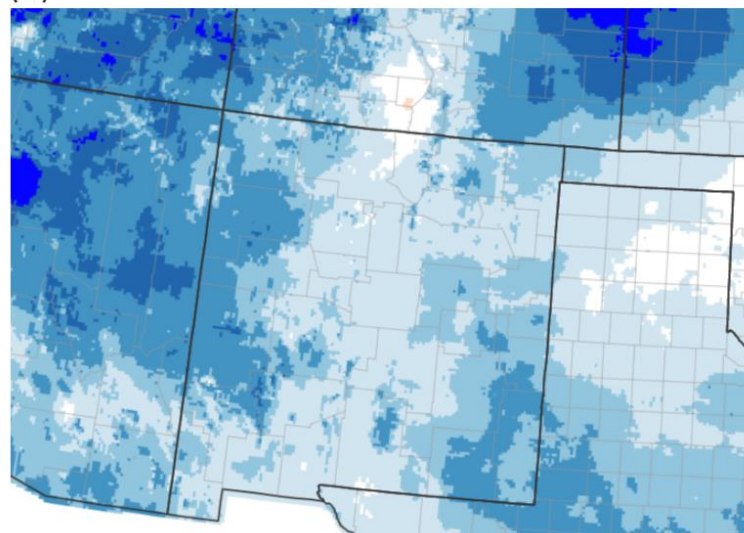


The 60 day percent of normal precipitation shows the difference of the last 60 days from the usual conditions for the same time period averaged from 1991-2020 using the gridMET and PRISM temperature datasets. Precipitation data are updated daily, with a delay of 3 to 4 days to allow for data collection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

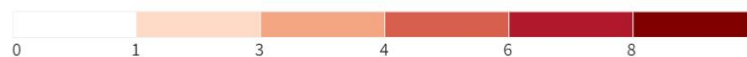
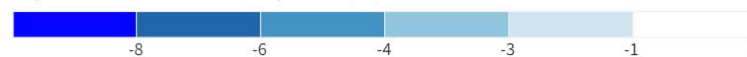
Source(s): UC Merced, Climate Engine
Data Valid - 02/25/23

Drought.gov

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



Departure from Normal Max Temperature (°F)

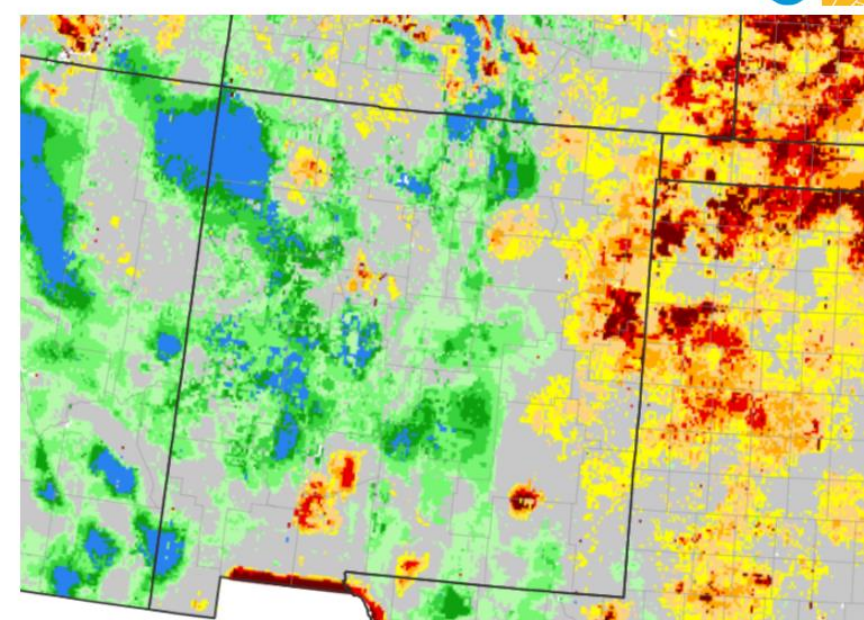


The 30-day departure from the normal maximum temperature (°F) shows the difference of the last 30 days from the usual conditions for the same time period averaged from 1991-2020 using the gridMET and PRISM temperature datasets. Temperature data are updated daily, with a delay of 3 to 4 days to allow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

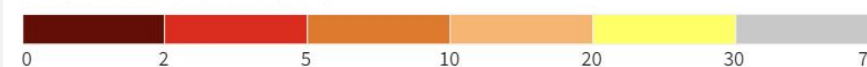
Source(s): UC Merced, Climate Engine
Data Valid - 02/25/23

Drought.gov

NASA SPoRT-LIS 0-100 cm Soil Moisture Percentile



0-100 cm Soil Moisture Percentile



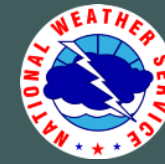
Source(s): NASA
Updates Daily - 03/01/23

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

2023 Spring Outlook

For Northern & Central New Mexico



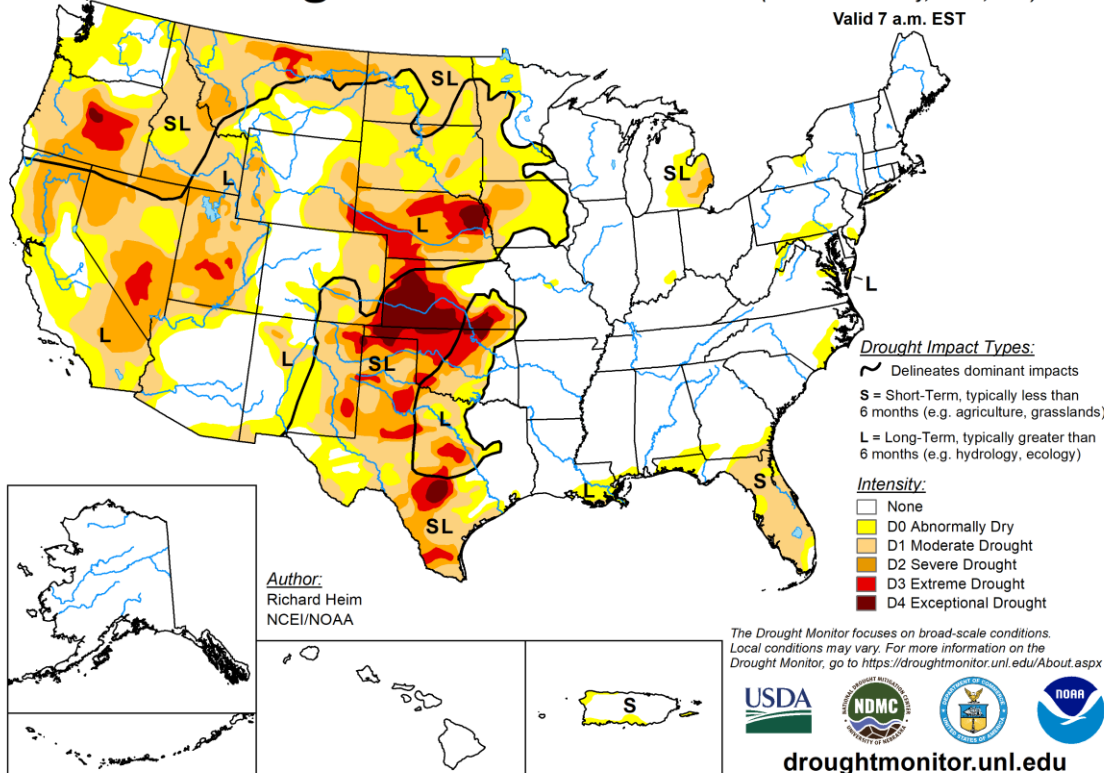
Albuquerque
WEATHER FORECAST OFFICE

U.S. Drought Monitor

February 28, 2023

(Released Thursday, Mar. 2, 2023)

Valid 7 a.m. EST

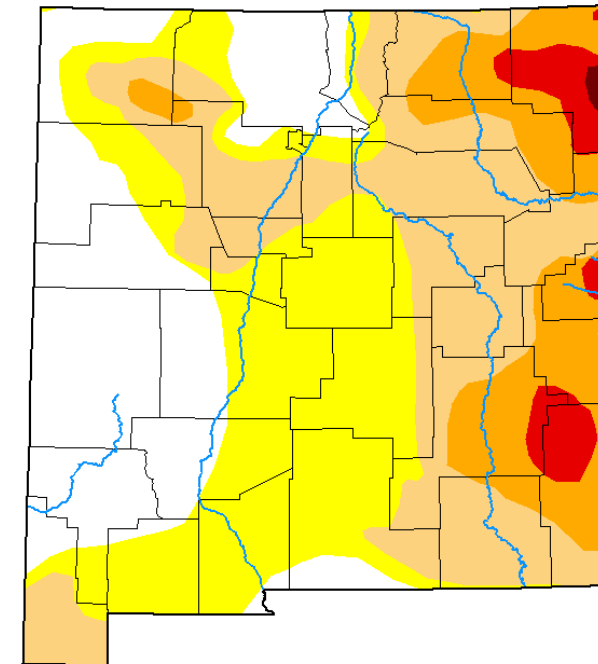


U.S. Drought Monitor New Mexico

February 28, 2023

(Released Thursday, Mar. 2, 2023)

Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	25.96	74.04	44.75	16.46	3.82	0.19
Last Week 02-21-2023	23.60	76.40	46.61	18.05	3.82	0.19
3 Months Ago 11-29-2022	6.76	93.24	42.32	18.42	3.74	0.19
Start of Calendar Year 01-03-2023	7.03	92.97	41.30	18.55	3.74	0.19
Start of Water Year 09-27-2022	0.99	99.01	76.80	31.46	6.99	0.00
One Year Ago 03-01-2022	0.00	100.00	97.09	80.96	33.09	2.77

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
Richard Heim
NCEI/NOAA

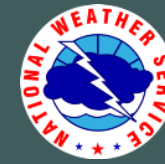


droughtmonitor.unl.edu

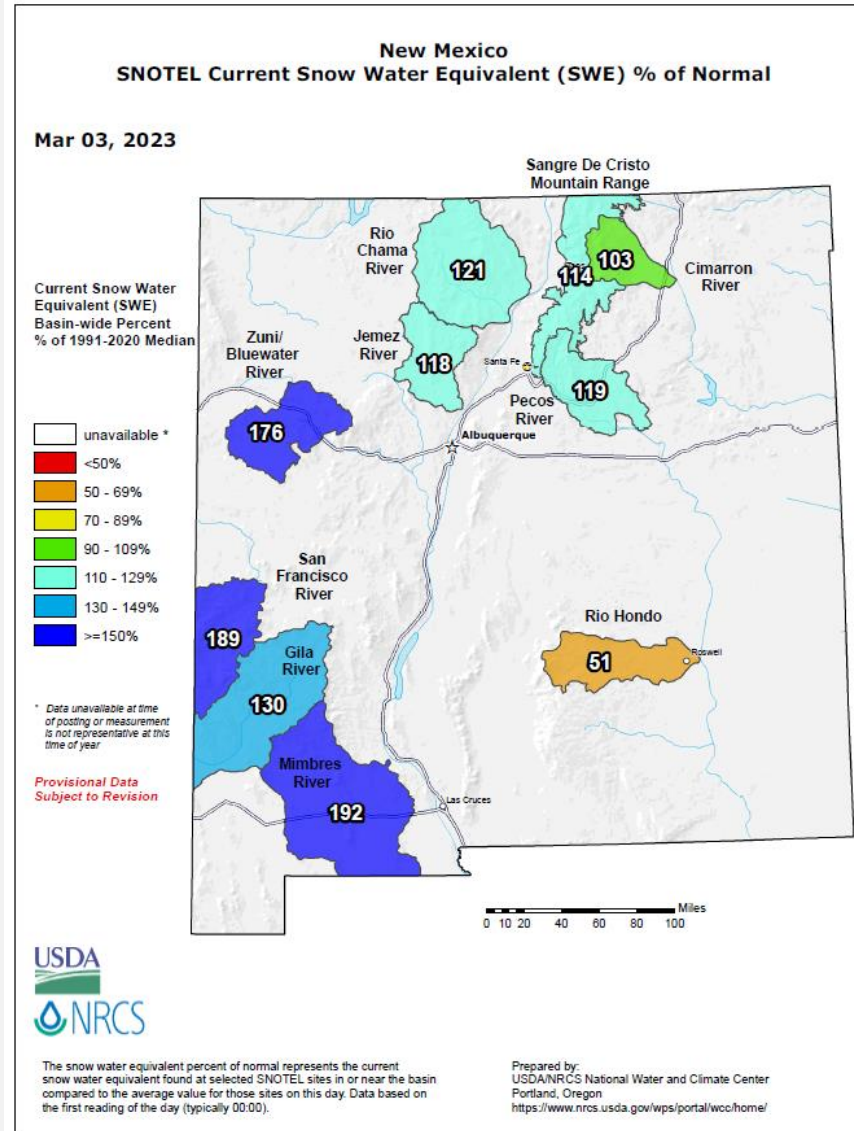
U.S. Drought Monitor showing that much of eastern New Mexico remains in Moderate drought with areas of Severe and localized Extreme conditions. New Mexico and much of the western half of the country are in a two decade-long megadrought. It's considered the most extreme drought during the past 1,200 years.

2023 Spring Outlook

For Northern & Central New Mexico



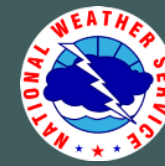
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Snow water equivalent (SWE) percentage of normal. The vast majority of watersheds are well above average.

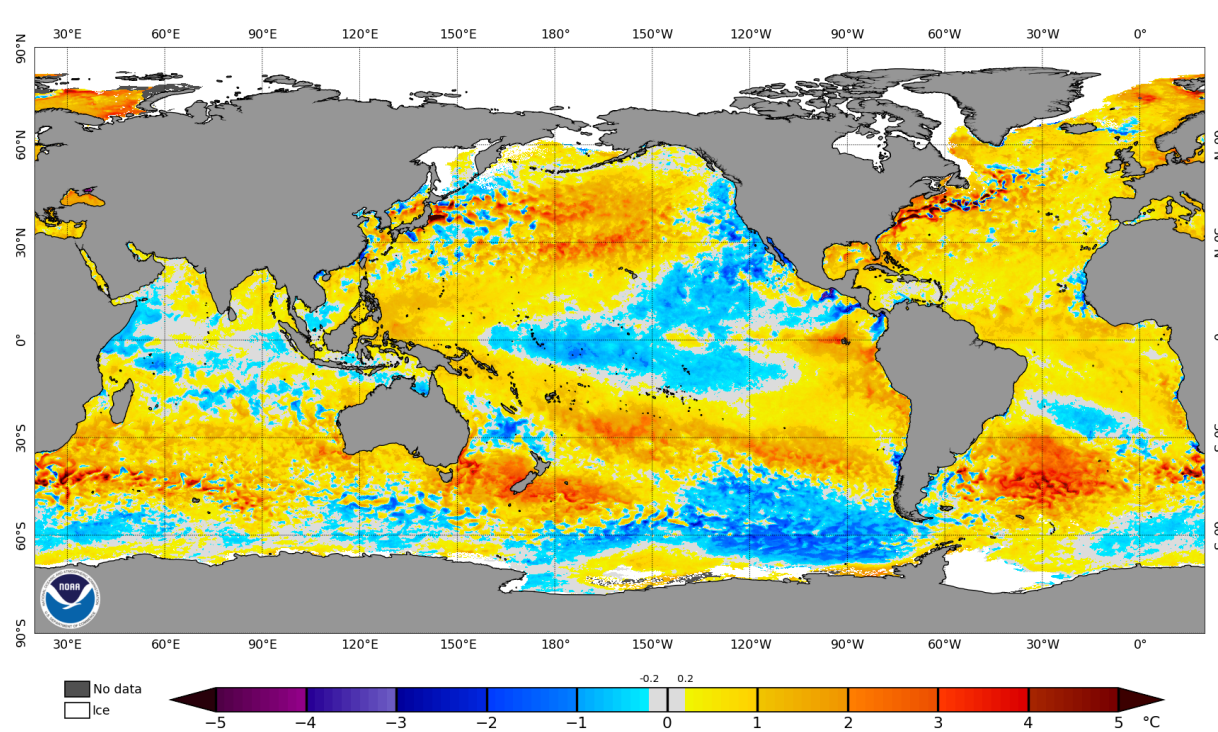
2023 Spring Outlook

For Northern & Central New Mexico

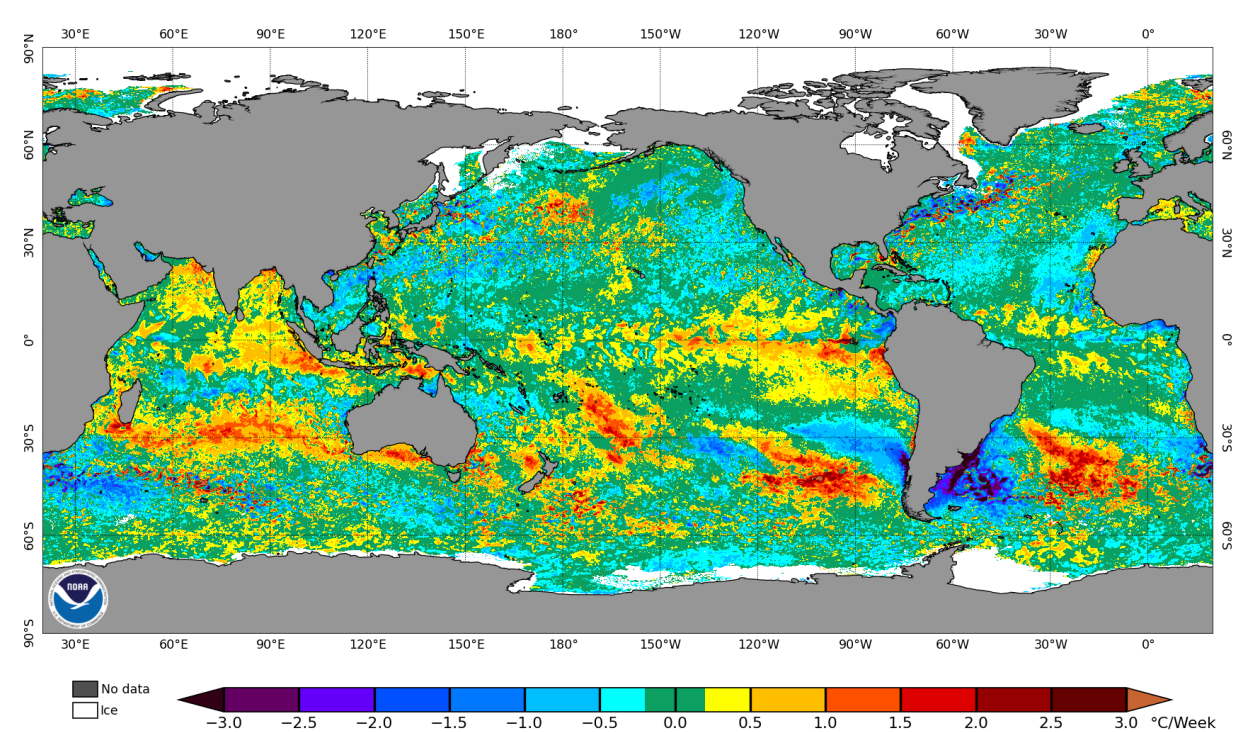


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NOAA Coral Reef Watch Daily 5km SST Anomalies (v3.1) 20 Feb 2023



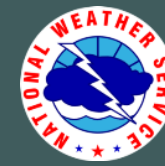
NOAA Coral Reef Watch Daily 5km SST Trend (Past 7 Days) (v3.1) 20 Feb 2023



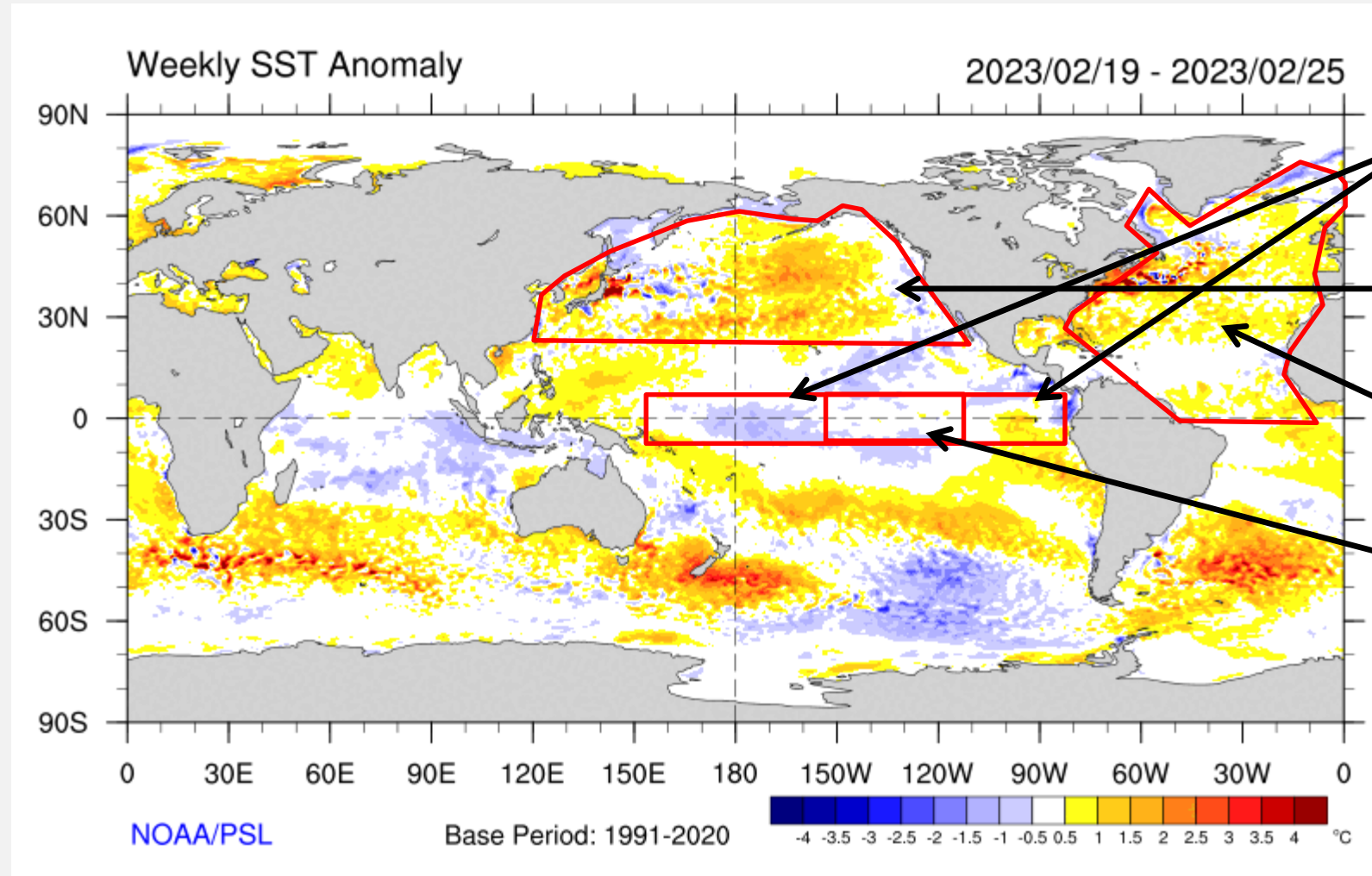
Sea Surface Temperature (SST) differences from average and SST trend in February 2023. Equatorial Eastern Pacific is warming rapidly.

2023 Spring Outlook

For Northern & Central New Mexico



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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**

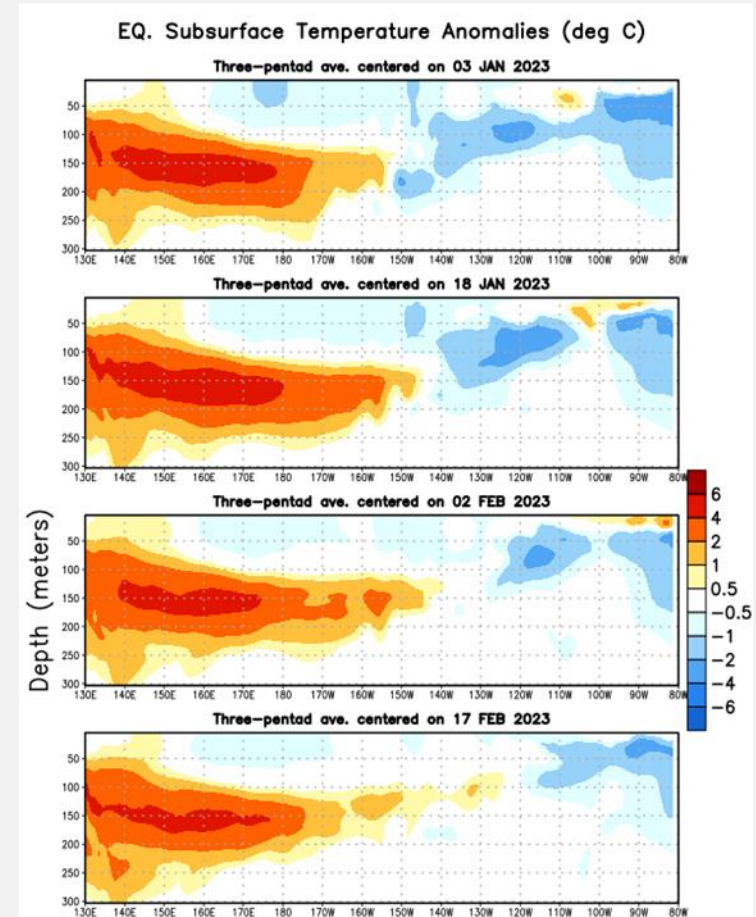
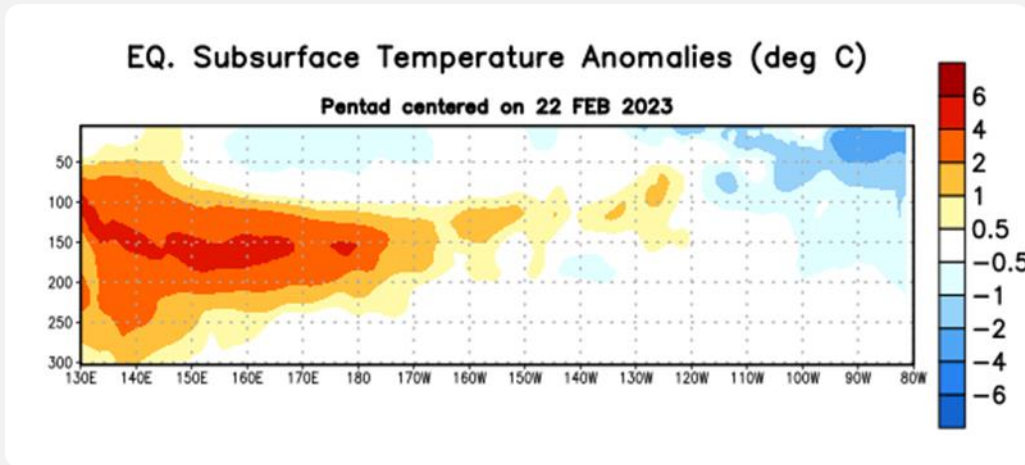
Latest weekly global SST anomalies showing the area of cooler than average temperatures in the eastern Equatorial Pacific shrinking over the past couple of months.

2023 Spring Outlook

For Northern & Central New Mexico



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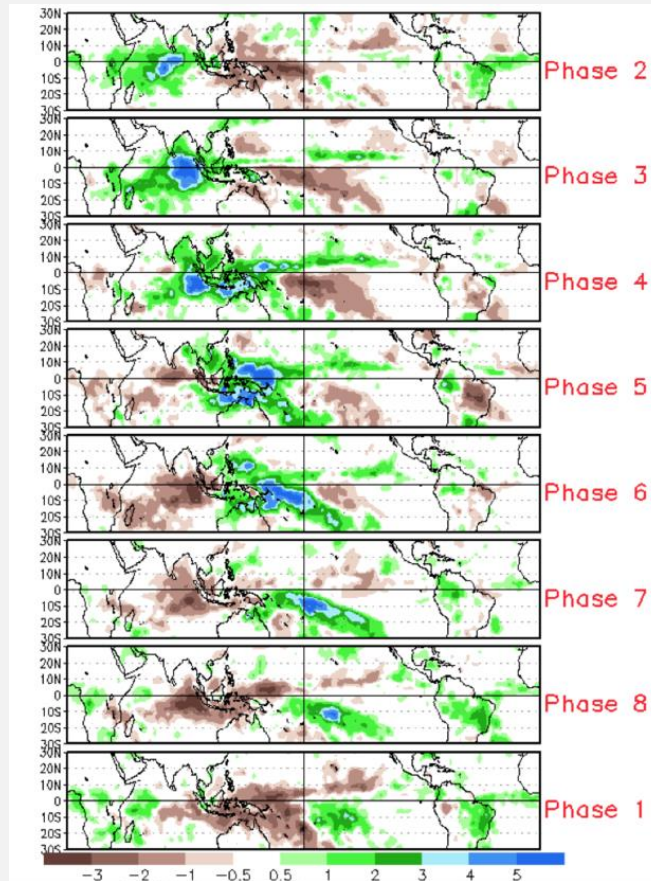
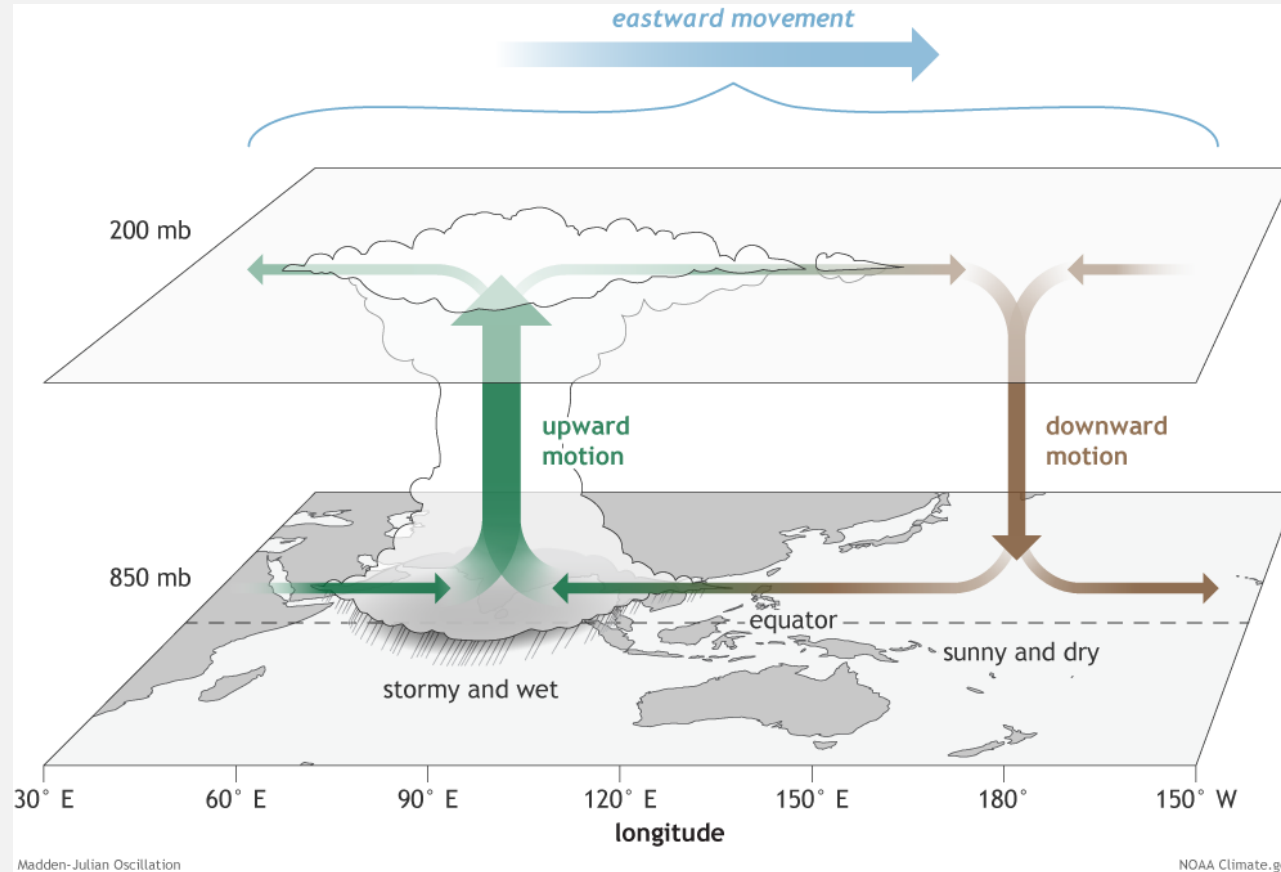
Negative subsurface temperature anomalies are disappearing in the Central Pacific, and continue to shrink in the Eastern Pacific. Warming at depth continues to spread eastward.

2023 Spring Outlook

For Northern & Central New Mexico



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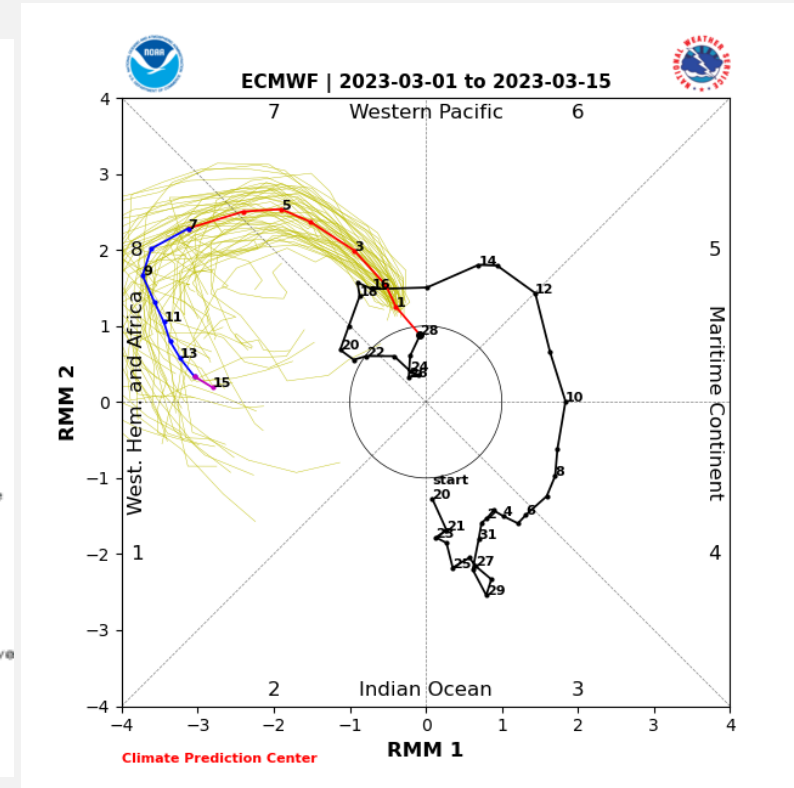
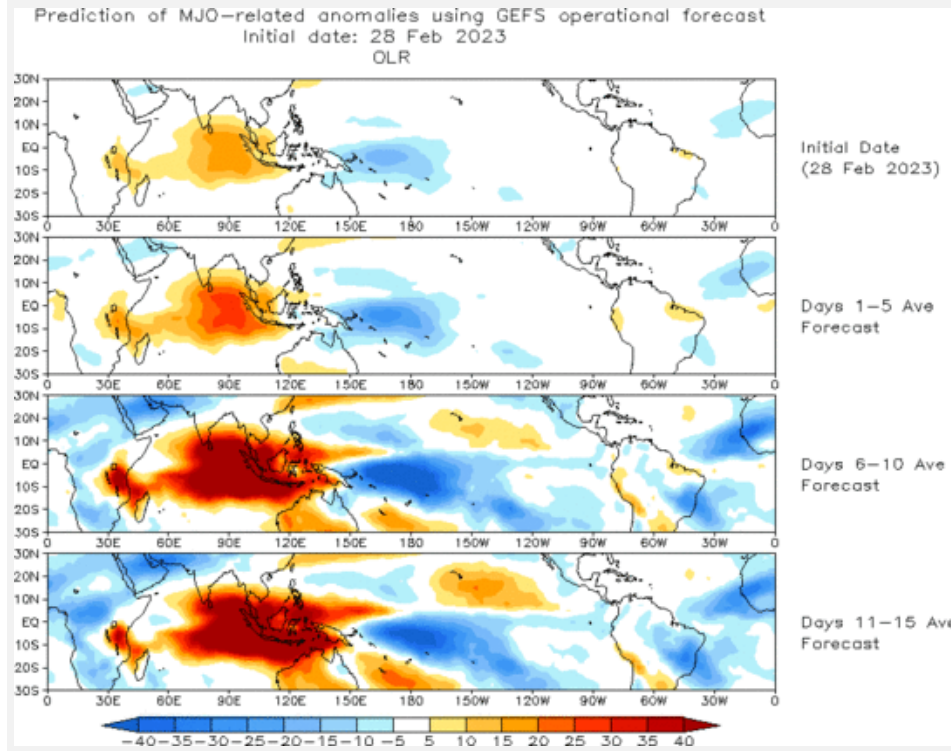
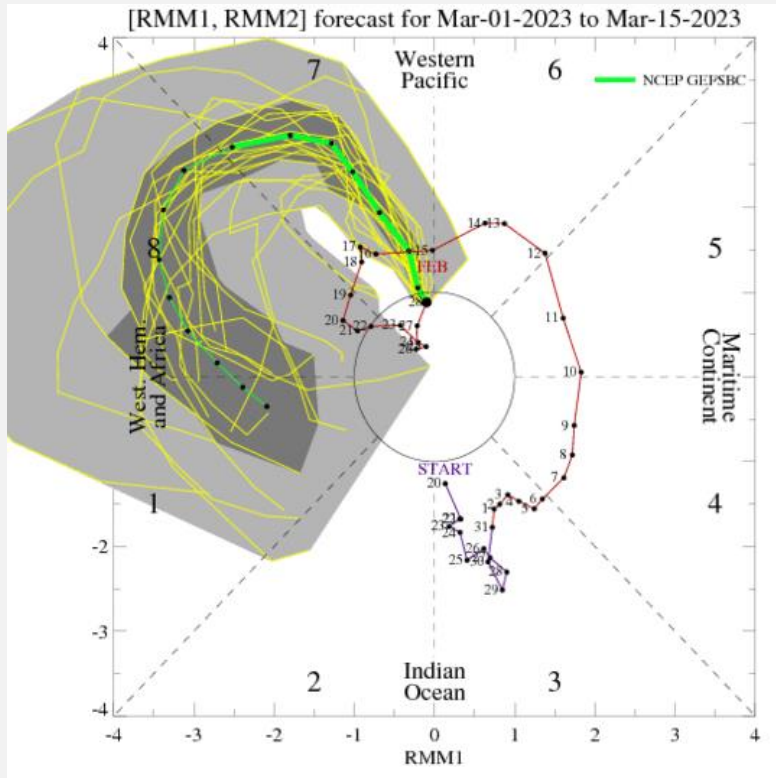
The Madden-Julian Oscillation (MJO) is an area of enhanced thunderstorms that travels around the world every 30 to 60 days from west to east along/near the equator. Ahead and behind the active stormy area are areas of suppressed convection and drier conditions. The MJO affects near-surface wind patterns, 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 allows thunderstorms related to the MJO to continue eastward into the EPAC, influencing the jet stream.

2023 Spring Outlook

For Northern & Central New Mexico



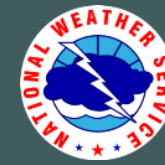
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Forecasts for the MJO during the first two weeks in March 2023. The forecast is quite remarkable for March with a few runs of the GFS literally off the charts with the strength of the MJO in phase 8 later this month. The middle graphic shows the GEFS 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.

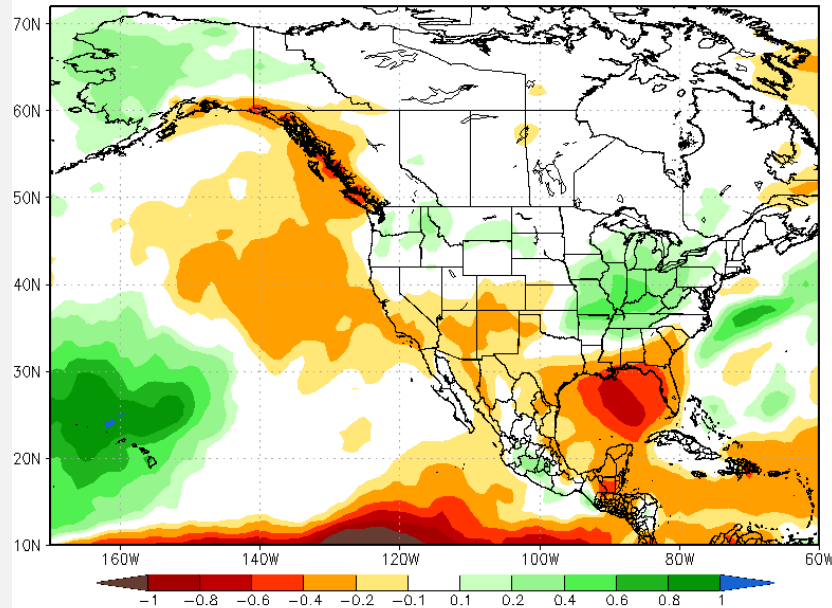
2023 Spring Outlook

For Northern & Central New Mexico

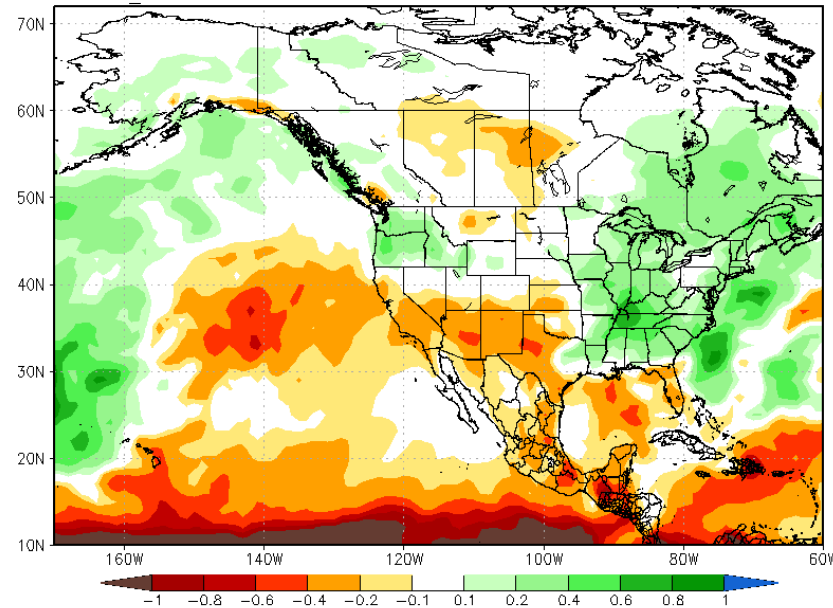


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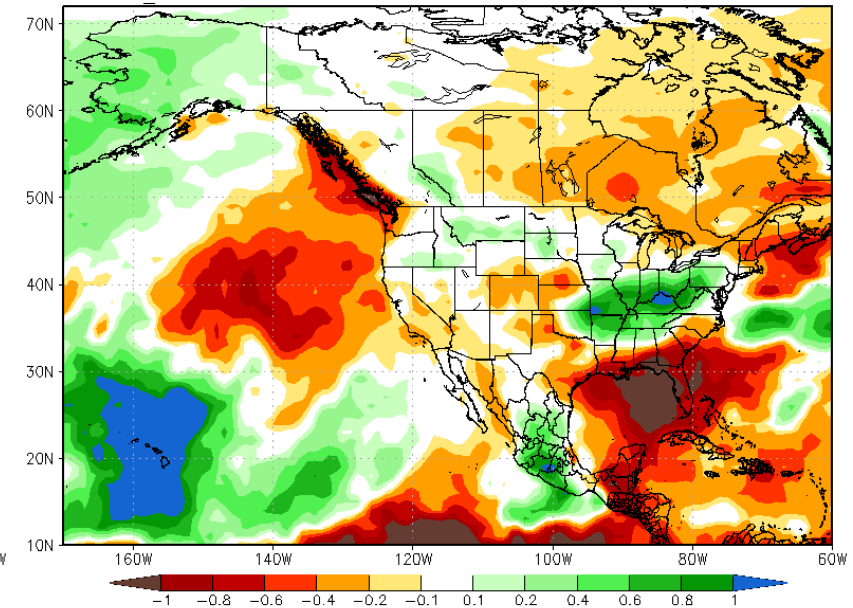
NMME Forecast of Prec. rate Anom IC=202302 for Lead 1 2023MAM



GFDL_SPEAR Forecast of Prec. rate Anom IC=202302 for Lead 1 2023MAM



GEM5_NEMO Forecast of Prec. rate Anom IC=202302 for Lead 1 2023MAM



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.

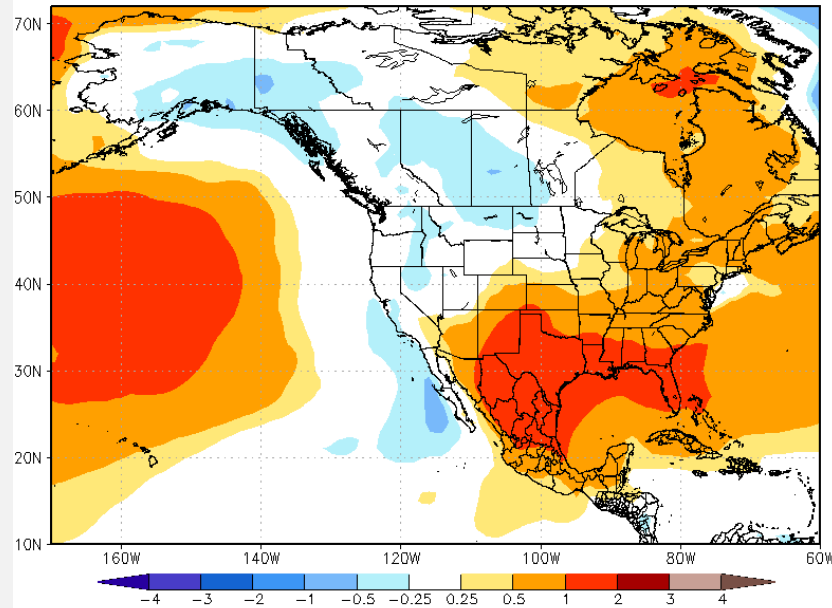
2023 Spring Outlook

For Northern & Central New Mexico

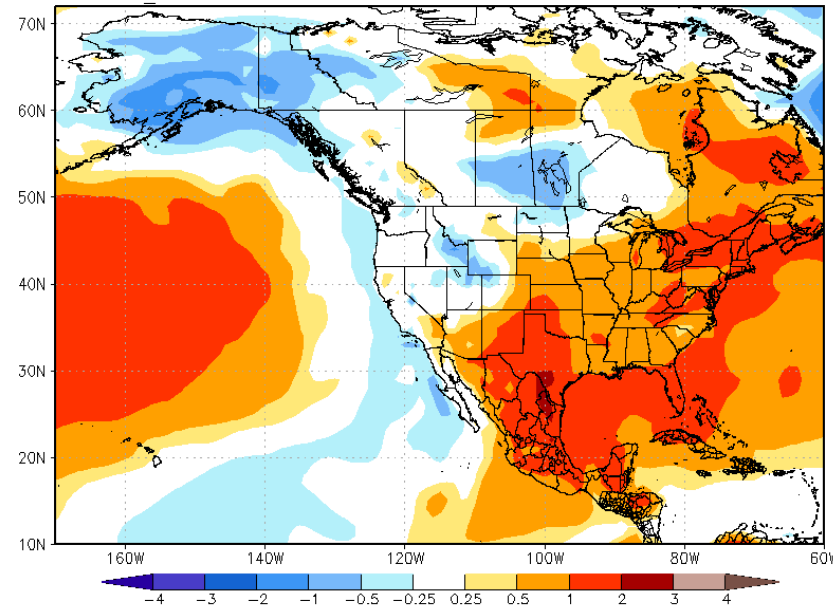


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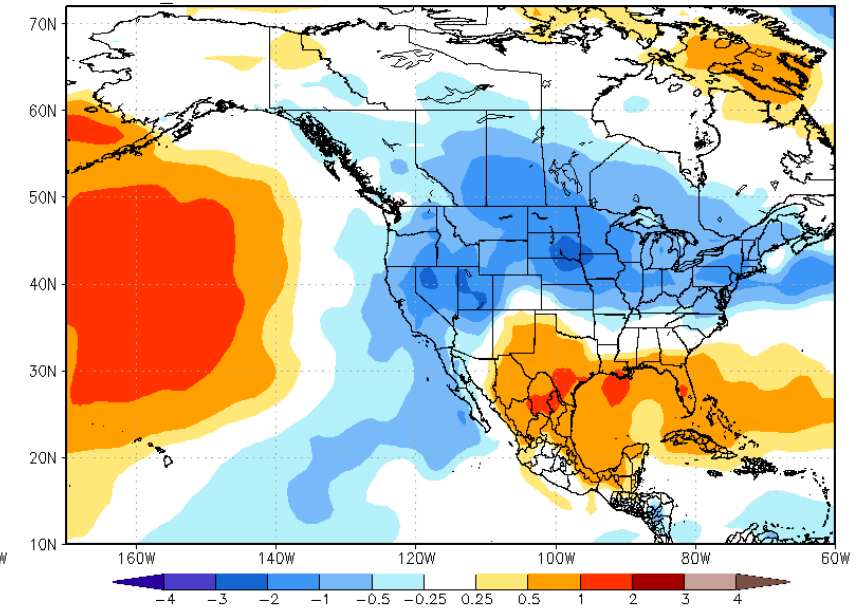
NMME Forecast of TMP2m Anom IC=202302 for Lead 1 2023MAM



GFDL_SPEAR Forecast of TMP2m Anom IC=202302 for Lead 1 2023MAM



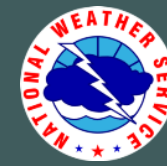
GEM5_NEMO Forecast of TMP2m Anom IC=202302 for Lead 1 2023MAM



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.

2023 Spring Outlook

For Northern & Central New Mexico



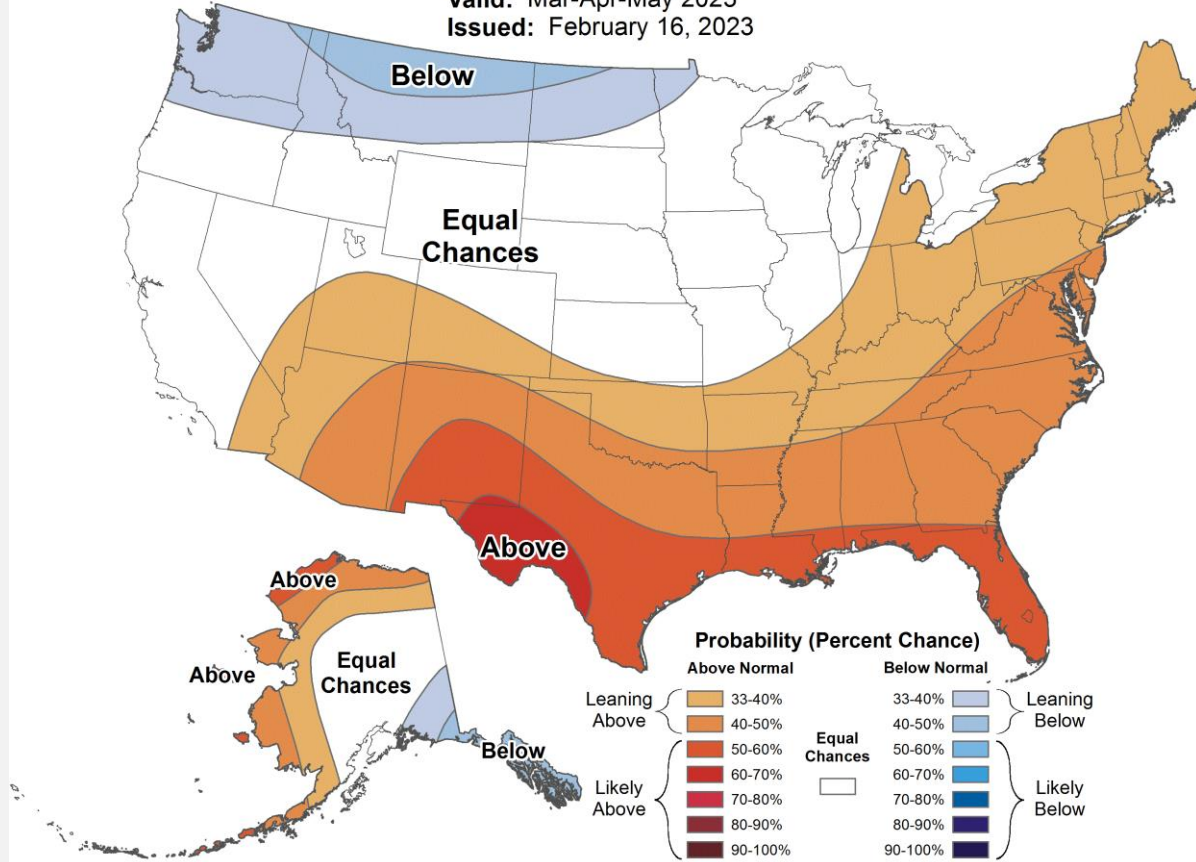
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Seasonal Temperature Outlook



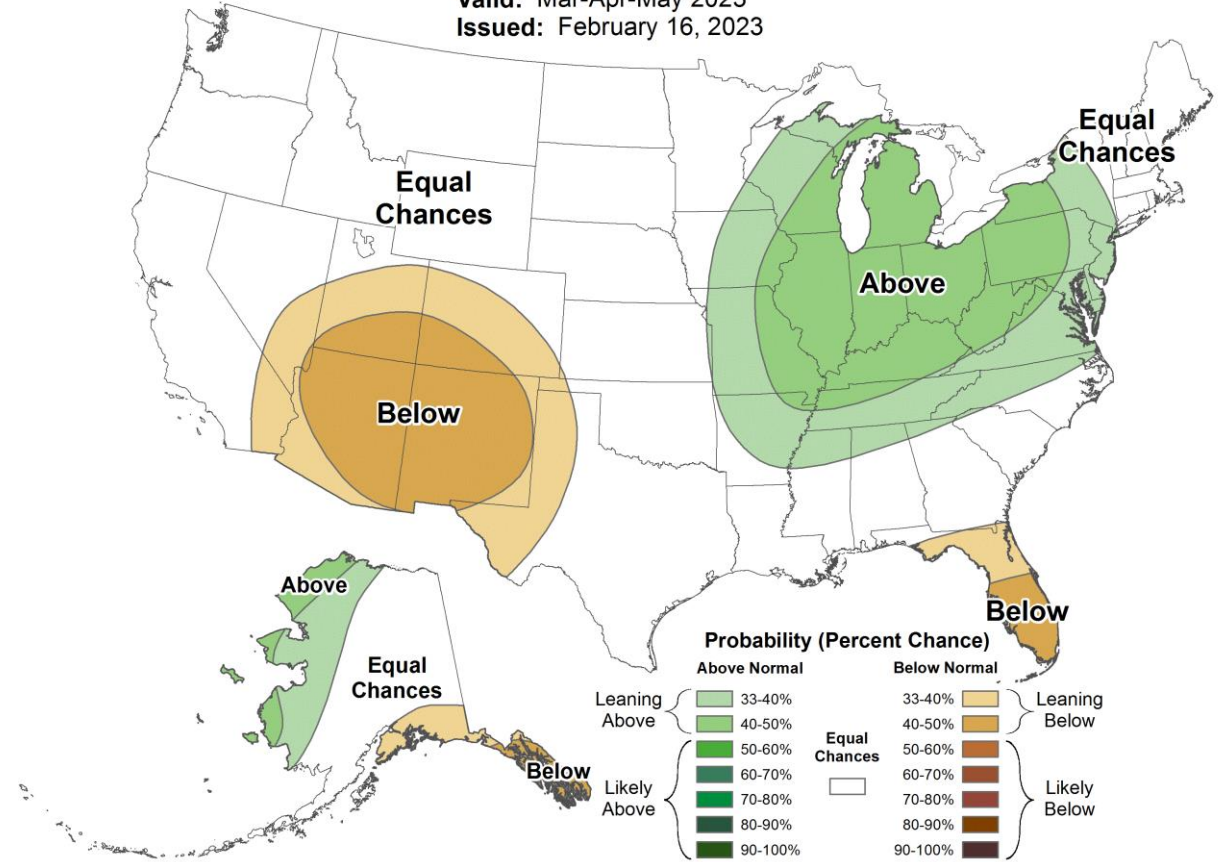
Valid: Mar-Apr-May 2023
Issued: February 16, 2023



Seasonal Precipitation Outlook



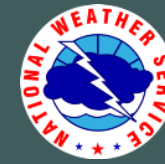
Valid: Mar-Apr-May 2023
Issued: February 16, 2023



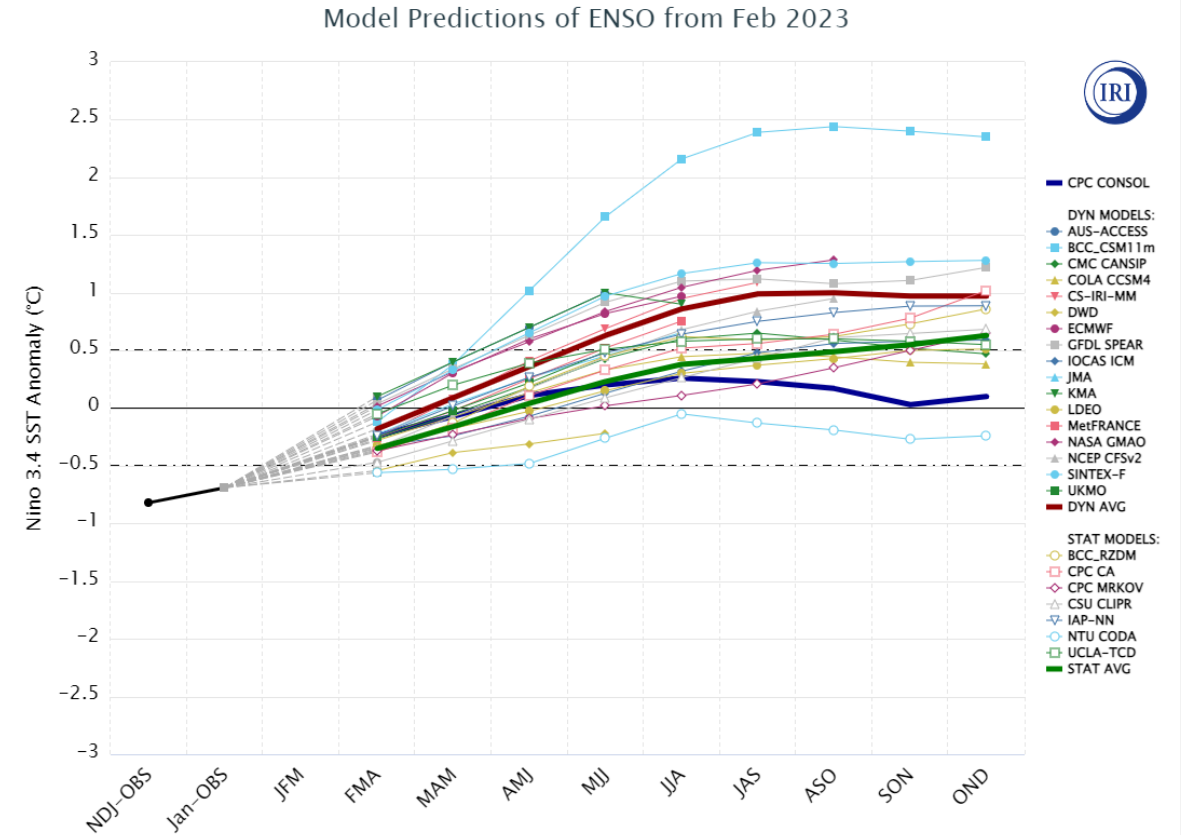
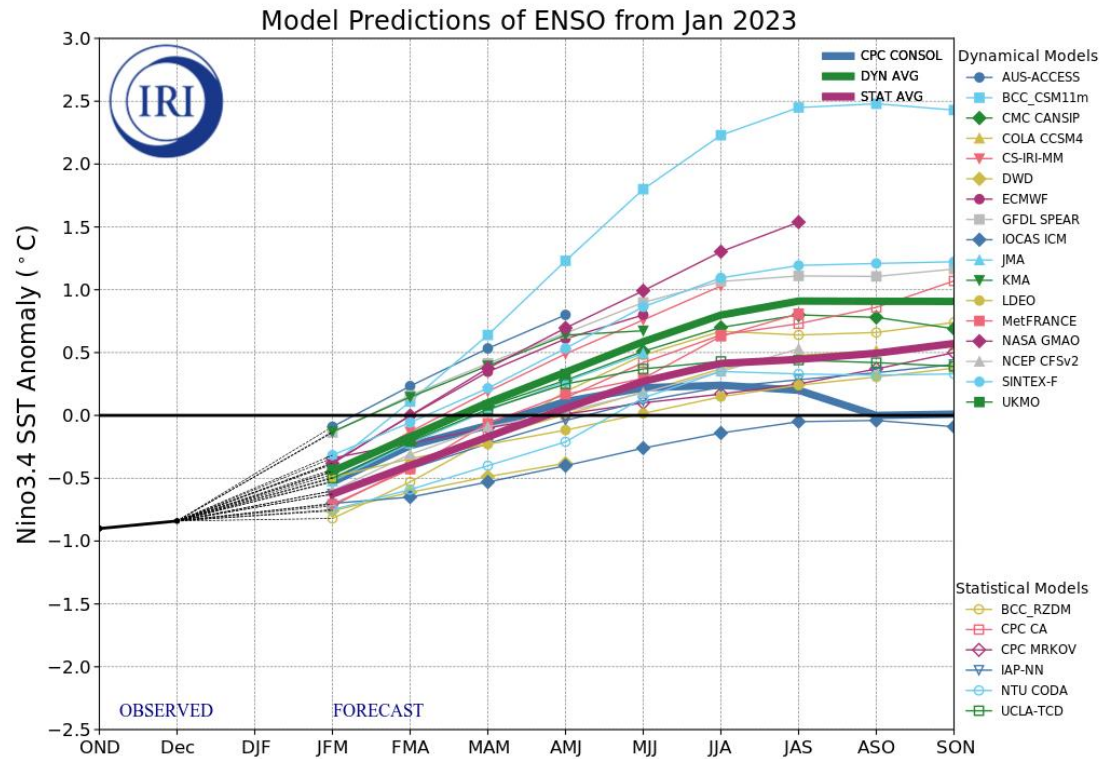
Climate Prediction Center's Official 2023 Climate Outlook for March, April and May showing probabilities favor above average temperatures and below average precipitation.

2023 Spring Outlook

For Northern & Central New Mexico



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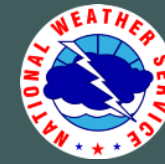


Highcharts.com

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.

2023 Spring Outlook

For Northern & Central New Mexico



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C3S: JMA contribution
Prob(most likely category of precipitation)
Nominal forecast start: 01/02/23
Ensemble size = 55, climate size = 240

MAM 2023

C3S: CMCC contribution
Prob(most likely category of precipitation)
Nominal forecast start: 01/02/23
Ensemble size = 50, climate size = 960

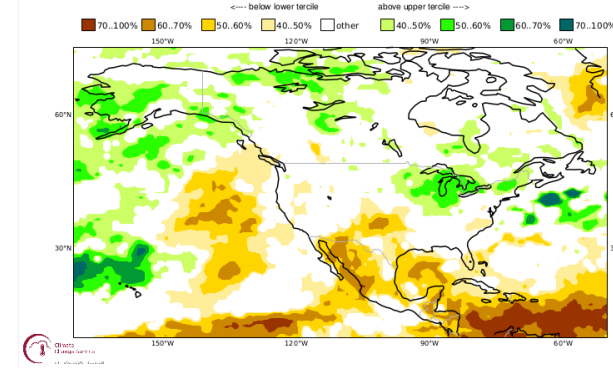
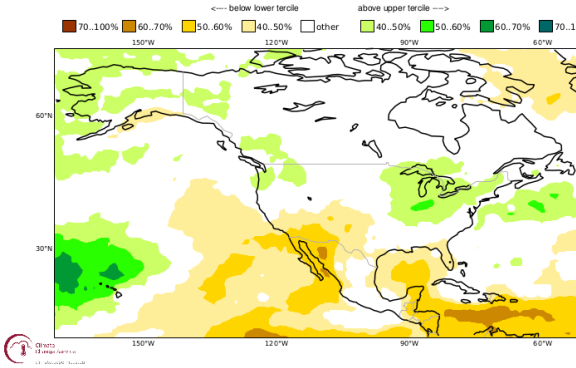
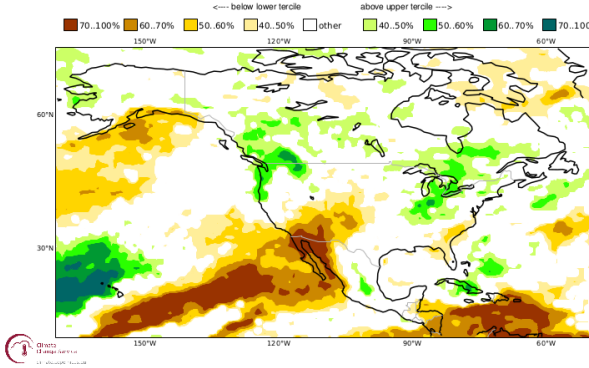
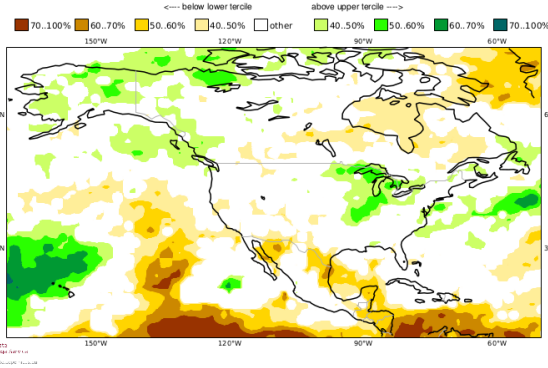
MAM 2023

C3S multi-system seasonal forecast
ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA/ECCC
Prob(most likely category of precipitation)
Nominal forecast start: 01/02/23
Unweighted mean

MAM 2023

C3S: DWD contribution
Prob(most likely category of precipitation)
Nominal forecast start: 01/02/23
Ensemble size = 50, climate size = 720

MAM 2023



C3S: ECMWF contribution
Prob(most likely category of precipitation)
Nominal forecast start: 01/02/23
Ensemble size = 51, climate size = 600

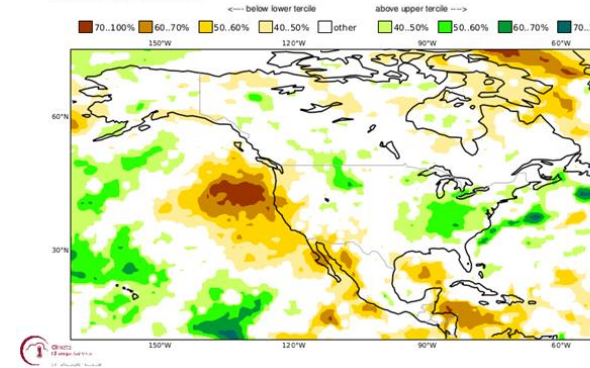
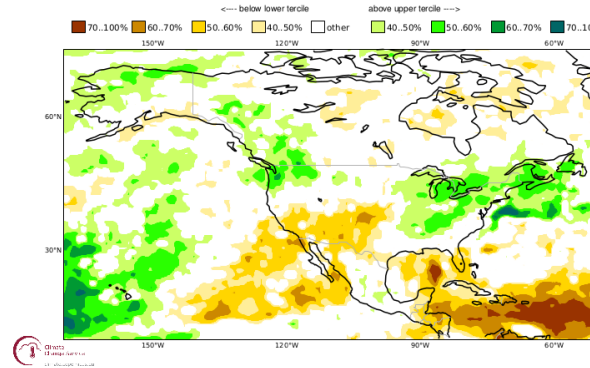
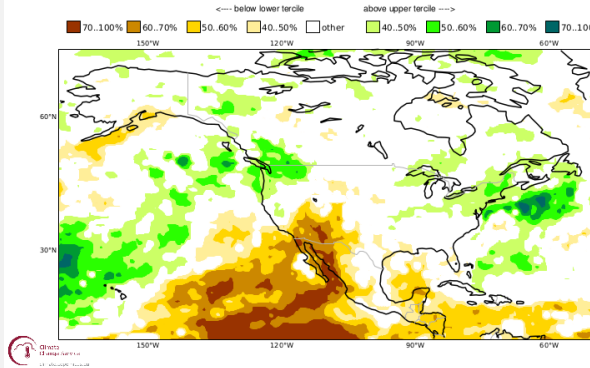
MAM 2023

C3S: Met Office contribution
Prob(most likely category of precipitation)
Nominal forecast start: 01/02/23
Ensemble size = 50, climate size = 672

MAM 2023

C3S: NCEP contribution
Prob(most likely category of precipitation)
Nominal forecast start: 01/02/23
Ensemble size = 52, climate size = 384

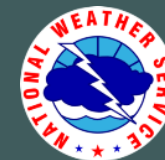
MAM 2023



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.

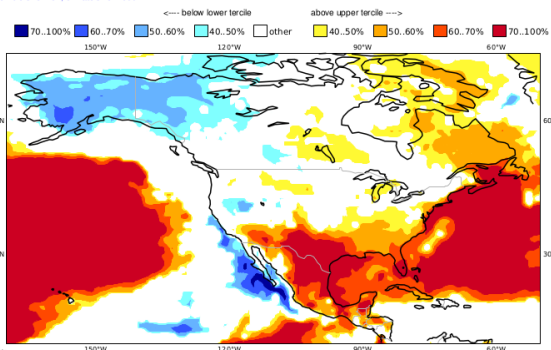
2023 Spring Outlook

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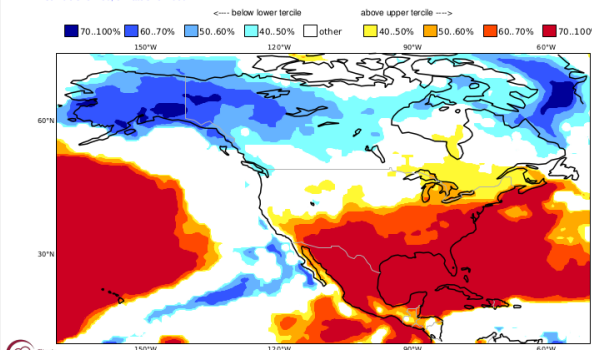


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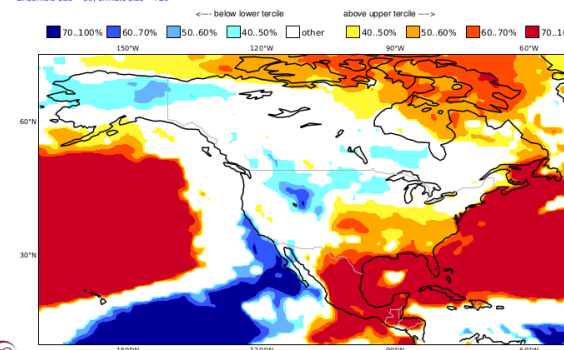
C3S: ECMWF contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/02/23
Ensemble size = 51, climate size = 600
MAM 2023



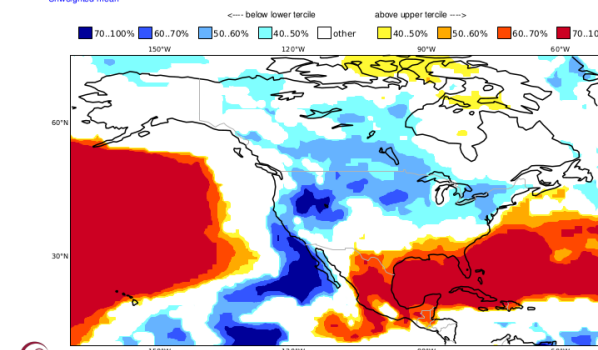
C3S: CMCC contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/02/23
Ensemble size = 50, climate size = 990
MAM 2023



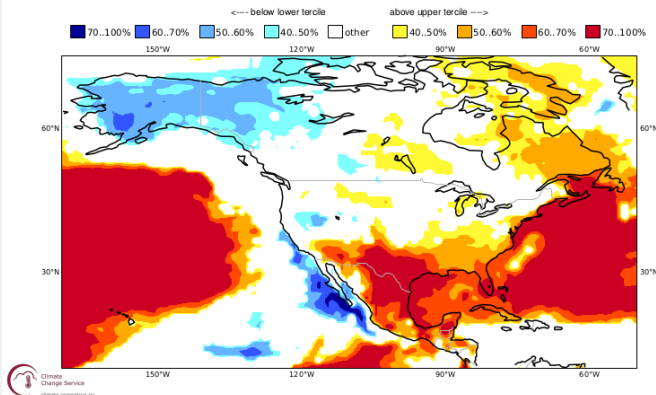
C3S: DWD contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/02/23
Ensemble size = 50, climate size = 720
MAM 2023



C3S: ECCO contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/02/23
Unweighted mean
MAM 2023

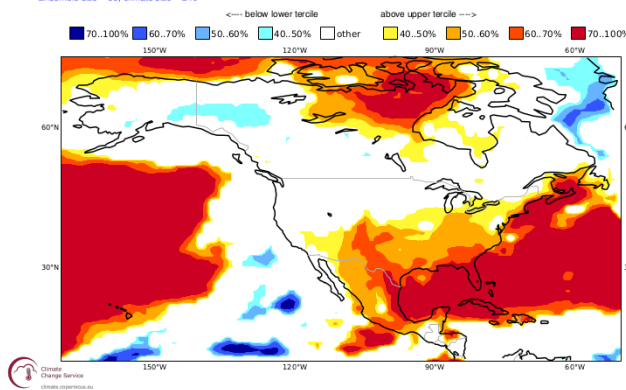


C3S: ECMWF contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/02/23
Ensemble size = 51, climate size = 600



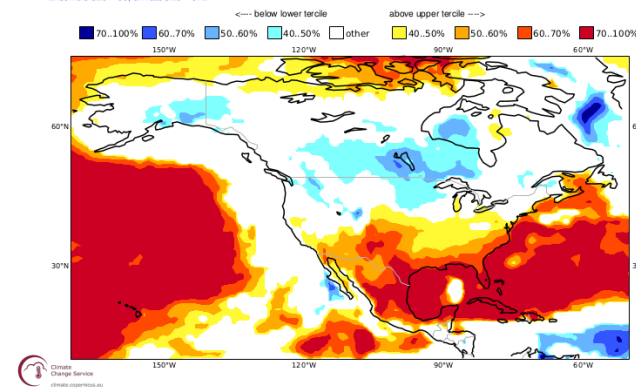
MAM 2023

C3S: JMA contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/02/23
Ensemble size = 55, climate size = 240



MAM 2023

C3S: Met Office contribution
Prob(most likely category of 2m temperature)
Nominal forecast start: 01/02/23
Ensemble size = 50, climate size = 672

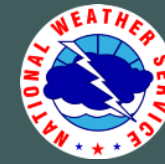


MAM 2023

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.

2023 Spring Outlook

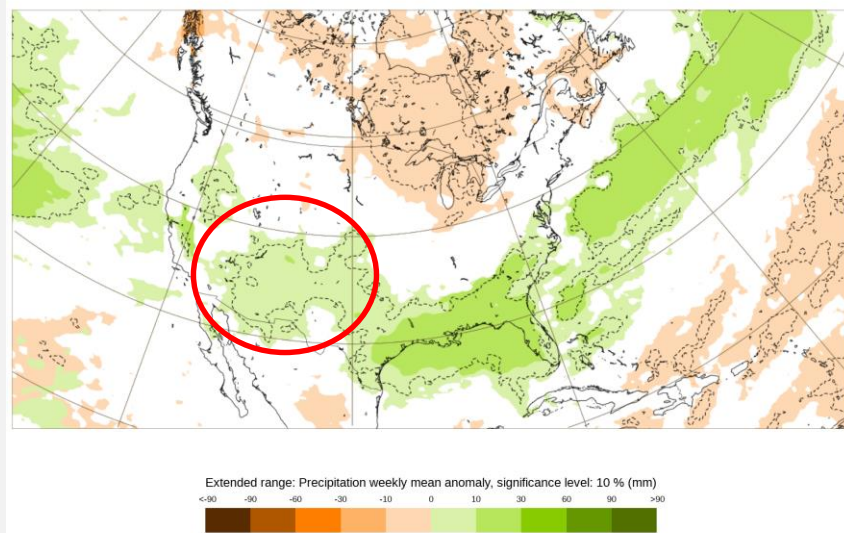
For Northern & Central New Mexico



Albuquerque
WEATHER FORECAST OFFICE

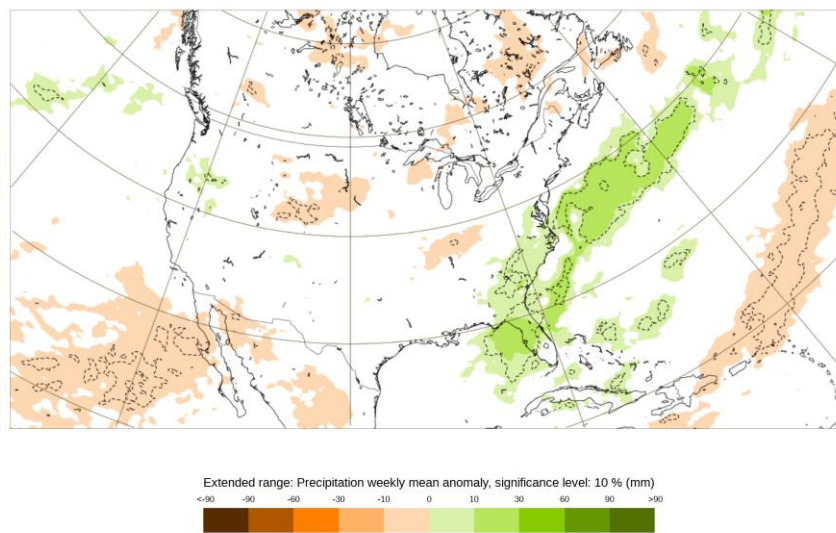
Precipitation: Weekly mean anomalies

Base time: Thu 02 Mar 2023 Valid time: Mon 13 Mar 2023 - Mon 20 Mar 2023 (+432h) Area : North America



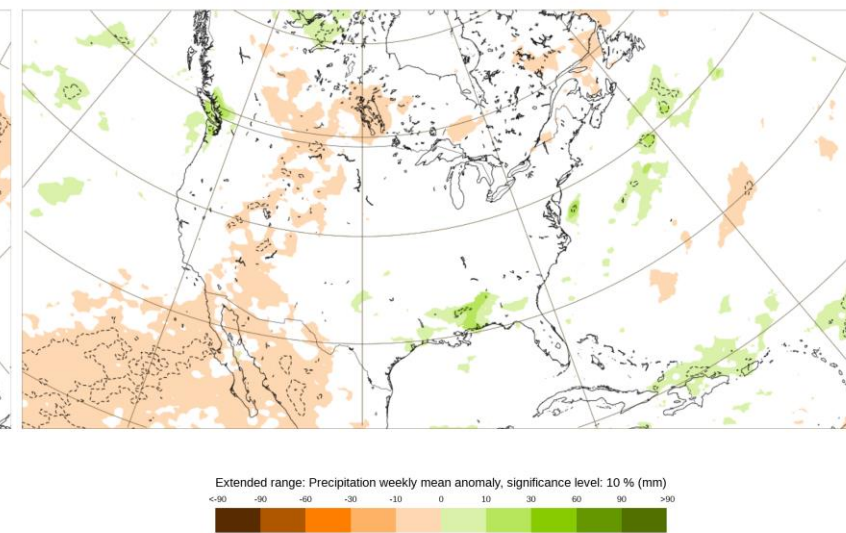
Precipitation: Weekly mean anomalies

Base time: Thu 02 Mar 2023 Valid time: Mon 20 Mar 2023 - Mon 27 Mar 2023 (+600h) Area : North America



Precipitation: Weekly mean anomalies

Base time: Thu 02 Mar 2023 Valid time: Mon 27 Mar 2023 - Mon 03 Apr 2023 (+768h) Area : North America



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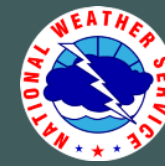
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The new European Centre for Medium-Range Weather Forecasts (ECVWF) Extended Range Ensemble Forecasts (ENS) which has shown superior forecast accuracy compared to other extended weather models (Prein et al., 2022). The week of March 13-20 looks especially 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

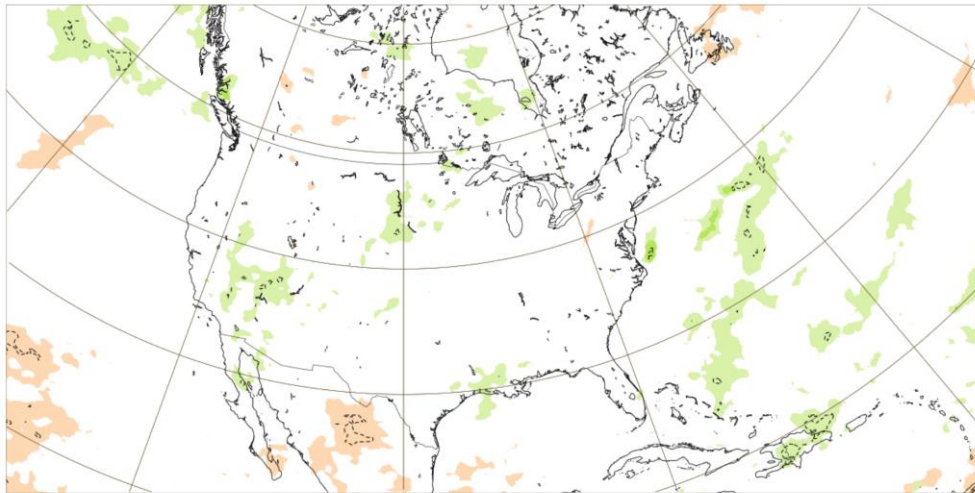
For Northern & Central New Mexico



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Precipitation: Weekly mean anomalies

Base time: Thu 02 Mar 2023 Valid time: Mon 03 Apr 2023 - Mon 10 Apr 2023 (+936h) Area : North America

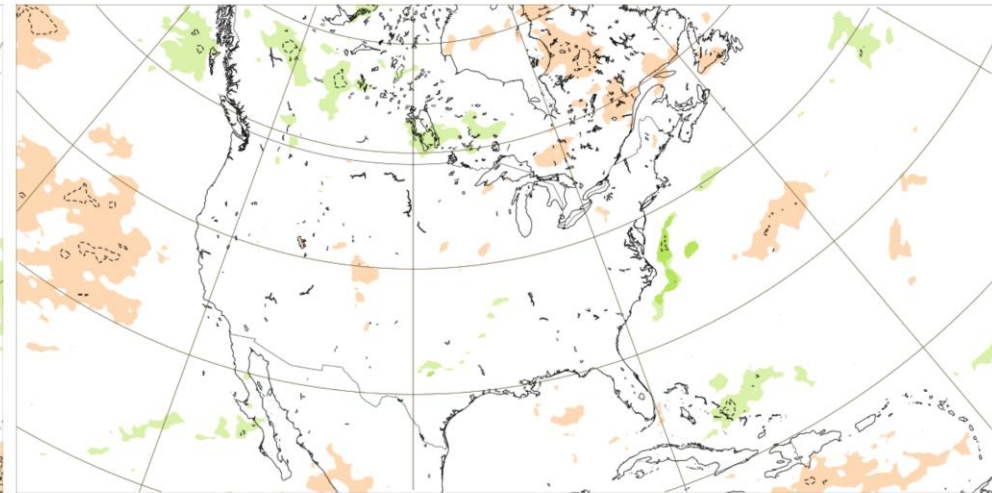


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Precipitation: Weekly mean anomalies

Base time: Thu 02 Mar 2023 Valid time: Mon 10 Apr 2023 - Mon 17 Apr 2023 (+1104h) Area : North America



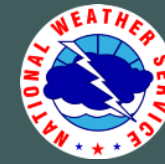
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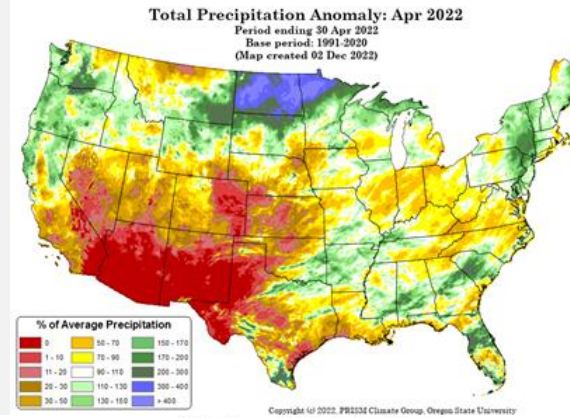
The first two weeks in April are forecast by the ECMWF ENS model to be near average precipitation. Average will seem downright soggy compared to April 2022 when the entire state recorded just 0.05”.

2023 Spring Outlook

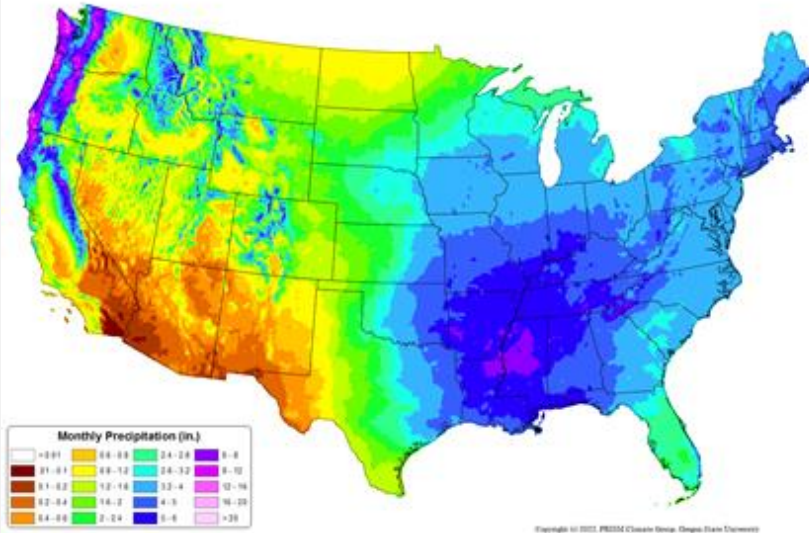
For Northern & Central New Mexico



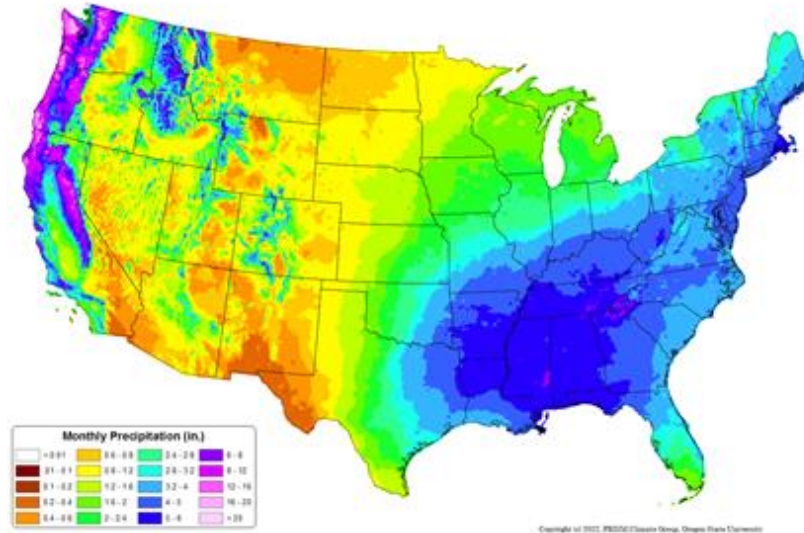
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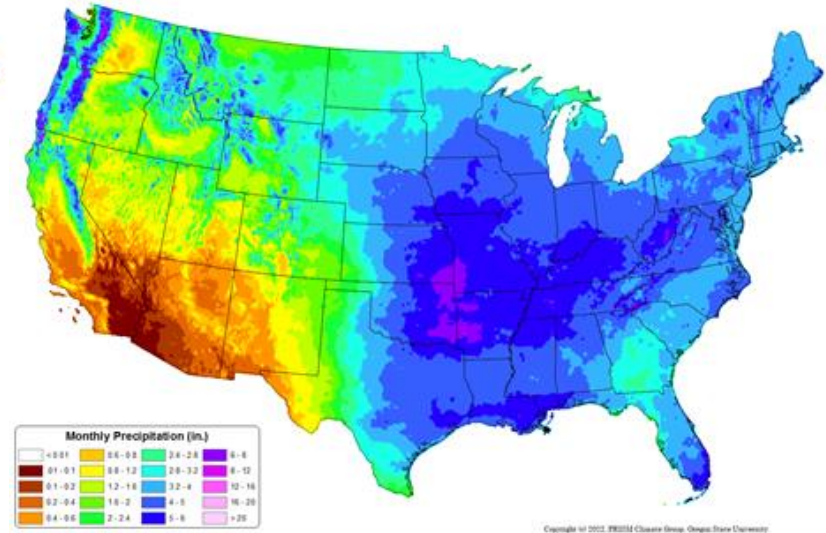
30-yr Normal Precipitation: April
Period: 1991-2020



30-yr Normal Precipitation: March
Period: 1991-2020



30-yr Normal Precipitation: May
Period: 1991-2020



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.

2023 Spring Outlook

For Northern & Central New Mexico



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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

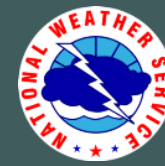
- May: Forecast confidence is moderate for near average precipitation and slightly above to above average temperatures

- 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

For Northern & Central New Mexico



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