

2022 Fall Outlook

For the Northern Two-thirds of New Mexico



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Courtesy: BalloonFiesta.com



Courtesy: Taos Ski Valley



Courtesy: Taos Ski Valley



Courtesy: Jemez Hot Springs



Courtesy: Balloon Fiesta 1972



Courtesy: NM Tourism Dept.



Courtesy: BalloonFiesta.com

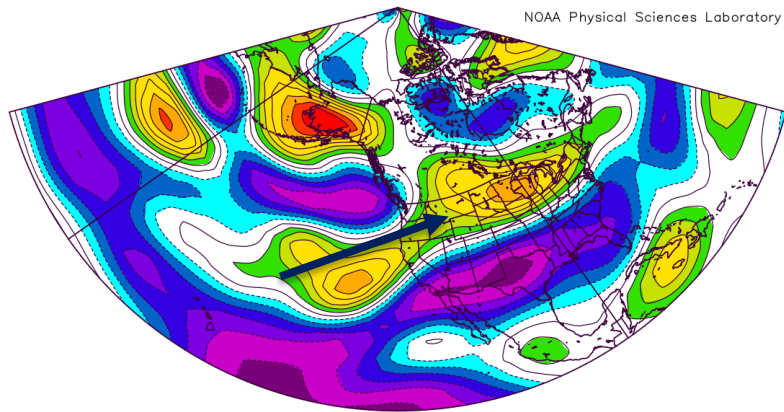
Why did this year's North American Monsoon (NAM) show up, again? La Niña held strong in summer, allowing the polar jet stream to remain stronger than average. Why does something so far away matter? A strong enough jet stream well north of New Mexico and the Southwest U.S. helps force the monsoon high east and northwest of New Mexico at times, allowing low-level moisture to move in from the south, southeast or northeast.

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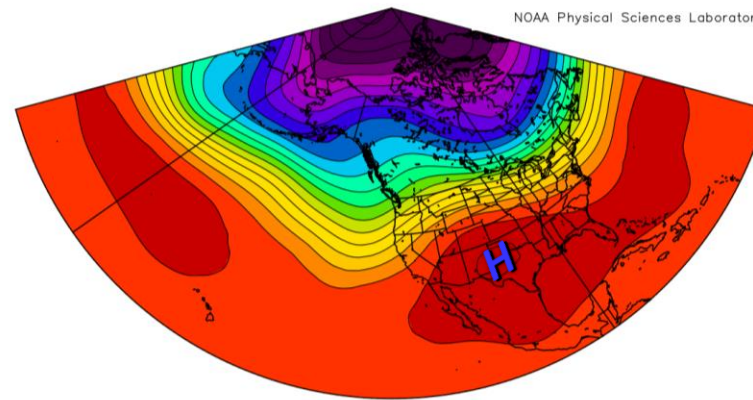
A Look Back at an Active Monsoon 2022



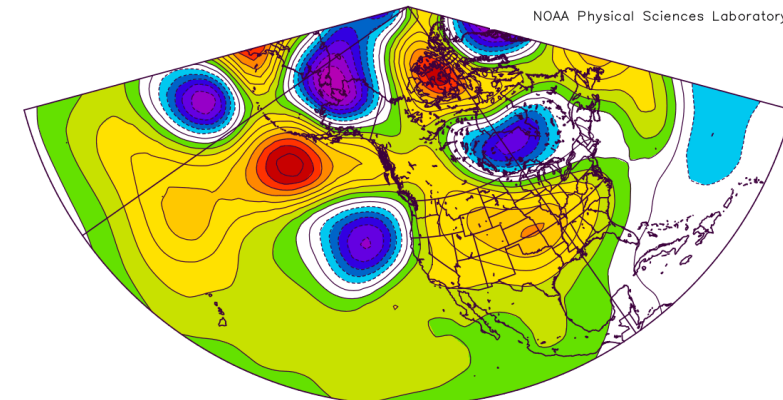
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250mb Zonal Wind (m/s) Composite Anomaly (1991–2020 Climatology)
6/1/22 to 8/15/22
NCEP/NCAR Reanalysis



500mb Geopotential Height (m) Composite Mean
6/1/22 to 8/15/22
NCEP/NCAR Reanalysis



500mb Geopotential Height (m) Composite Anomaly (1991–2020 Climatology)
6/1/22 to 8/15/22
NCEP/NCAR Reanalysis

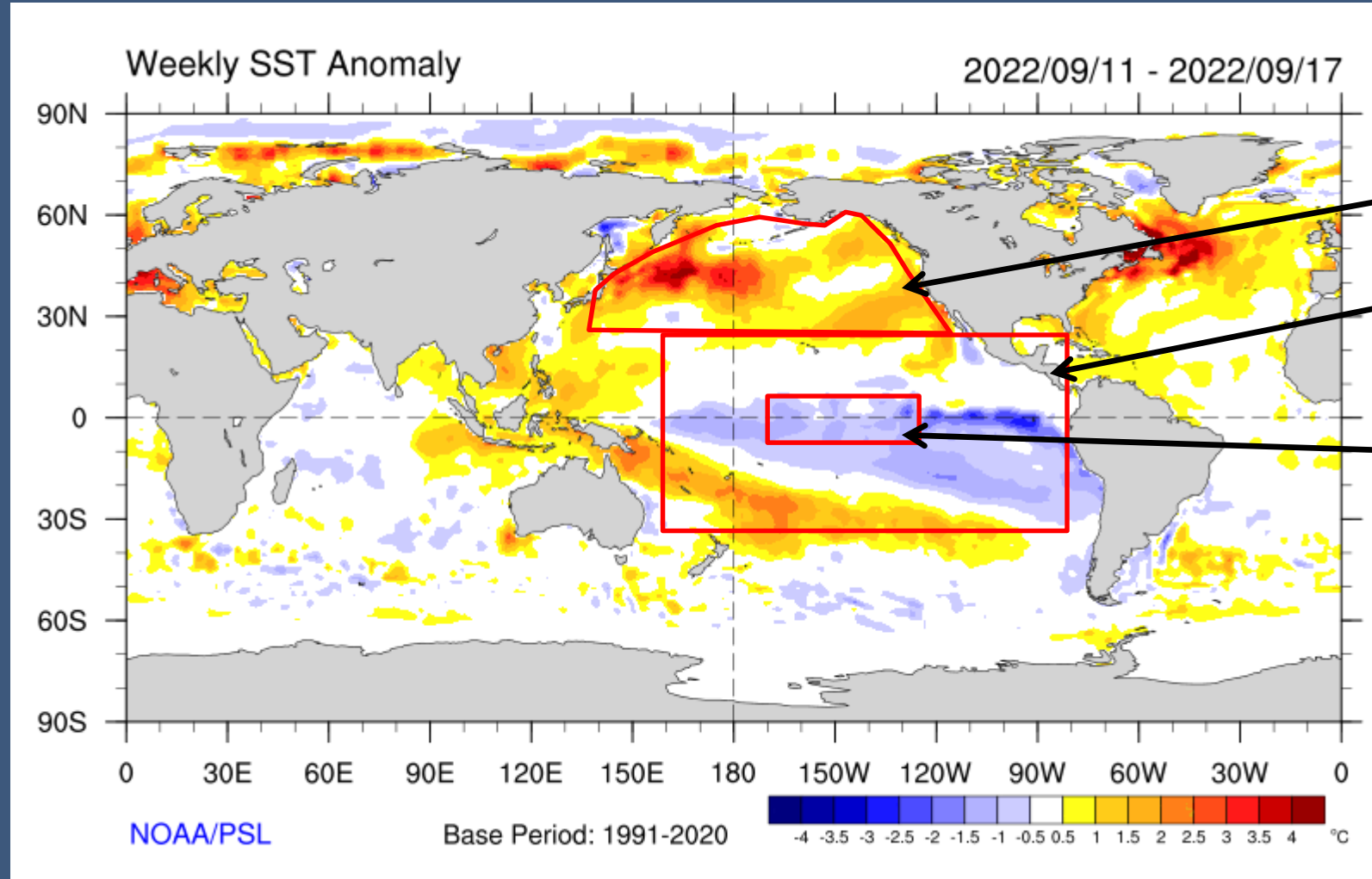
A stronger than average polar jet stream this monsoon season, shown here (left) in the warmer colors for June and July 2022, is strong enough during a La Niña event to force the monsoon high east, north or northwest of New Mexico at times during the warm season, allowing low level moisture to move into the state from a multitude of directions. In the past, climate scientists looked for clues from the Indian monsoon, at things like below average snowpack and soil moisture as an indicator with regard to strength of the upcoming monsoon season. We've since learned that Southern/Central Rocky Mountain snowpack and soil moisture along with surface thermal features are not what drive the monsoon high location. It's position is related to key synoptic scale features (i.e., polar jet stream position and strength) which include its teleconnections (Prein et al., 2022).

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Latest Sea Surface Temperatures (SSTs) & Oscillation Index Values for Pacific



➤ Pacific Decadal Oscillation (PDO) for AUG 2022: **-1.92**

➤ Multivariate ENSO Index (MEI) for JUL-AUG 2022: **-1.8**

➤ Oceanic Niño Index (ONI) (uses Niño 3.4 region - inner rectangle) for JJA 2022: **-0.8**

SST Anomalies in the Equatorial Pacific Ocean in late August/early September 2022 showing cooler than average conditions in the equatorial Pacific. It looks highly likely that the long-predicted third consecutive or “triple-dip” La Niña winter will occur, with a 91% chance of La Niña through September–November and an 80% chance through the early winter (December & January).

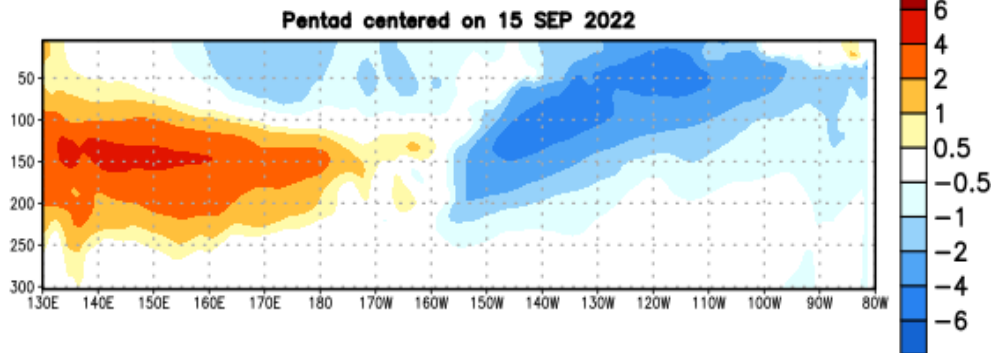
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Sub-surface Temperatures



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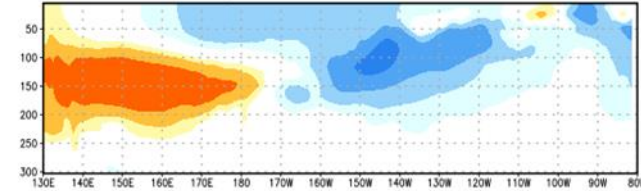
EQ. Subsurface Temperature Anomalies (deg C)



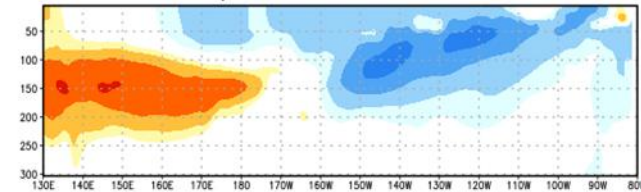
Most recent pentad analysis

EQ. Subsurface Temperature Anomalies (deg C)

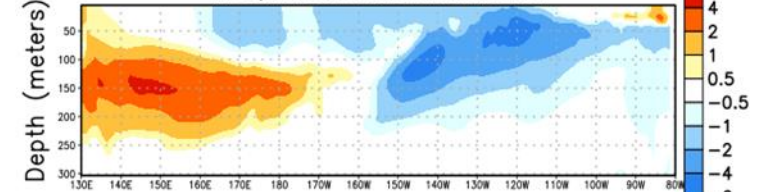
Three-pentad ave. centered on 27 JUL 2022



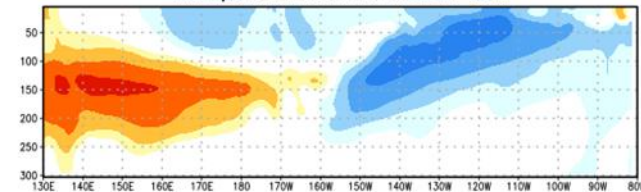
Three-pentad ave. centered on 11 AUG 2022



Three-pentad ave. centered on 26 AUG 2022



Three-pentad ave. centered on 10 SEP 2022



Sub-surface temperature anomalies at the equator. Sub-surface temperatures often precede surface temperatures by several months. An increasing amount of cooler than average water under the surface provides some additional confidence that in the fact climate models are on track forecasting a triple-dip La Niña in fall 2022.

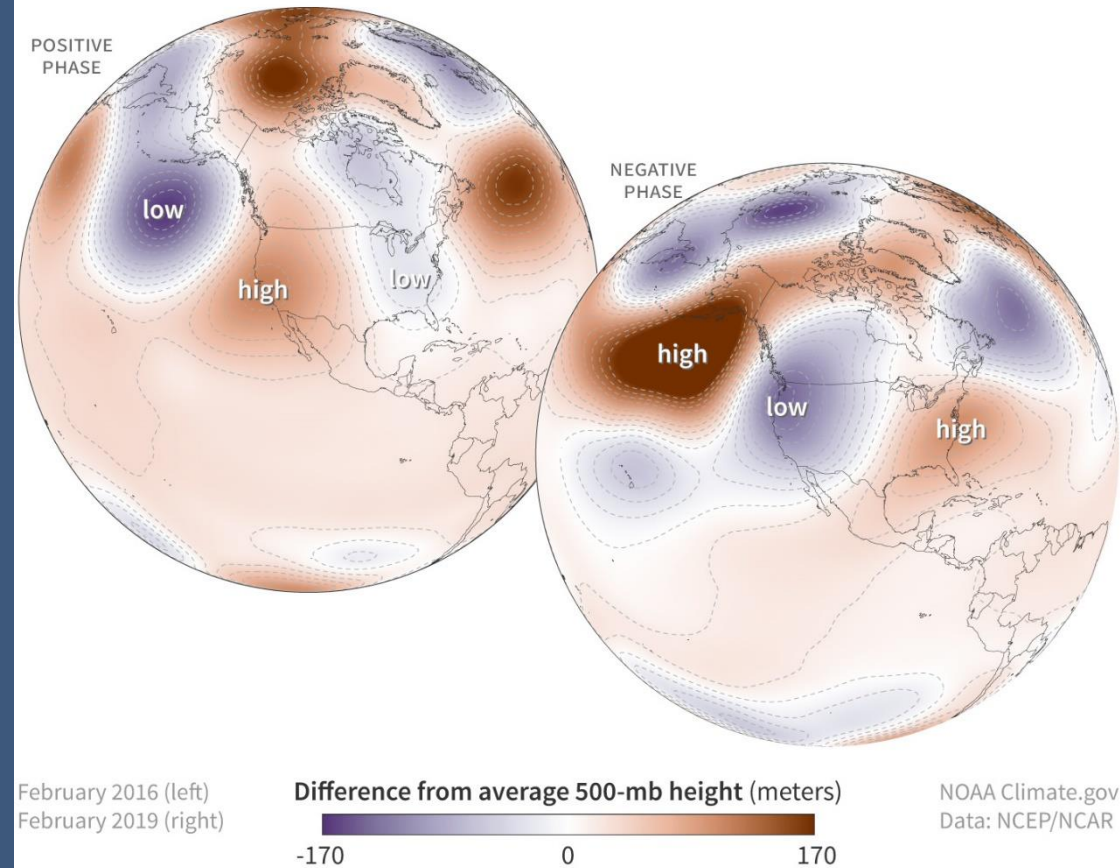
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Positive Pacific-North American Pattern (PNA)

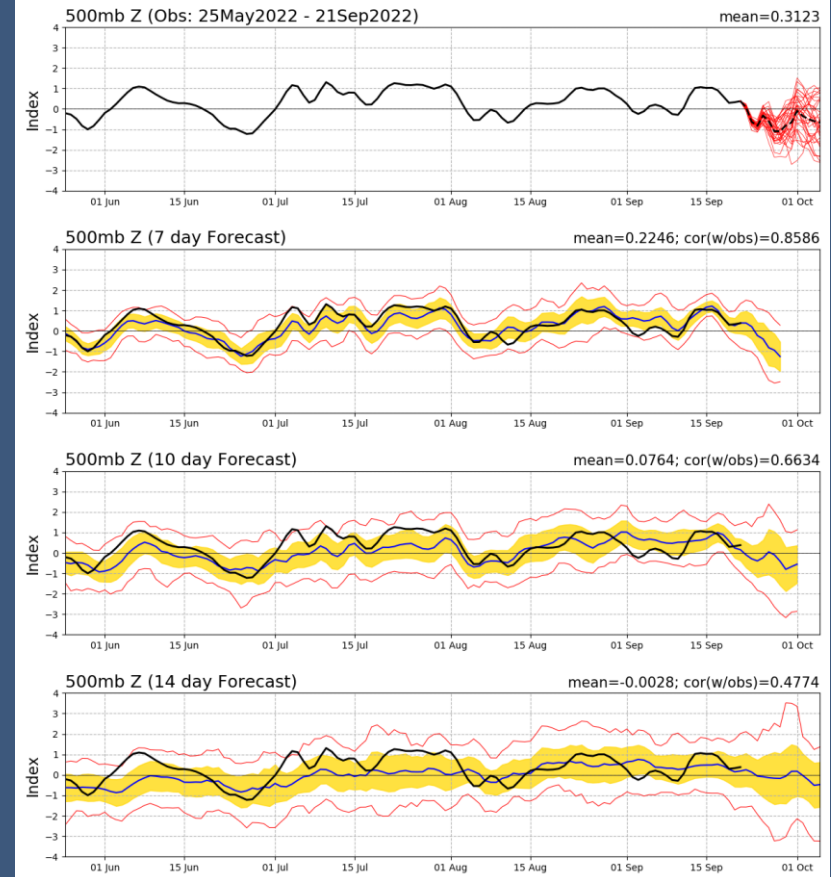


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PNA TRI-POLE PRESSURE PATTERNS



PNA Index: Observed & GEFS Forecasts



Air pressure in the lower atmosphere compared to the 1981-2010 average during February 2016 (top left), when the PNA was positive, and in February 2019 (bottom left), 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. NOAA Climate.gov, based on data from the Physical Science Lab. Ensemble Global Forecast System (GEFS) forecasts (right image) keep the PNA index negative through early October.

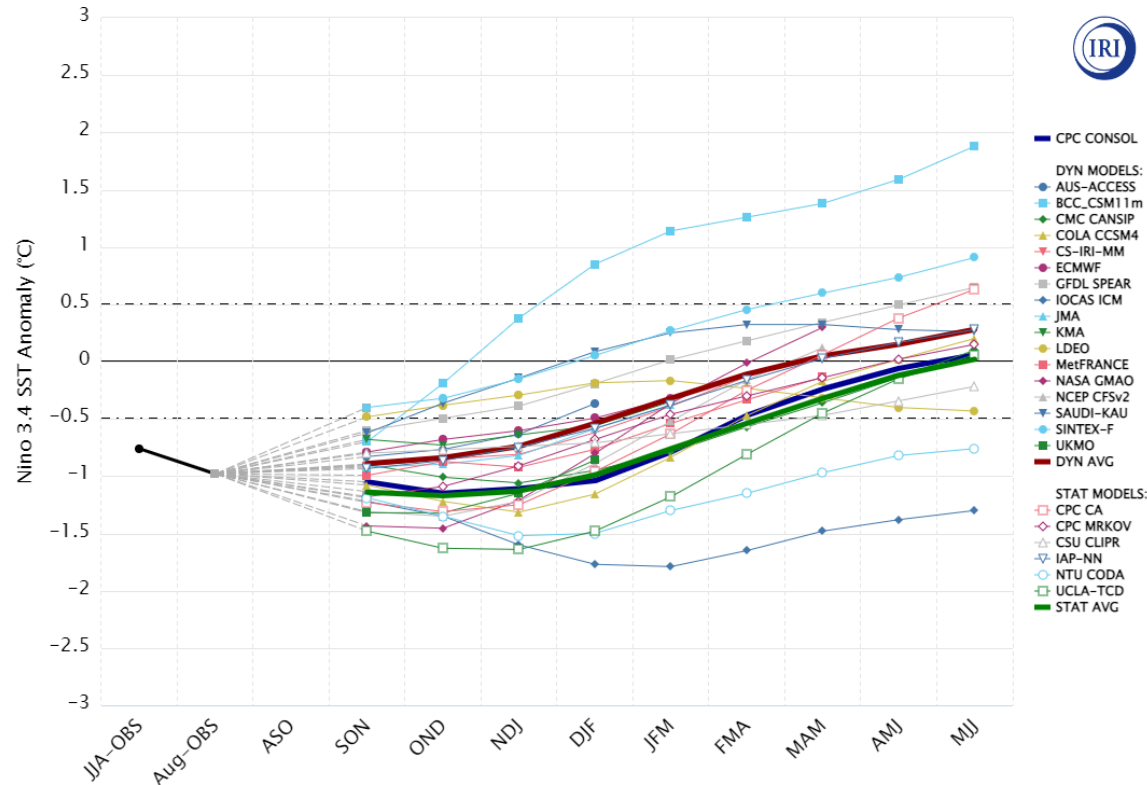
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ENSO SST Predictions



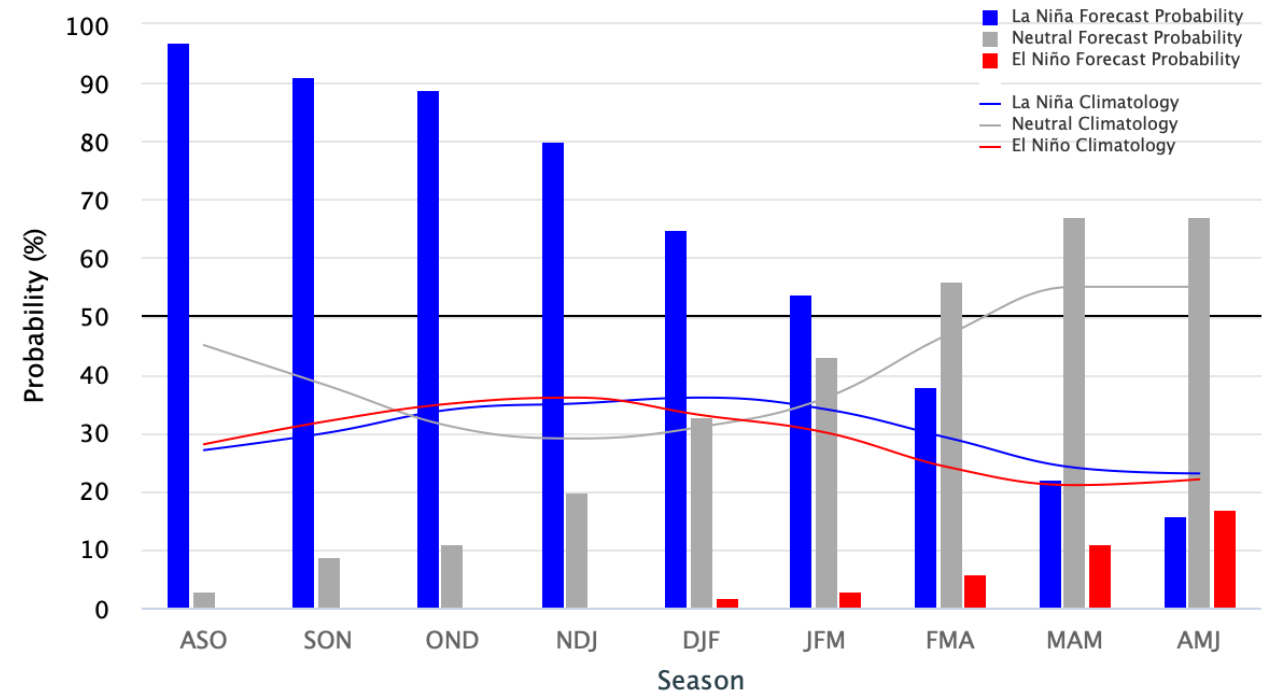
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Model Predictions of ENSO from Sep 2022



Early-September 2022 CPC Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly
Neutral ENSO: -0.5°C to 0.5°C



The vast majority of both dynamical (thick red line) models indicate La Niña conditions in fall 2022 and early winter, warming to a neutral state by late winter. We've seen this before if you recall last year's forecasts. There appears to be a possible climate model bias of trying to warm the eastern Pacific up too fast.

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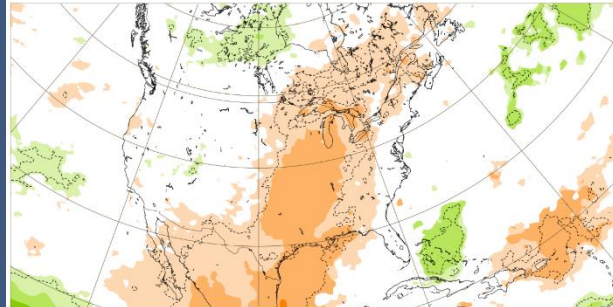
Oct Climate Model Forecasts - *Precipitation*



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Precipitation: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 03 Oct 2022 - Mon 10 Oct 2022 (+432h) Area : North America



Extended range: Precipitation weekly mean anomaly, significance level: 10 % (mm)
-100 -80 -60 -40 -20 0 20 40 60 80 100

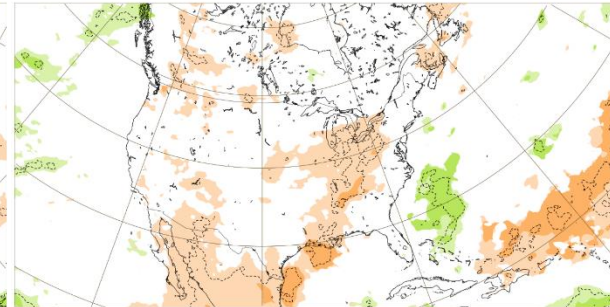
Oct 3-10

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Source: ensemble-avg
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Precipitation: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 10 Oct 2022 - Mon 17 Oct 2022 (+800h) Area : North America



Extended range: Precipitation weekly mean anomaly, significance level: 10 % (mm)
-100 -80 -60 -40 -20 0 20 40 60 80 100

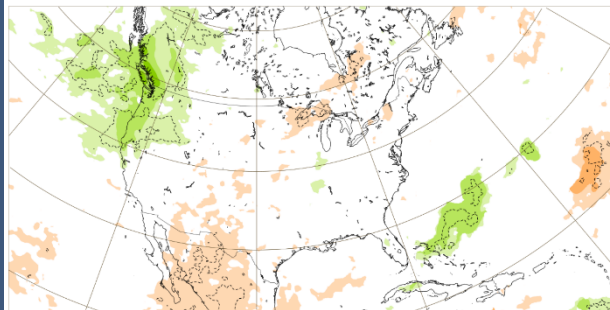
Oct 10-17

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Source: ensemble-avg
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Precipitation: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 17 Oct 2022 - Mon 24 Oct 2022 (+768h) Area : North America



Extended range: Precipitation weekly mean anomaly, significance level: 10 % (mm)
-100 -80 -60 -40 -20 0 20 40 60 80 100

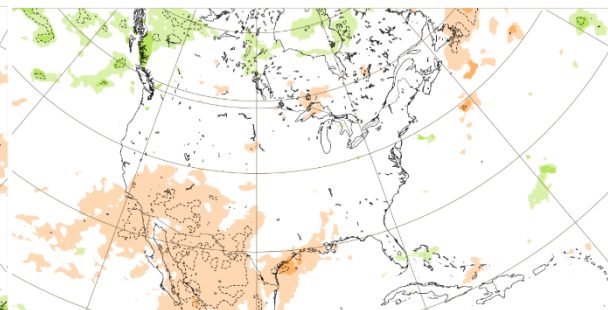
Oct 17-24

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Precipitation: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 24 Oct 2022 - Mon 31 Oct 2022 (+936h) Area : North America



Extended range: Precipitation weekly mean anomaly, significance level: 10 % (mm)
-100 -80 -60 -40 -20 0 20 40 60 80 100

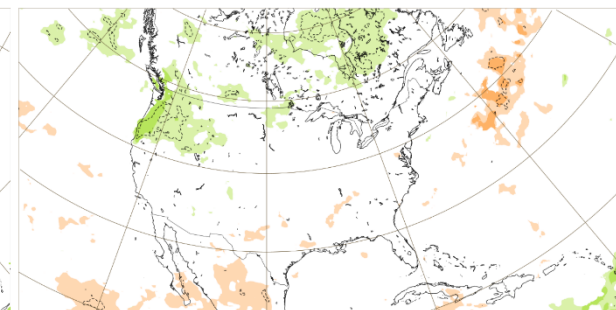
Oct 24-31

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Precipitation: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 31 Oct 2022 - Mon 07 Nov 2022 (+1104h) Area : North America



Extended range: Precipitation weekly mean anomaly, significance level: 10 % (mm)
-100 -80 -60 -40 -20 0 20 40 60 80 100

Oct 31- Nov 7

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Source: ensemble-avg
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European Center for Medium-Range Weather Forecasts (ECMWF) weekly precipitation anomaly or difference from average forecasts for October 2022. The forecast is near to slightly below average with regard to precipitation in October.

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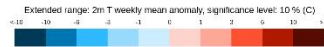
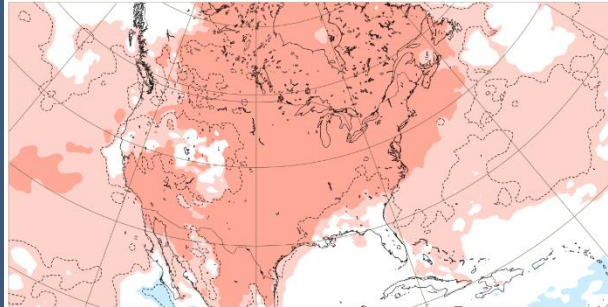
Oct Climate Model Forecasts - Temperature



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2 m temperature: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 24 Oct 2022 - Mon 31 Oct 2022 (+936h) Area: North America

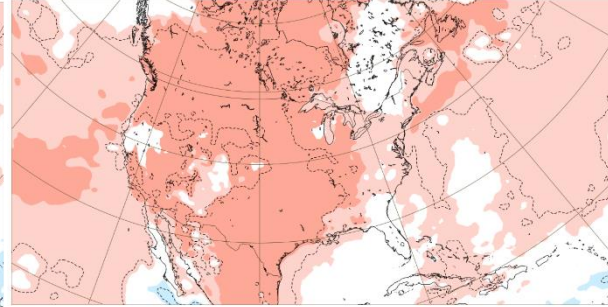


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2 m temperature: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 17 Oct 2022 - Mon 24 Oct 2022 (+768h) Area: North America

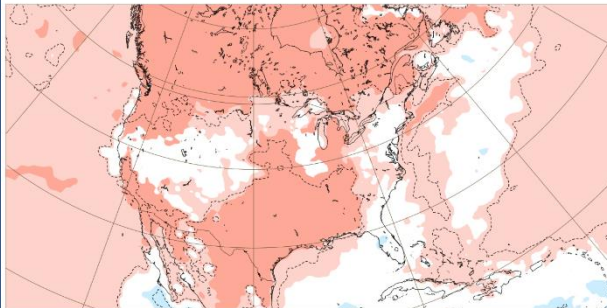


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2 m temperature: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 10 Oct 2022 - Mon 17 Oct 2022 (+900h) Area: North America

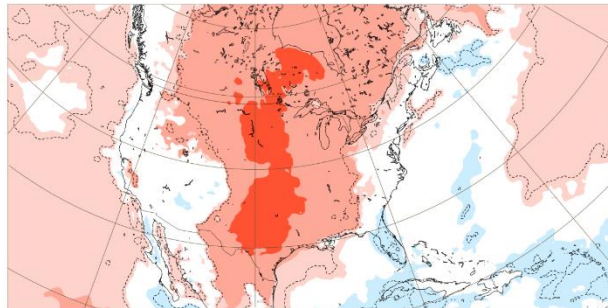


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2 m temperature: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 03 Oct 2022 - Mon 10 Oct 2022 (+432h) Area: North America

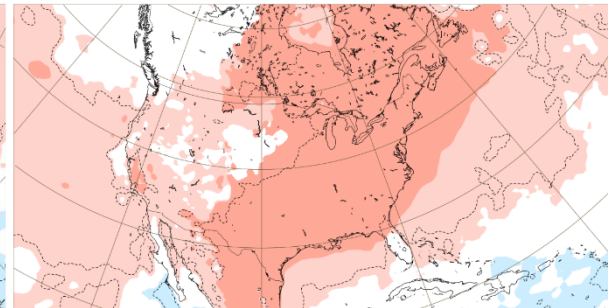


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2 m temperature: Weekly mean anomalies

Base time: 1 hu 22 Sep 2022 Valid time: Mon 31 Oct 2022 - Mon 07 Nov 2022 (+1104h) Area: North America



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ECMWF weekly temperature anomaly forecasts for October 2022. The forecast is near to slightly above average temperatures through October into the first week of November.

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Oct-Nov-Dec Climate Model Forecasts – Precipitation & Temperature



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Precipitation – SEAS5

ECMWF Seasonal Forecast

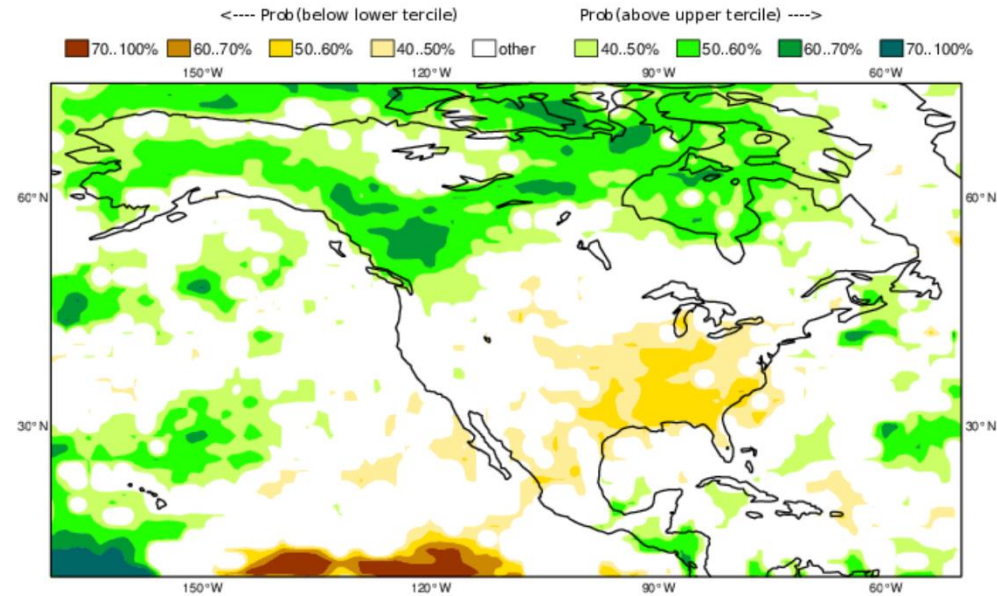
Prob(most likely category of precipitation)

Forecast start is 01/09/22, climate period is 1993-2016

Ensemble size = 51, climate size = 600

System 5

OND 2022



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2m Temperature Anomaly – SEAS5

ECMWF Seasonal Forecast

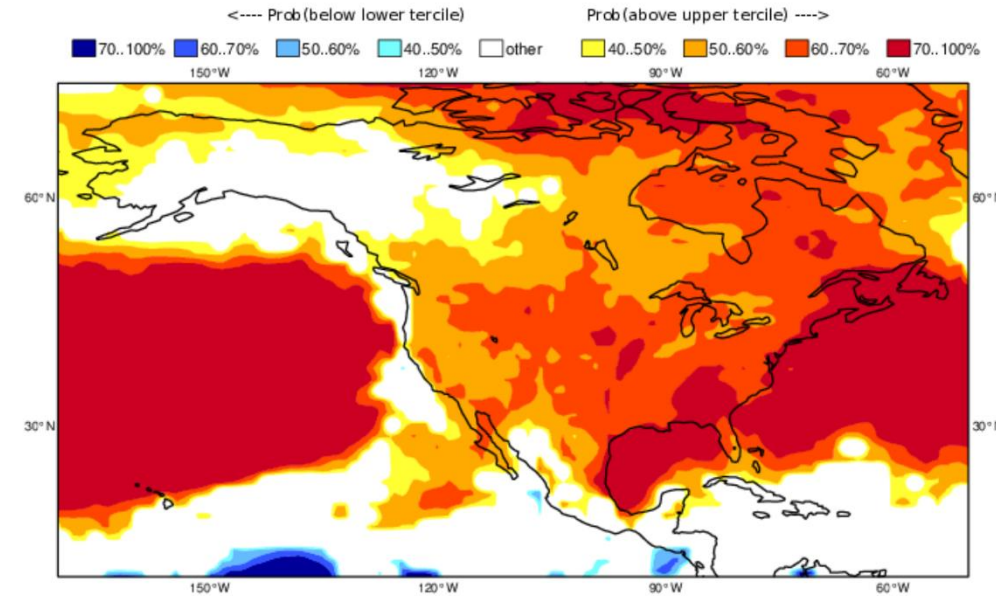
Prob(most likely category of 2m temperature)

Forecast start is 01/09/22, climate period is 1993-2016

Ensemble size = 51, climate size = 600

System 5

OND 2022



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ECMWF seasonal forecast for October, November and December 2022. This particular ensemble climate model is forecasting near average precipitation for NM and slightly above average to above average temperature.

2022 Fall Outlook

Climate Prediction Center's (CPC) Official OND Outlook

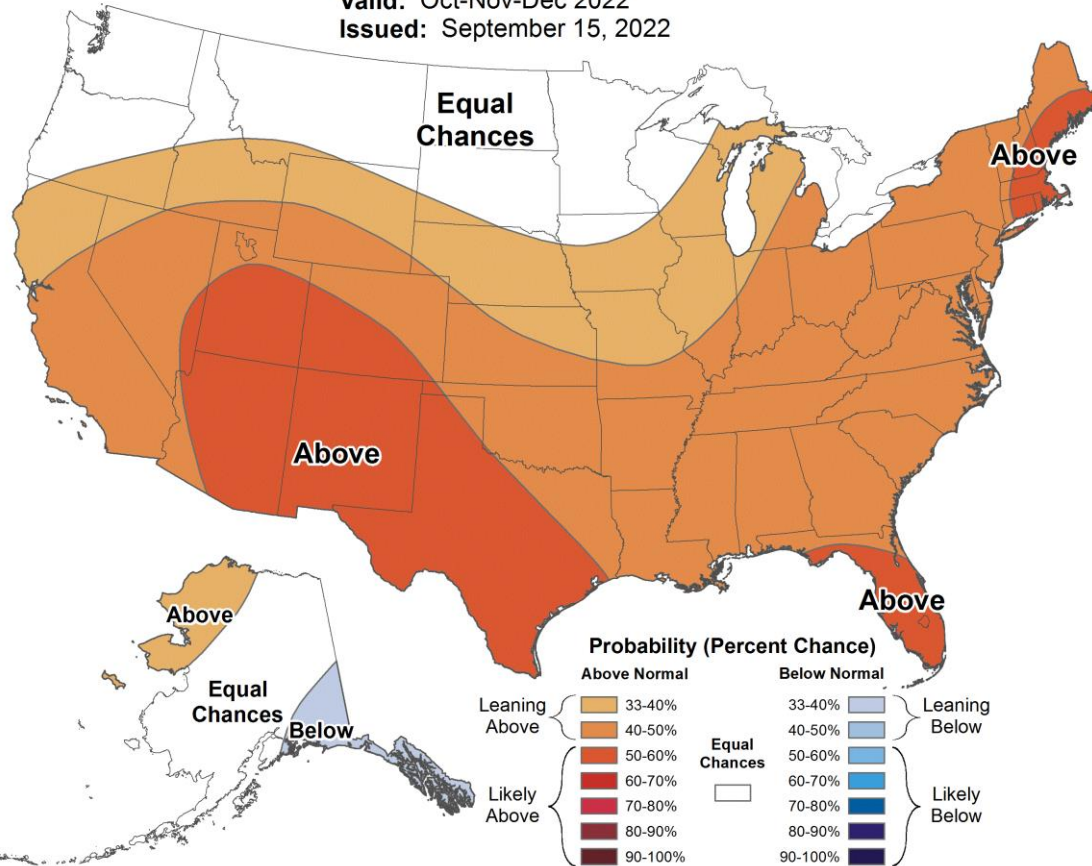


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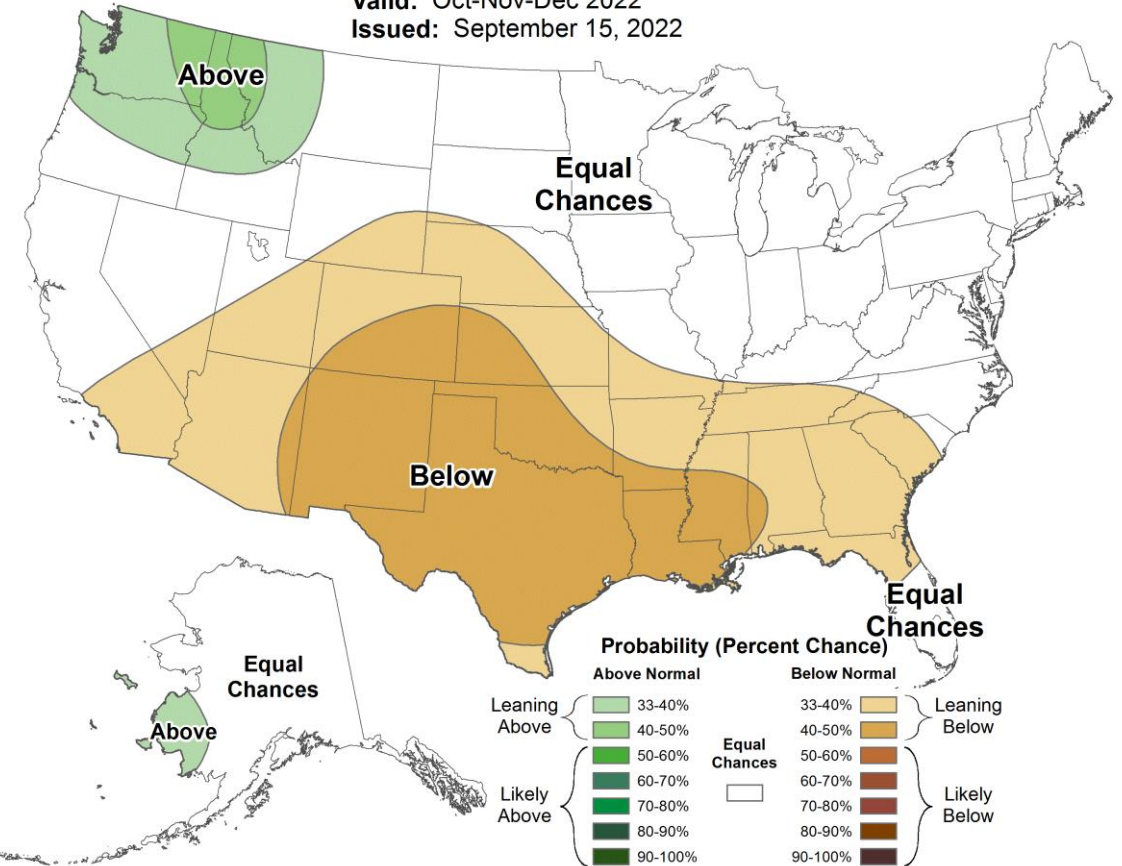
Seasonal Temperature Outlook

Valid: Oct-Nov-Dec 2022
Issued: September 15, 2022



Seasonal Precipitation Outlook

Valid: Oct-Nov-Dec 2022
Issued: September 15, 2022



CPC's forecast calls for above average chances for above average temperature and below average precipitation for Oct-Nov-Dec 2022.

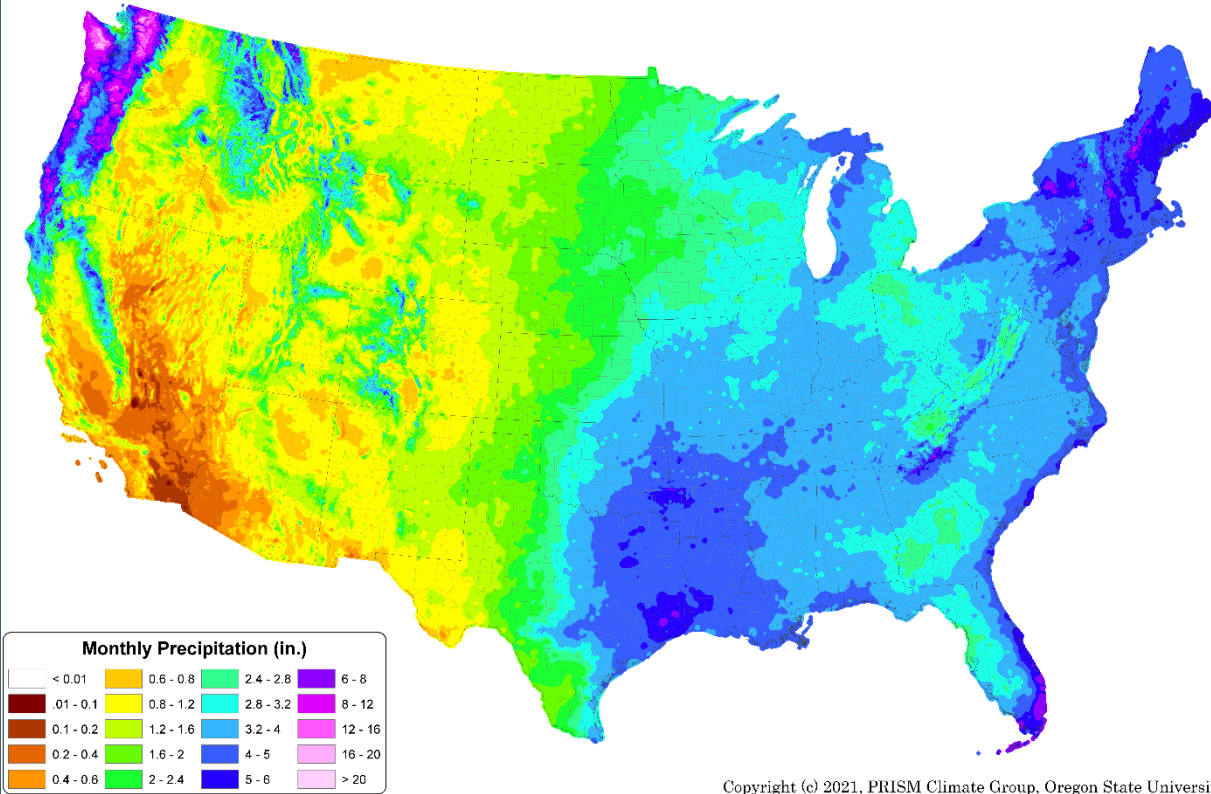
2022 Fall Outlook

Average Precipitation Maps

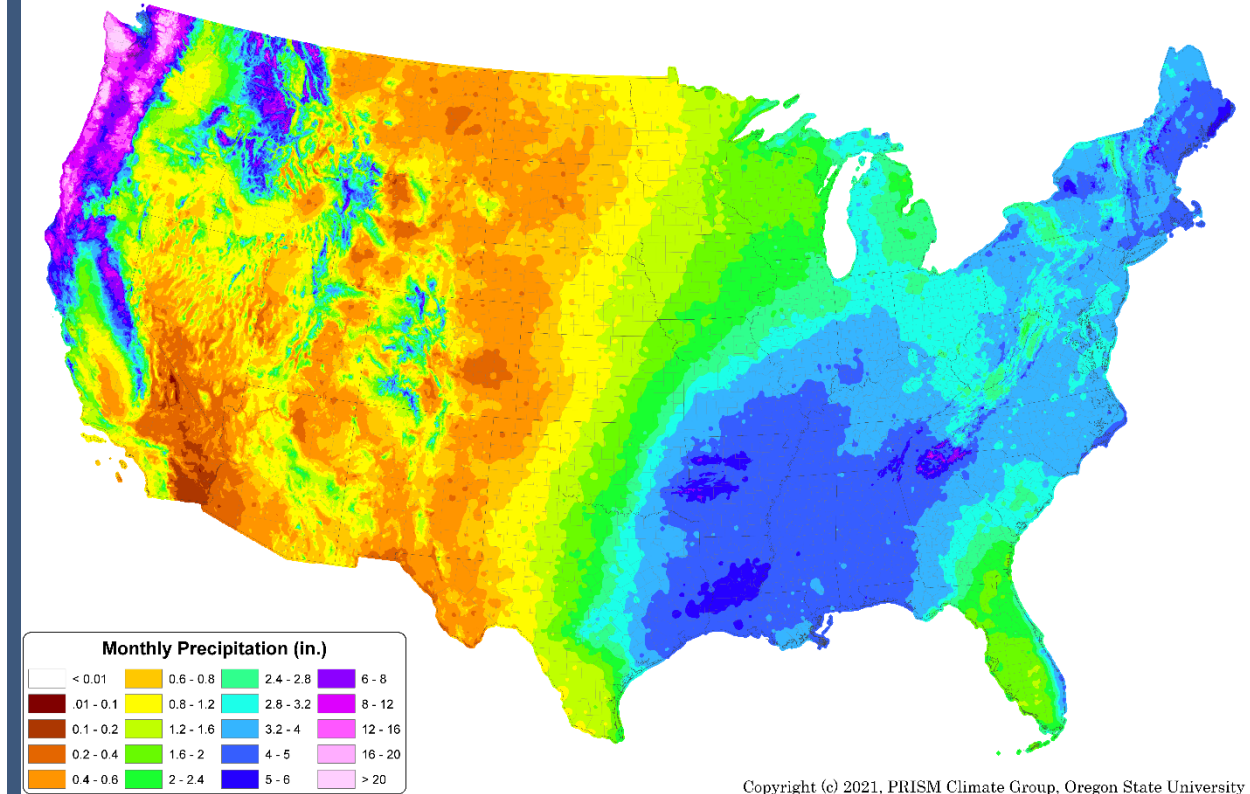


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30-yr Normal Precipitation: October
Period: 1991-2020



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



Average or normal precipitation (1991-2020) in October and November.

2022 Fall Outlook

How About Wind and Precipitation During the First Two Weeks of October?



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While chances for precipitation in early October will be near average, chances for strong winds at Balloon Fiesta Park are forecast to be above average given that current forecast models are indicative of the potential for at least isolated afternoon and evening showers and thunderstorms during the first week in October.

2022 Fall Outlook

Summary



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- Forecasts from the most highly-skilled weather and climate models indicate that precipitation in central and northern New Mexico during **October 2022** will most likely be near 1991-2020 climatological averages while model precipitation forecasts favor near to slightly below average in **November 2022**.
- Climate model forecasts along with temperature trends since 2000 indicate that temperatures in central and northern New Mexico during October 2022 will most likely range from near to slightly above average while November is forecast to be slightly above to above average.

2022 Fall Outlook



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Outlook Information

- Outlook provided by National Weather Service Forecast Office Albuquerque, NM.
- For further information contact Andrew Church: andrew.church@noaa.gov (505) 244-9150