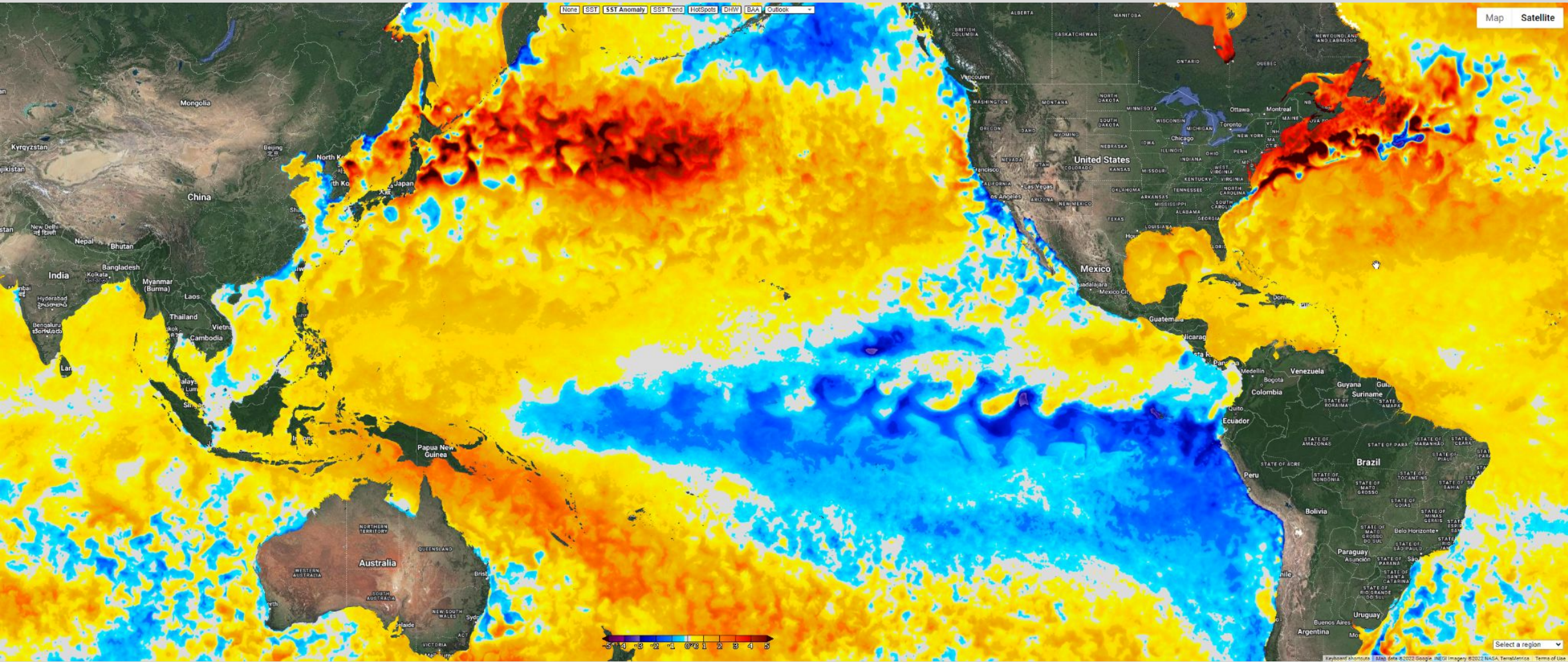


Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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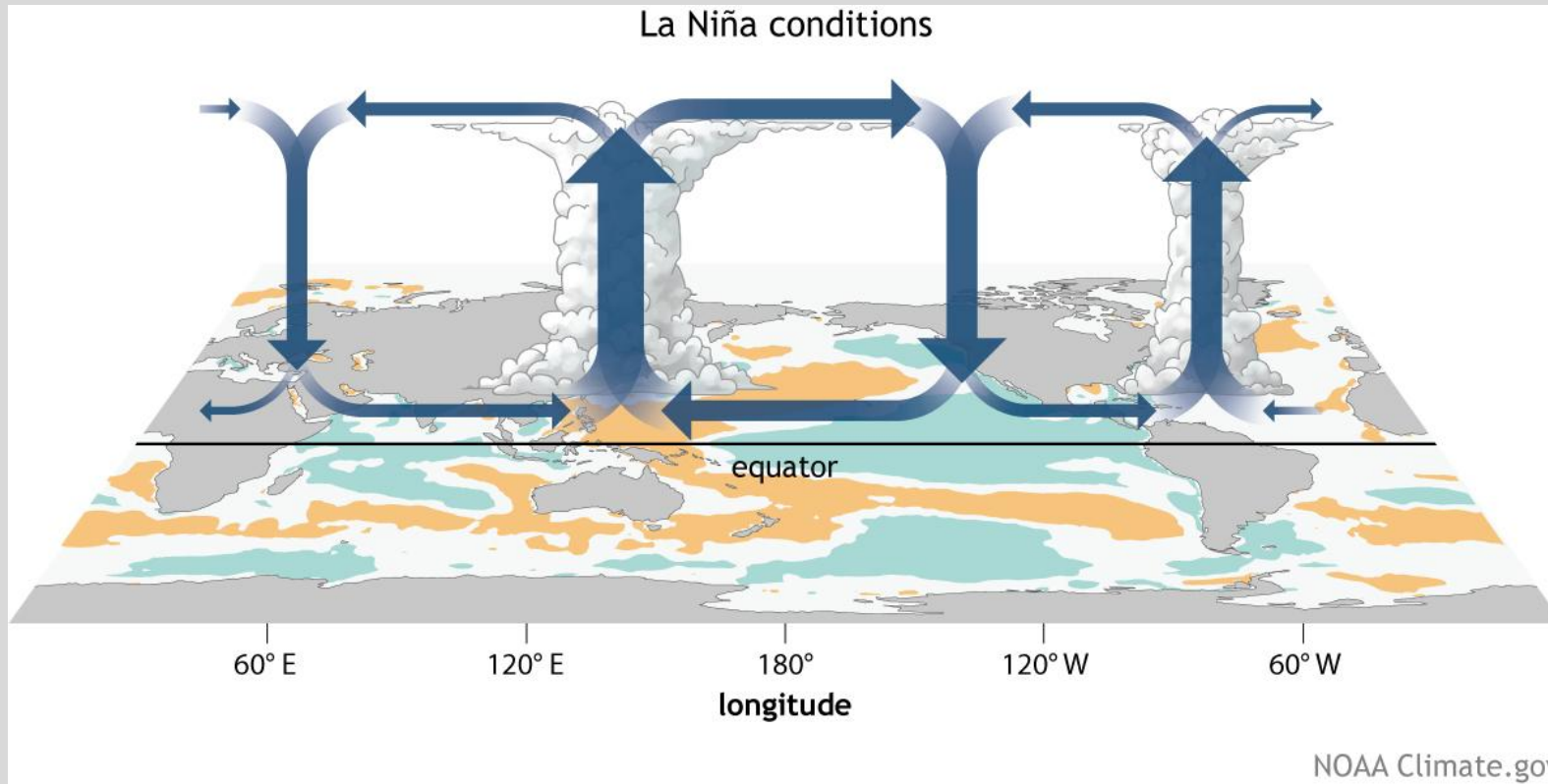
Sea Surface Temperature - Difference from Average November 7, 2022

Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier

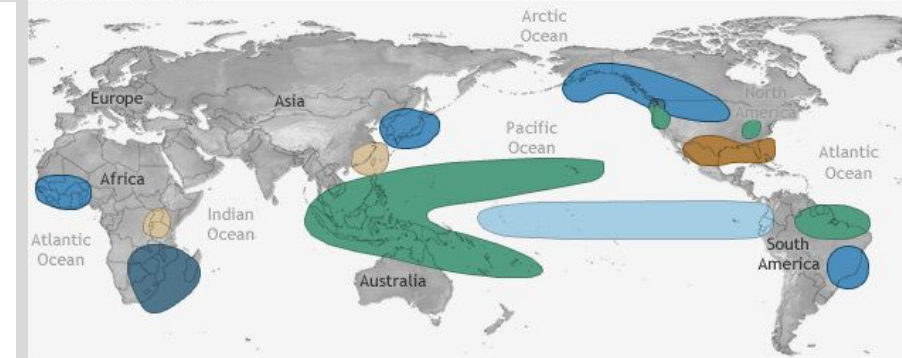


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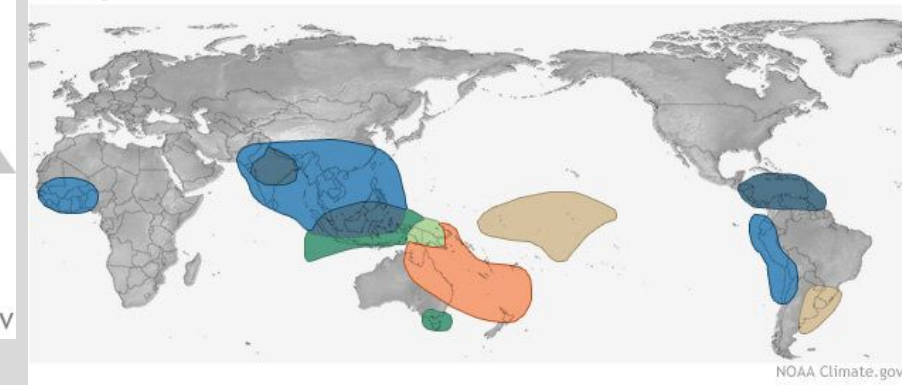


LA NIÑA CLIMATE IMPACTS

December-February



June-August



La Niña is a Pacific Ocean climate pattern that has global impacts. It's defined by **the periodic cooling of ocean surface temperatures in the central and east-central equatorial Pacific**. Typically, La Nina events occur every 3 to 5 years or so, but on occasion can occur over successive years. La Niña represents the cool phase of the [El Niño/Southern Oscillation](#) (ENSO) cycle. This is only the third time in the historical record of ENSO (El Niño-Southern Oscillation, the whole El Niño and La Niña system), which dates back to 1950, that we have had three La Niña winters in a row. The other triple dips occurred in 1973–1976 and 1998–2001.

Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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- ❖ **Wind**
- ❖ **Temperature**
- ❖ **Precipitation**

Observed Changes In Spring During La Niña

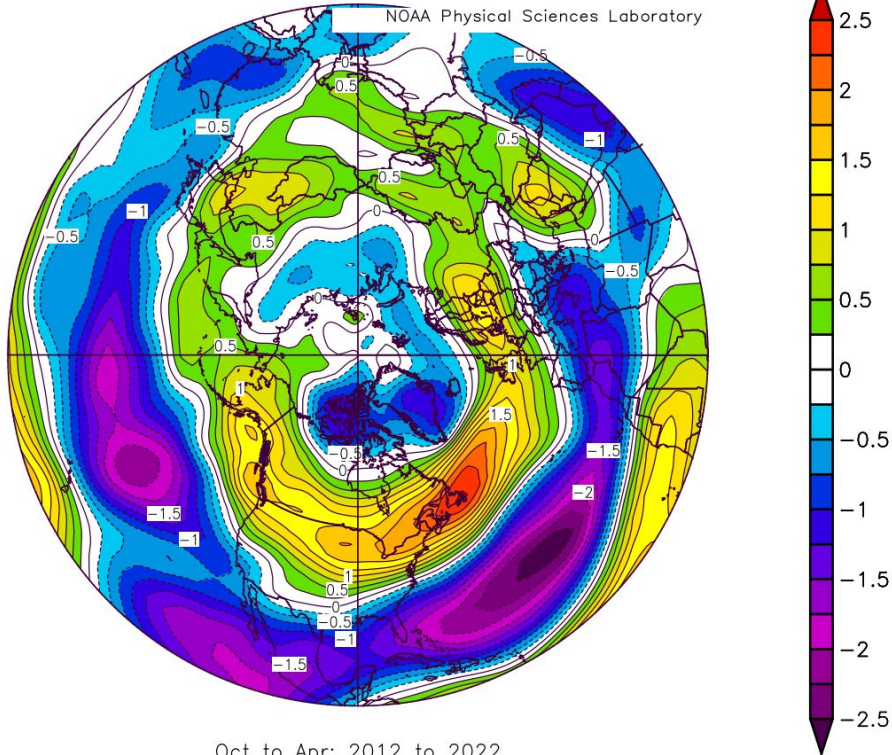
Trending Windier, Warmer and Drier



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NCEP/NCAR Reanalysis
250mb Zonal Wind (m/s) Composite Anomaly 1991–2020 climo

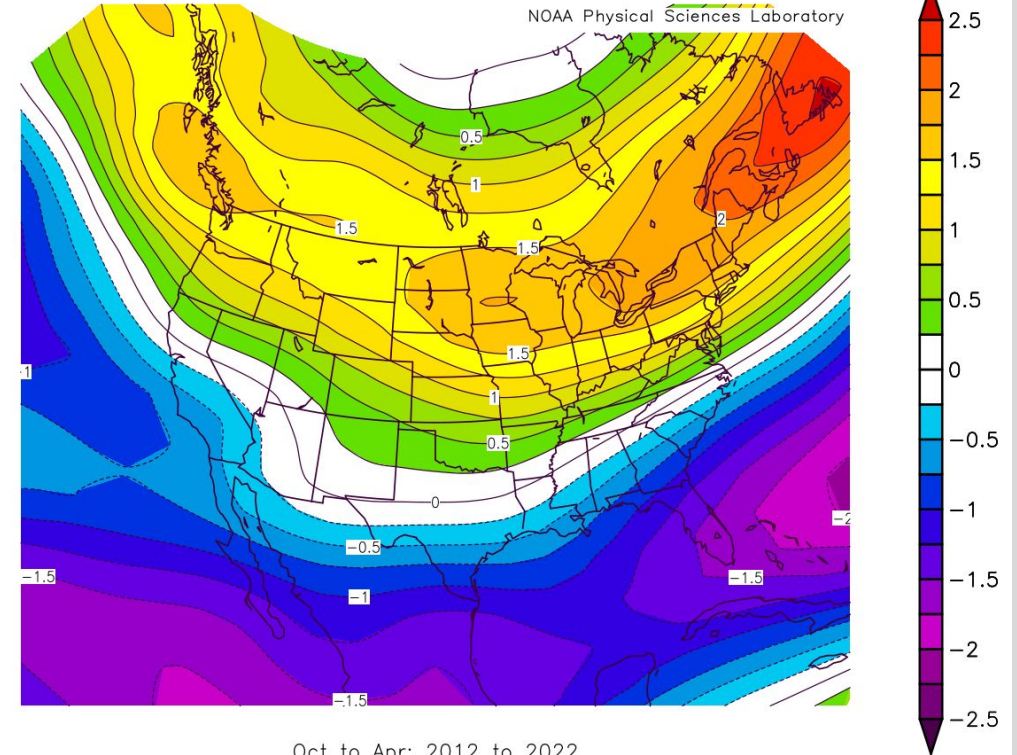
NOAA Physical Sciences Laboratory



Oct to Apr: 2012 to 2022

NCEP/NCAR Reanalysis
250mb Zonal Wind (m/s) Composite Anomaly 1991–2020 climo

NOAA Physical Sciences Laboratory



Oct to Apr: 2012 to 2022

Difference from average jet stream (zonal or west to east wind component) during the cool season over the past 3 decades. 2 m/s = 4.5 mph.

Observed Changes In Spring During La Niña

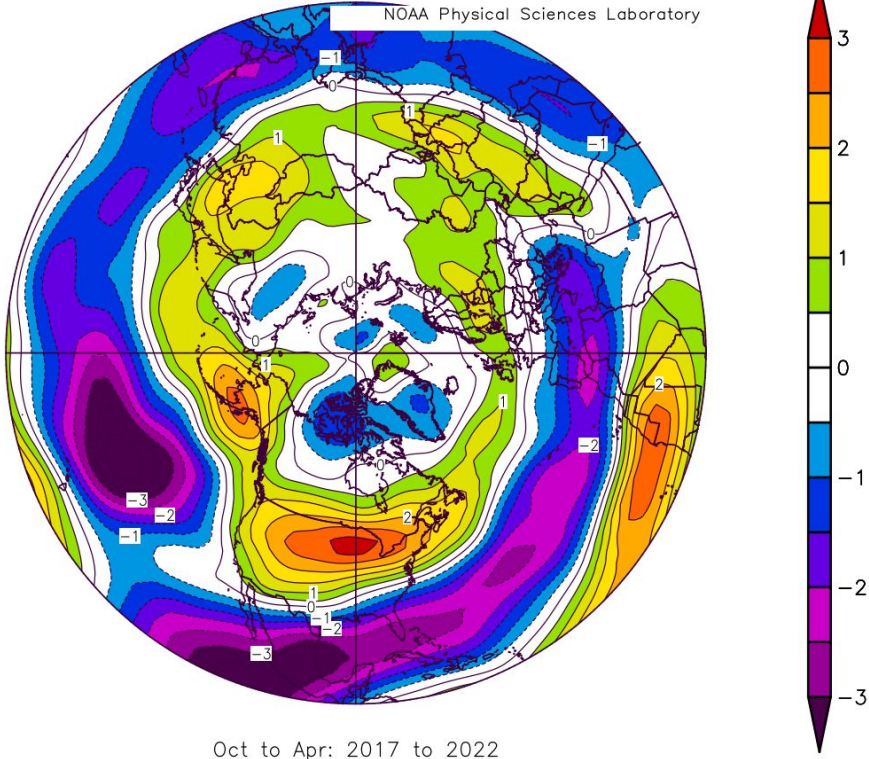
Trending Windier, Warmer and Drier



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NCEP/NCAR Reanalysis
250mb Zonal Wind (m/s) Composite Anomaly 1991–2020 climo

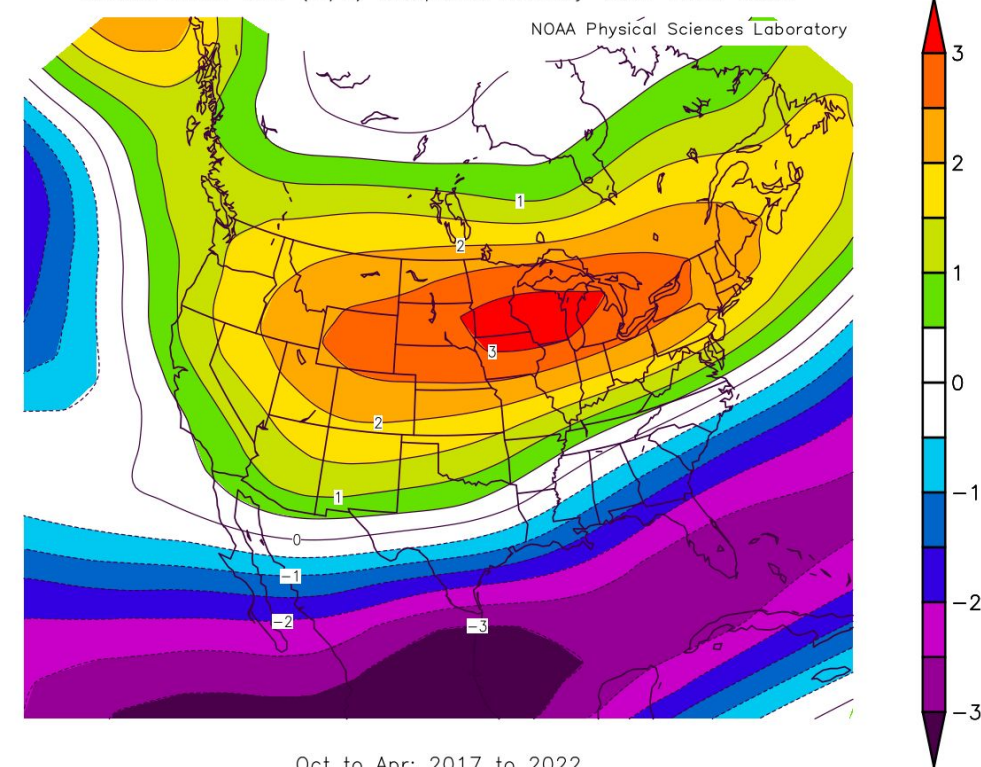
NOAA Physical Sciences Laboratory



Oct to Apr: 2017 to 2022

NCEP/NCAR Reanalysis
250mb Zonal Wind (m/s) Composite Anomaly 1991–2020 climo

NOAA Physical Sciences Laboratory



Oct to Apr: 2017 to 2022

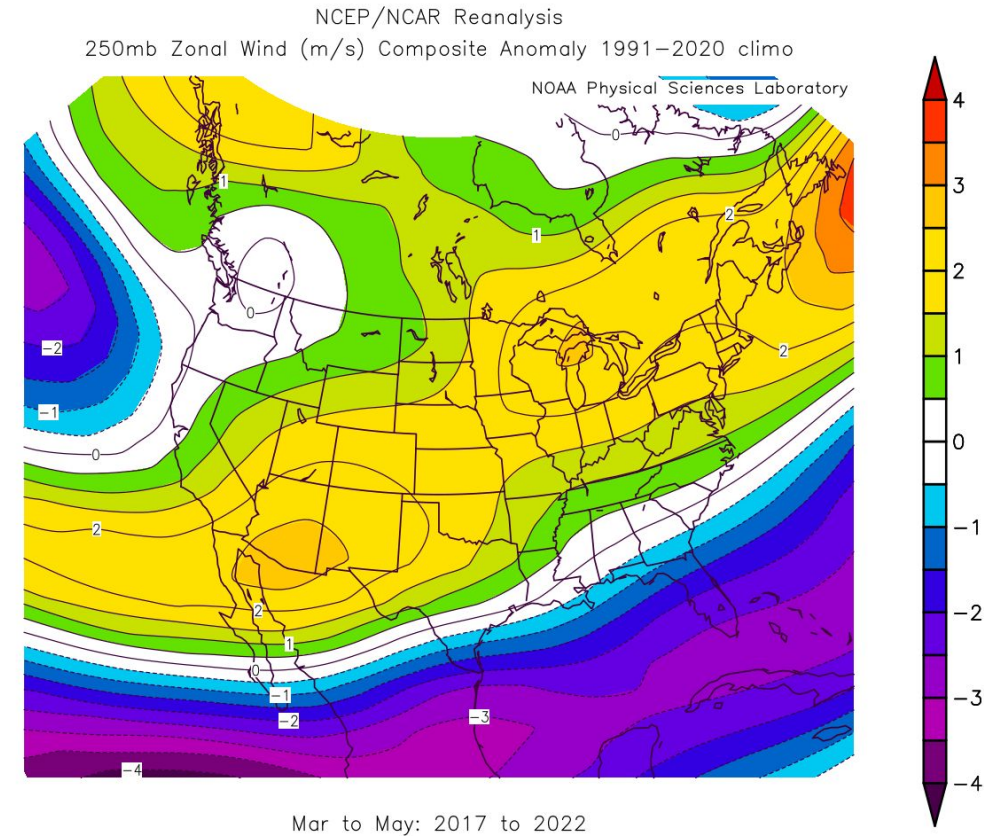
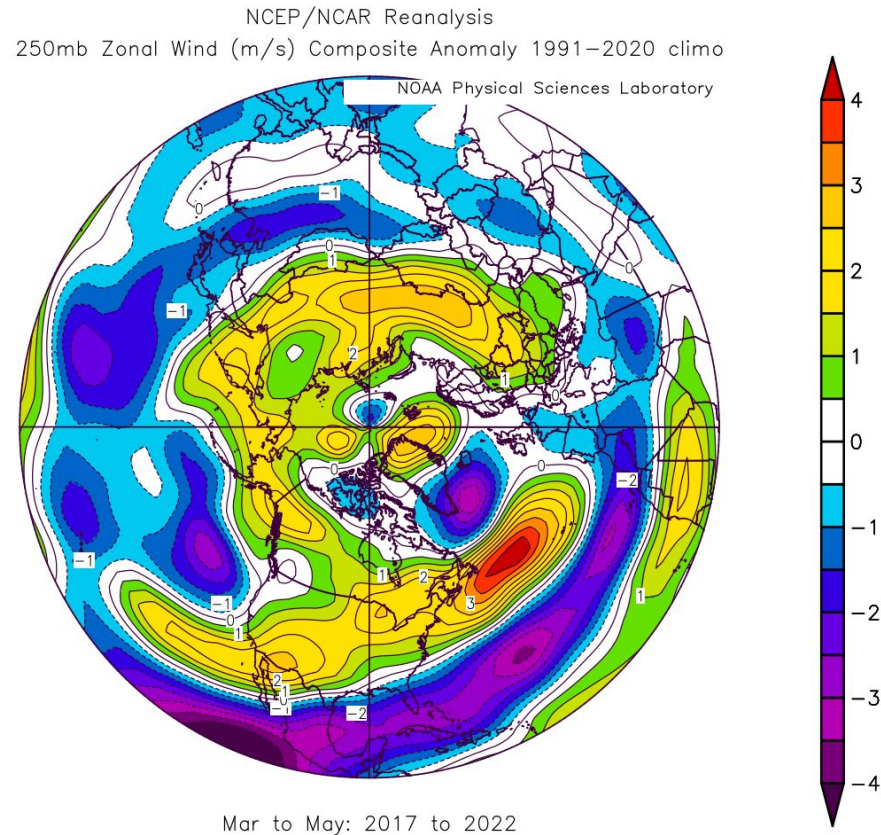
Difference from average jet stream (zonal or west to east wind component) during the cool season over the past 5 years. 3 m/s = 6.7 mph.

Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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Difference from average jet stream (zonal or west to east wind component) during the windy season (MAM) over the past decade. 2.5 m/s = 5.6 mph.

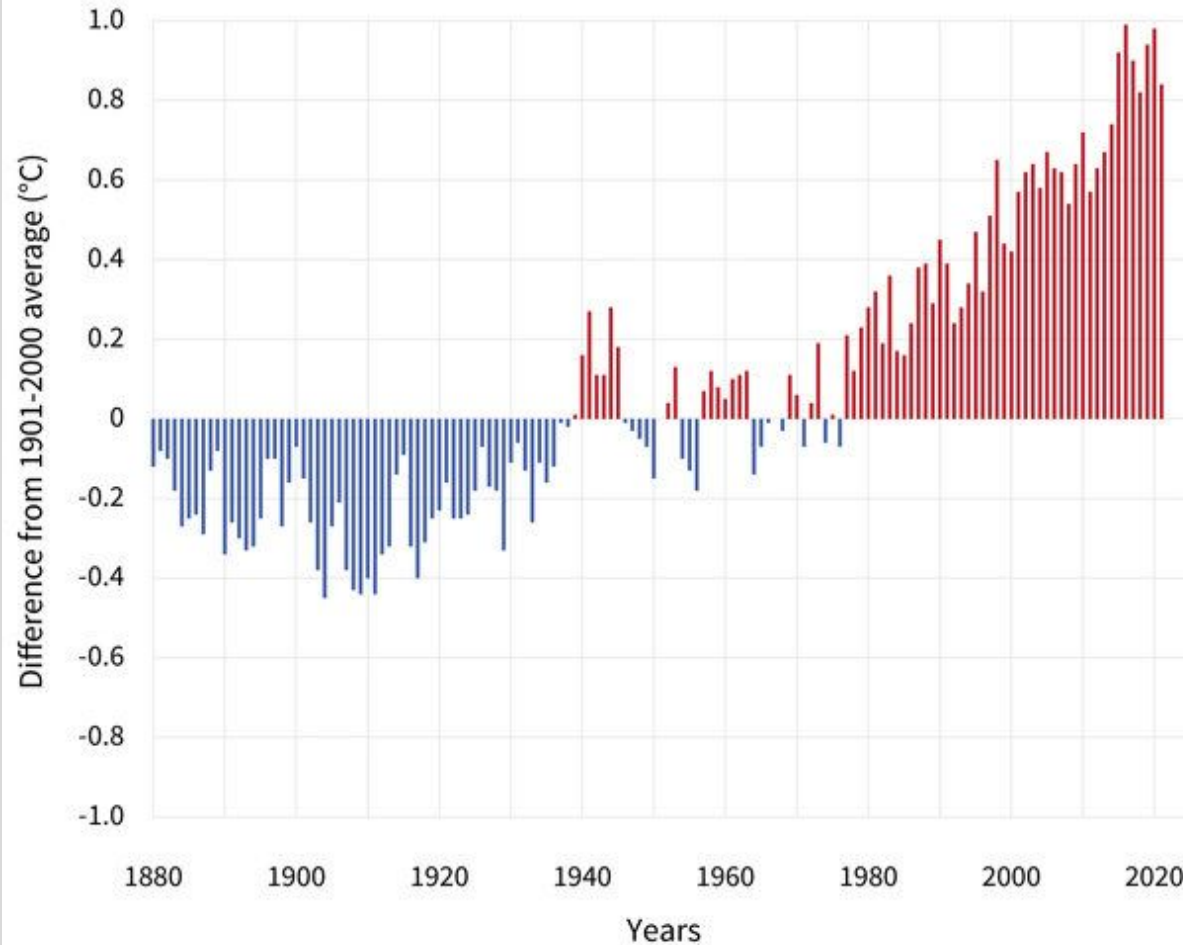
Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



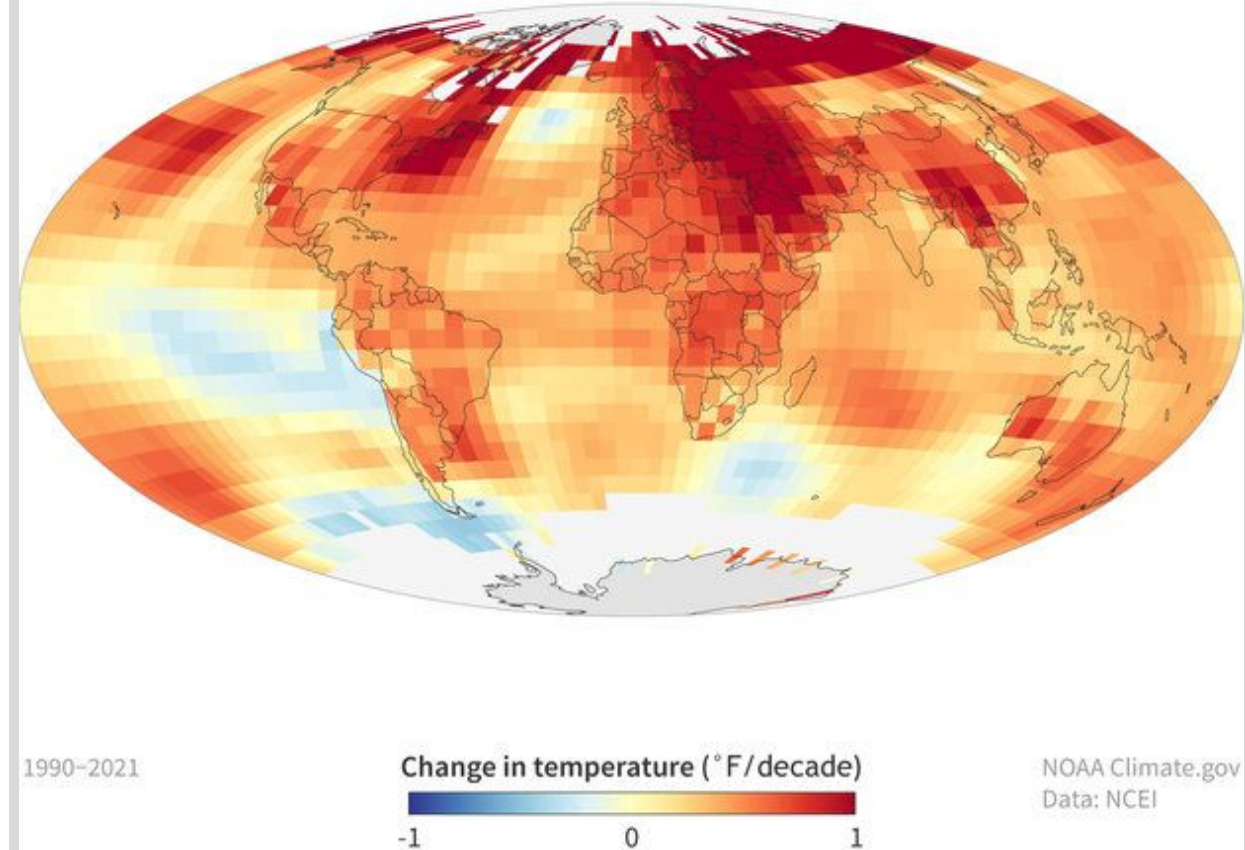
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GLOBAL AVERAGE SURFACE TEMPERATURE



Yearly global temperatures from 1880-2021 compared to the twentieth-century average. Global average surface temperature has risen 0.14 degrees Fahrenheit per decade since 1880. The rate of warming has more than doubled since 1981. Data from NOAA NCEI.

RECENT TEMPERATURE TRENDS (1990-2021)



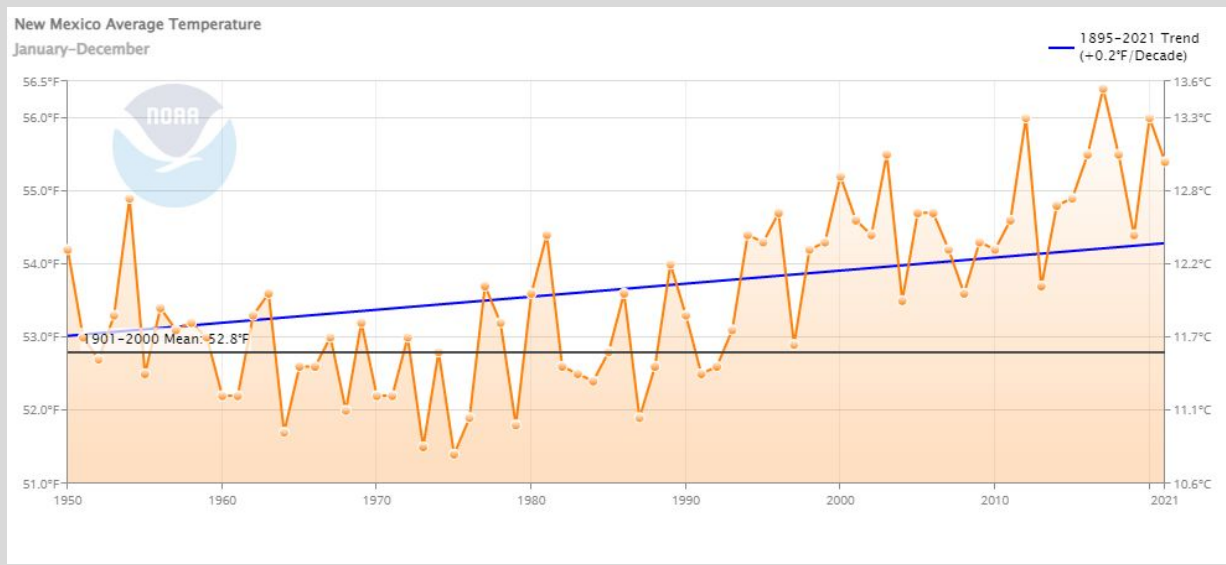
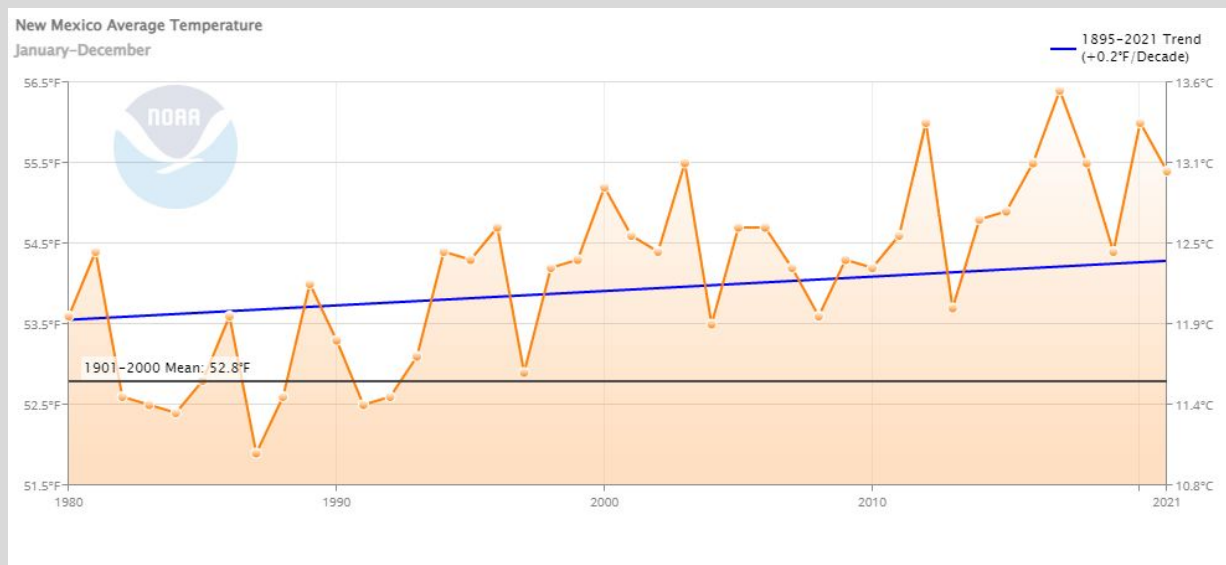
Trends in average surface temperature from 1990-2021. Overall, land areas warmed faster than oceans. The most extreme warming (darkest red) was in the northern high latitudes, and parts of Eurasia and the Middle East. Data from NOAA NCEI.

Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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Average Annual Statewide Temperature - 1980-2021, 1950-2021

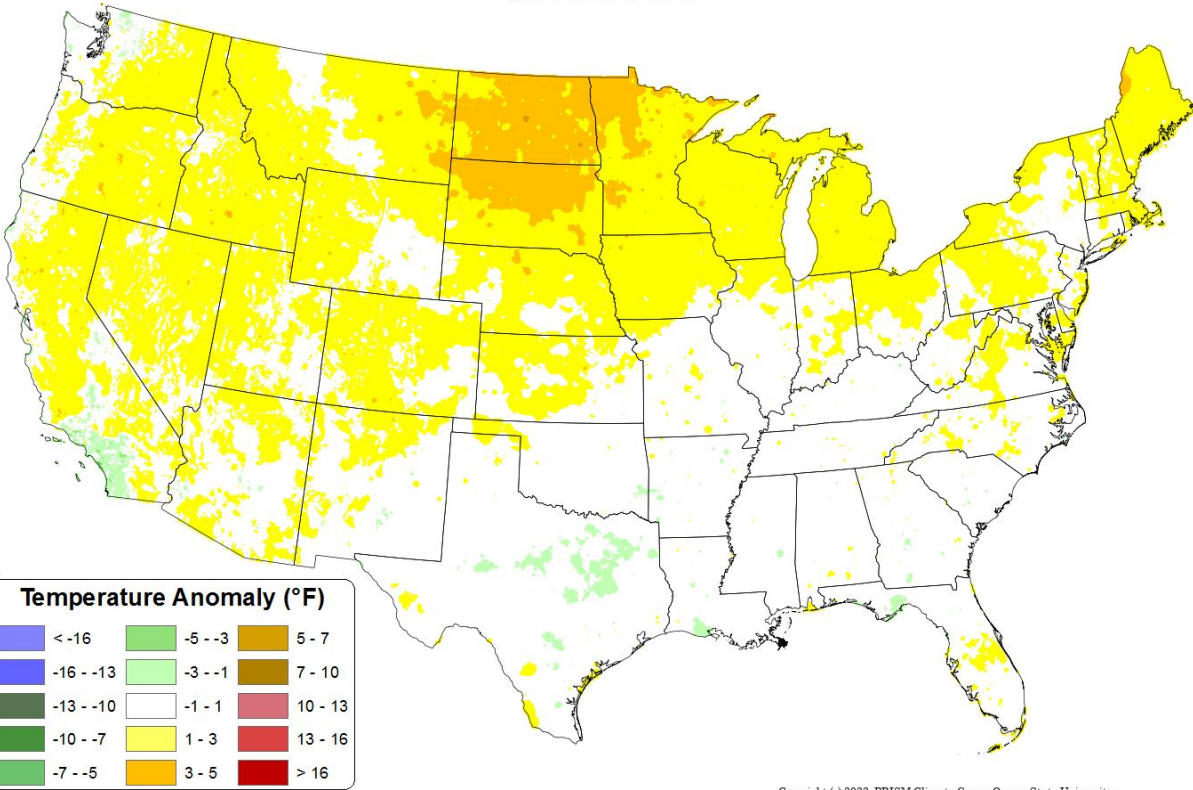
Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier

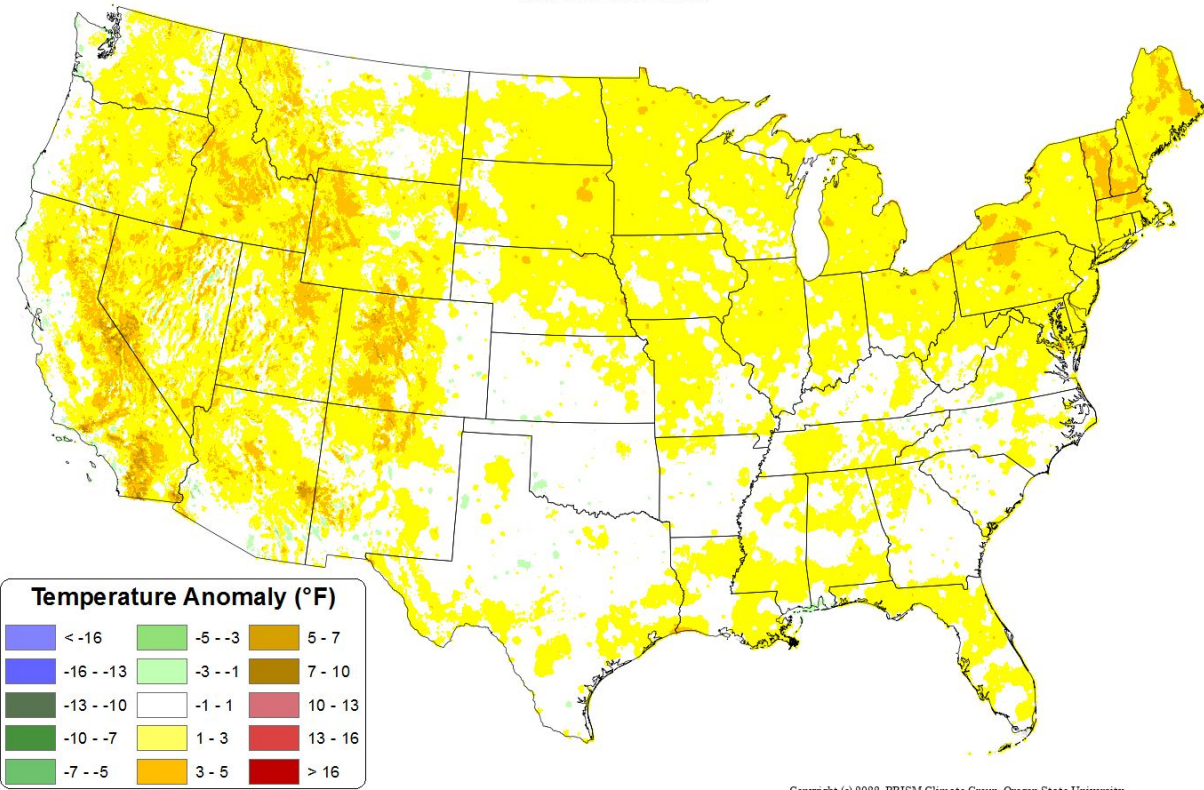


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Annual Maximum Temperature Anomaly: 2021
Period ending 31 Dec 2021
Base period: 1991-2020
(Map created 02 Jul 2022)



Annual Minimum Temperature Anomaly: 2021
Period ending 31 Dec 2021
Base period: 1991-2020
(Map created 02 Jul 2022)



Difference from Average Temperatures 2021: Daytime Highs vs. Overnight Low Temperatures

Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier

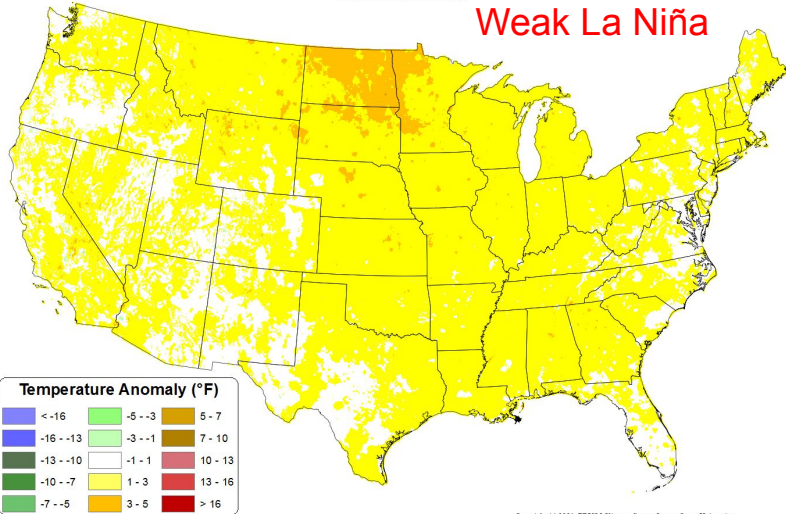


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Annual Daily Mean Temperature Anomaly: 2016

Period ending 31 Dec 2016
Base period: 1991-2020
(Map created 15 Nov 2021)

Weak La Niña

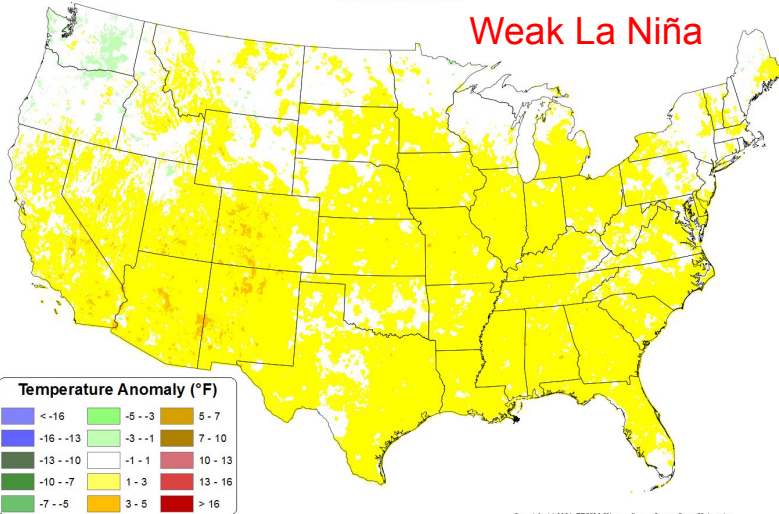


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Annual Daily Mean Temperature Anomaly: 2017

Period ending 31 Dec 2017
Base period: 1991-2020
(Map created 15 Nov 2021)

Weak La Niña

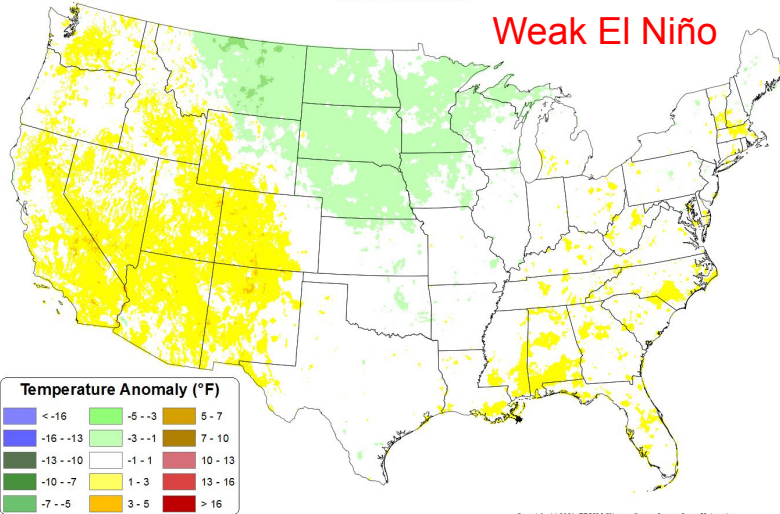


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Annual Daily Mean Temperature Anomaly: 2018

Period ending 31 Dec 2018
Base period: 1991-2020
(Map created 15 Nov 2021)

Weak El Niño

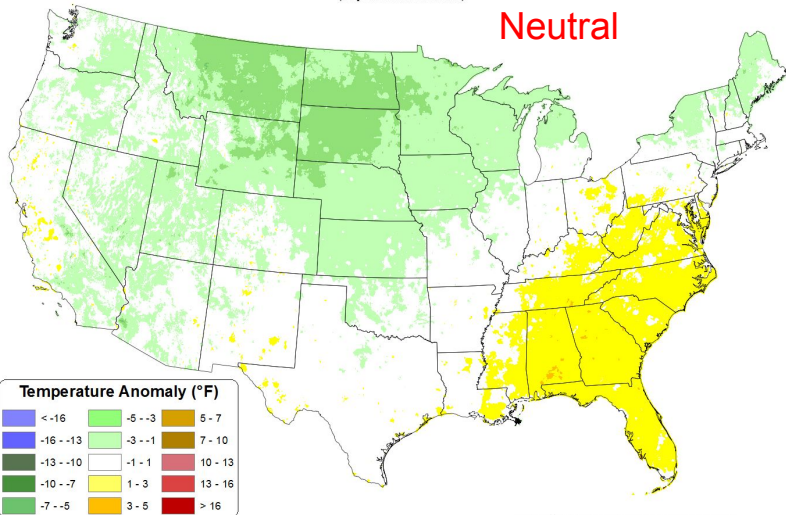


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Annual Daily Mean Temperature Anomaly: 2019

Period ending 31 Dec 2019
Base period: 1991-2020
(Map created 15 Nov 2021)

Neutral

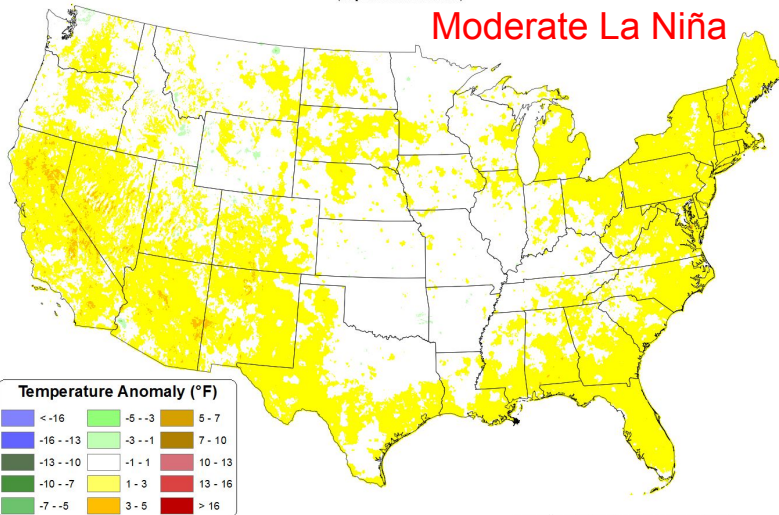


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Annual Daily Mean Temperature Anomaly: 2020

Period ending 31 Dec 2020
Base period: 1991-2020
(Map created 15 Nov 2021)

Moderate La Niña

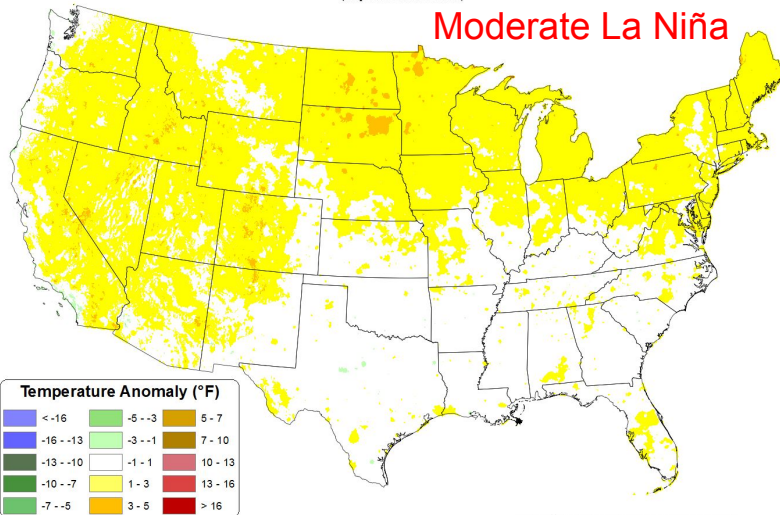


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Annual Daily Mean Temperature Anomaly: 2021

Period ending 31 Dec 2021
Base period: 1991-2020
(Map created 02 Jul 2022)

Moderate La Niña



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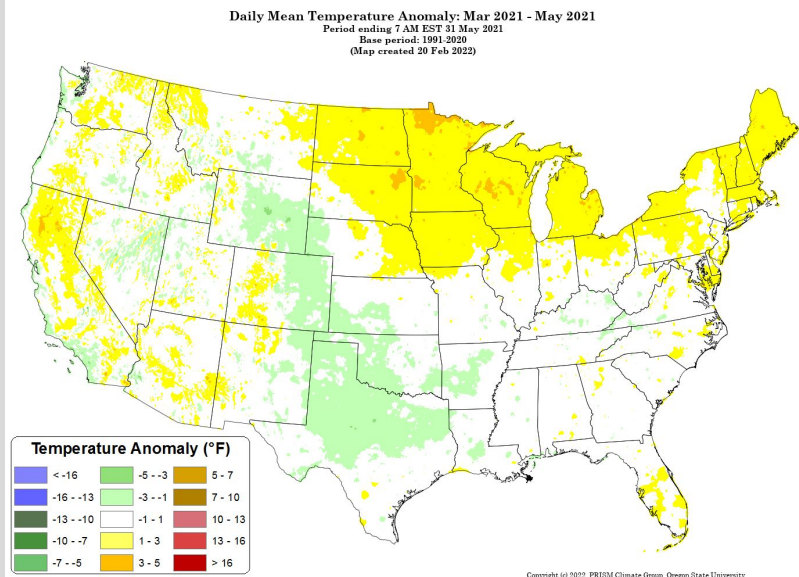
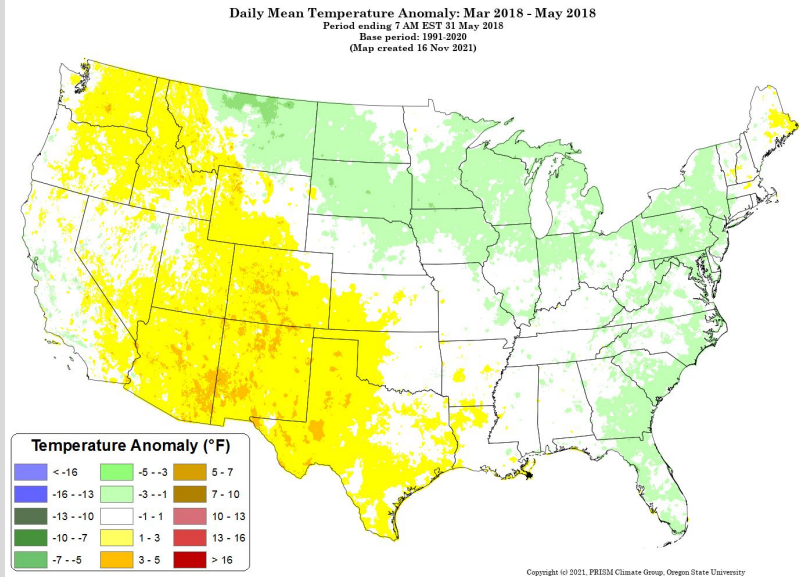
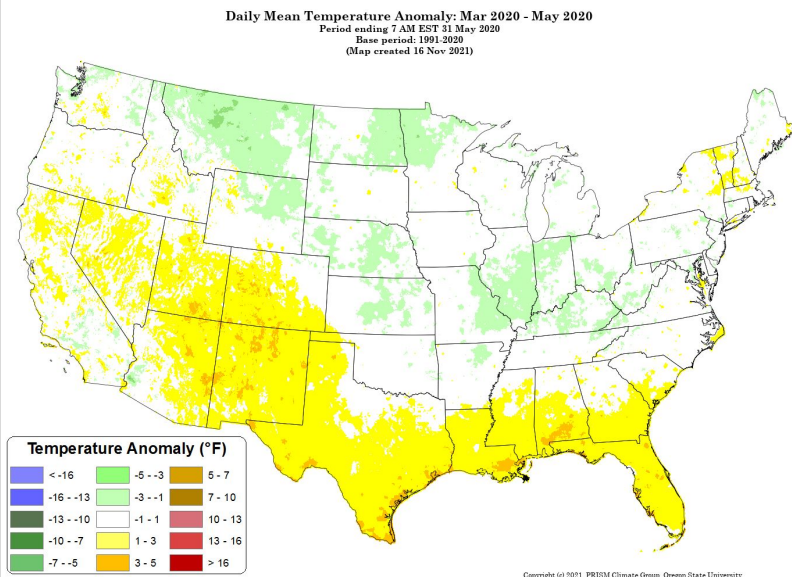
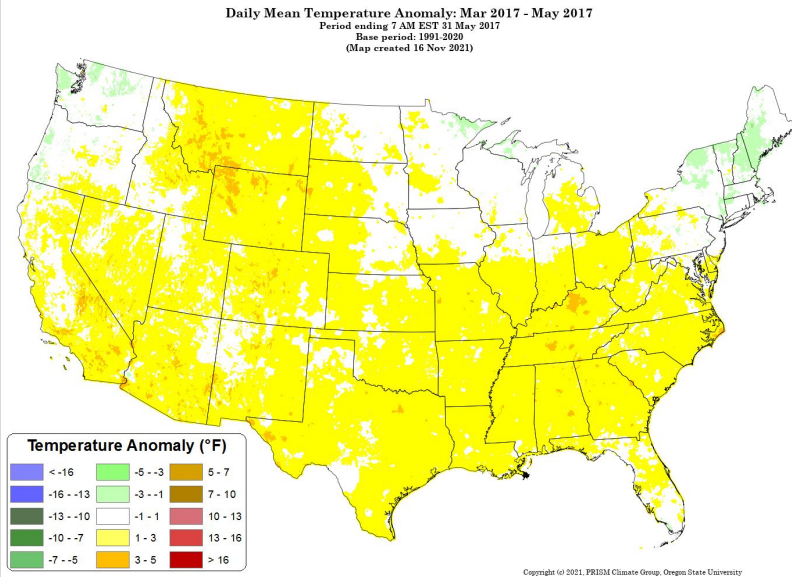
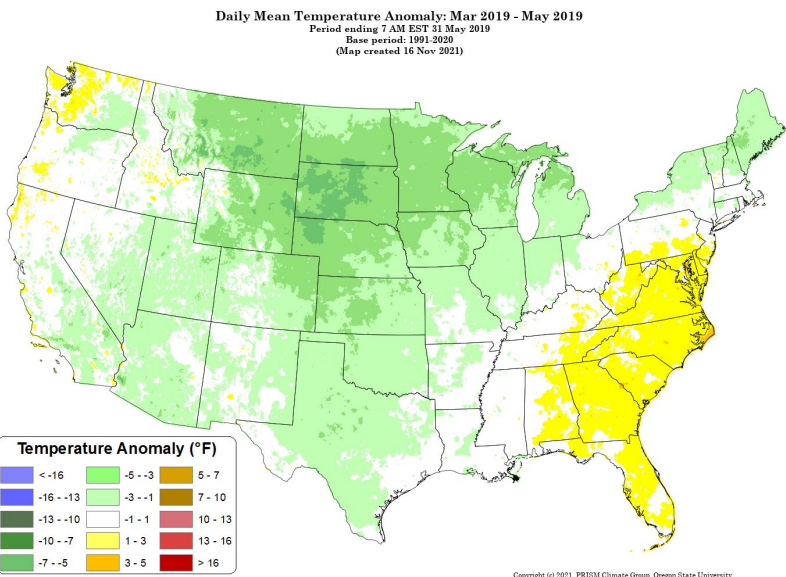
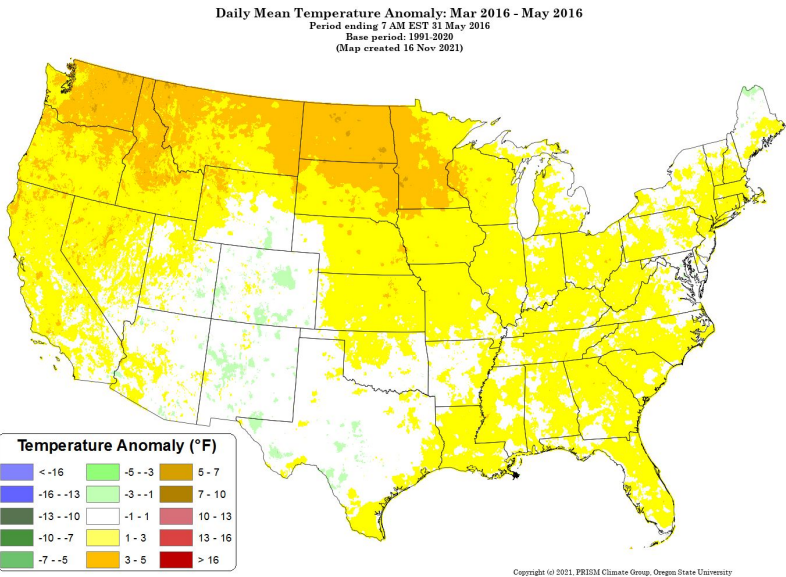
Mean Temperature - Difference from Average - 2016-2021

Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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Mean Temperature - March, April and May (MAM) - 2016-2021

Observed Changes In Spring During La Niña

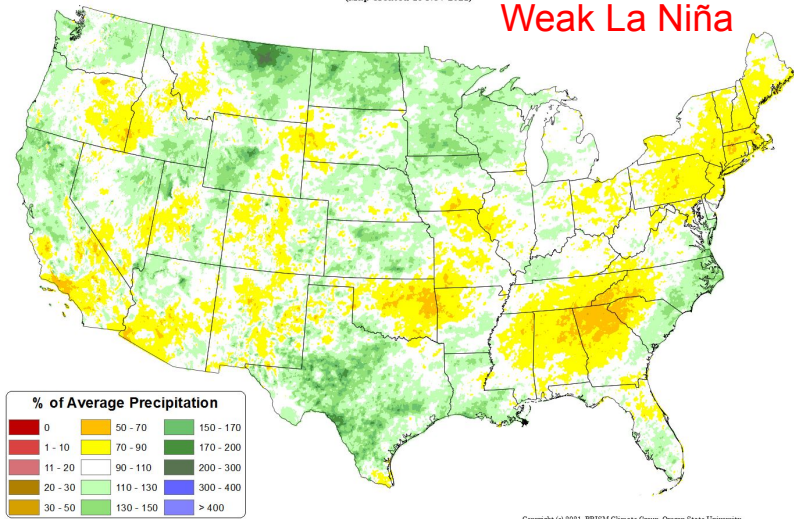
Trending Windier, Warmer and Drier



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Total Annual Precipitation Anomaly: 2016
Period ending 31 Dec 2016
Base period: 1991-2020
(Map created 15 Nov 2021)

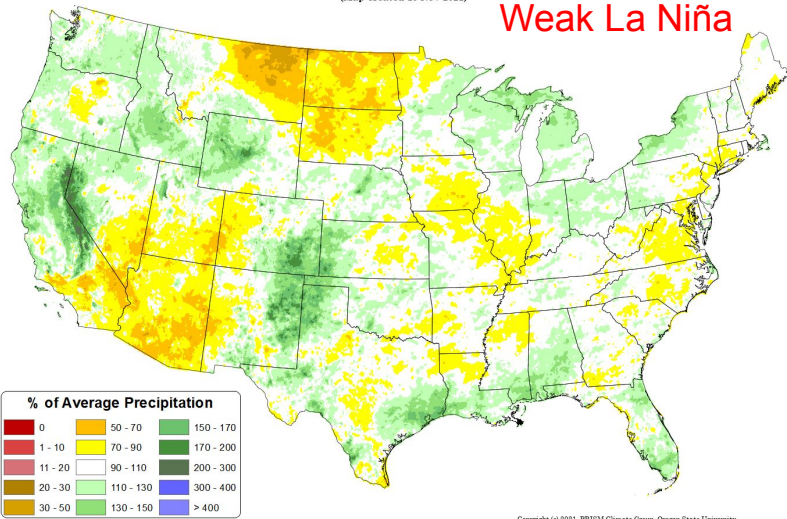
Weak La Niña



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Total Annual Precipitation Anomaly: 2017
Period ending 31 Dec 2017
Base period: 1991-2020
(Map created 15 Nov 2021)

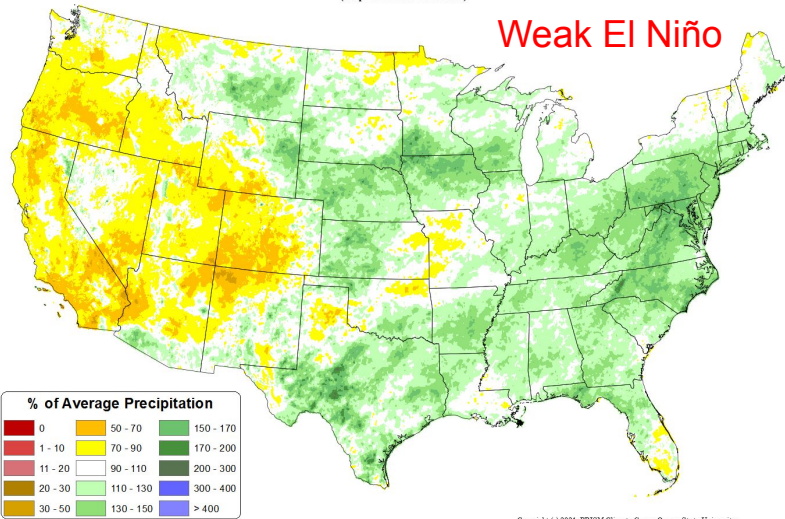
Weak La Niña



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Total Annual Precipitation Anomaly: 2018
Period ending 31 Dec 2018
Base period: 1991-2020
(Map created 15 Nov 2021)

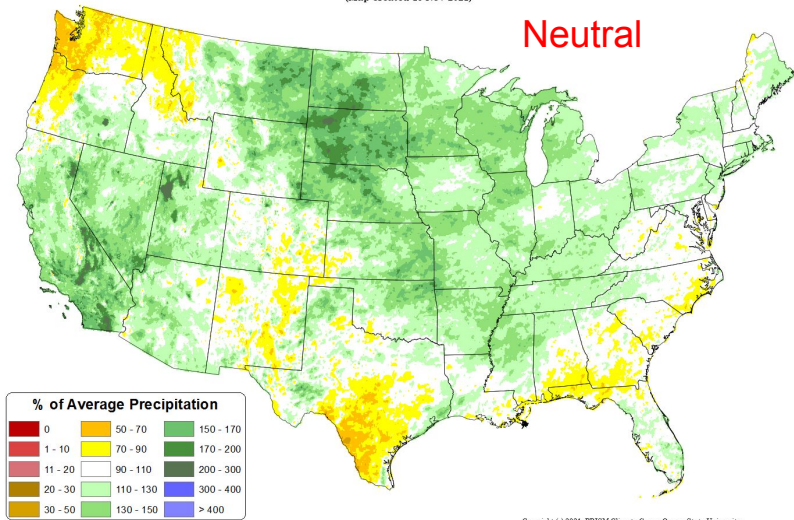
Weak El Niño



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Total Annual Precipitation Anomaly: 2019
Period ending 31 Dec 2019
Base period: 1991-2020
(Map created 15 Nov 2021)

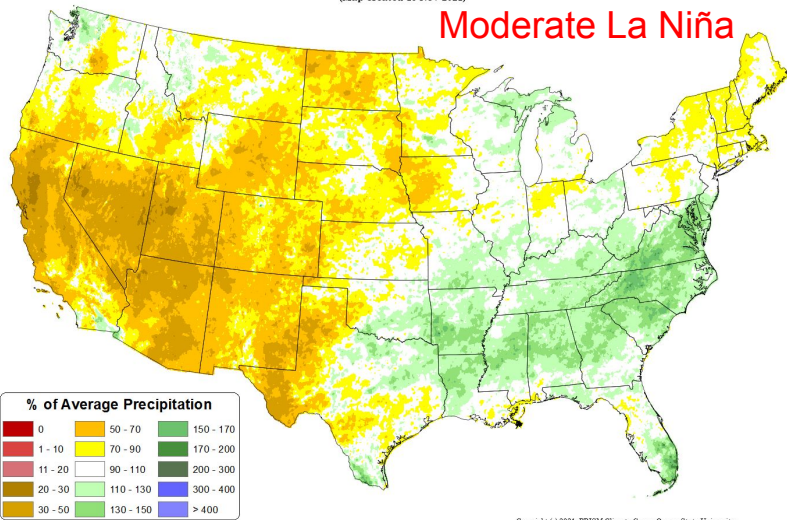
Neutral



Copyright (c) 2021, PRISM Climate Group, Oregon State University

Total Annual Precipitation Anomaly: 2020
Period ending 31 Dec 2020
Base period: 1991-2020
(Map created 15 Nov 2021)

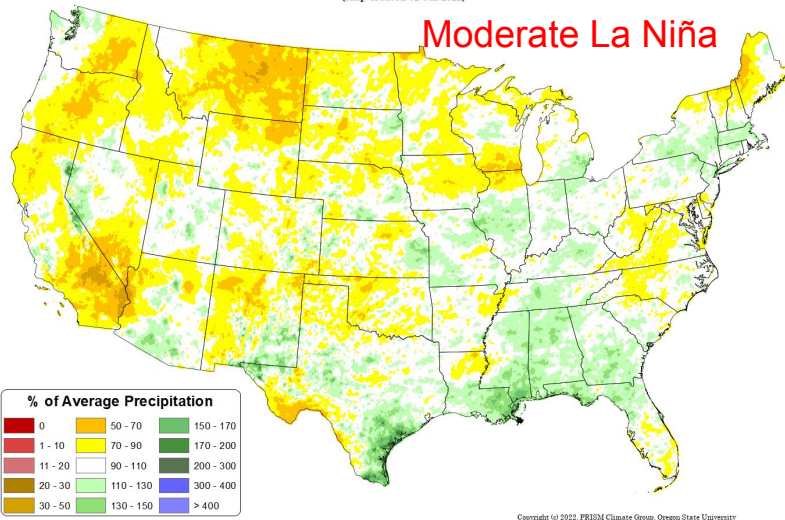
Moderate La Niña



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Total Annual Precipitation Anomaly: 2021
Period ending 31 Dec 2021
Base period: 1991-2020
(Map created 02 Jul 2022)

Moderate La Niña



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Total Annual Precipitation Difference from Average - 2016-2021

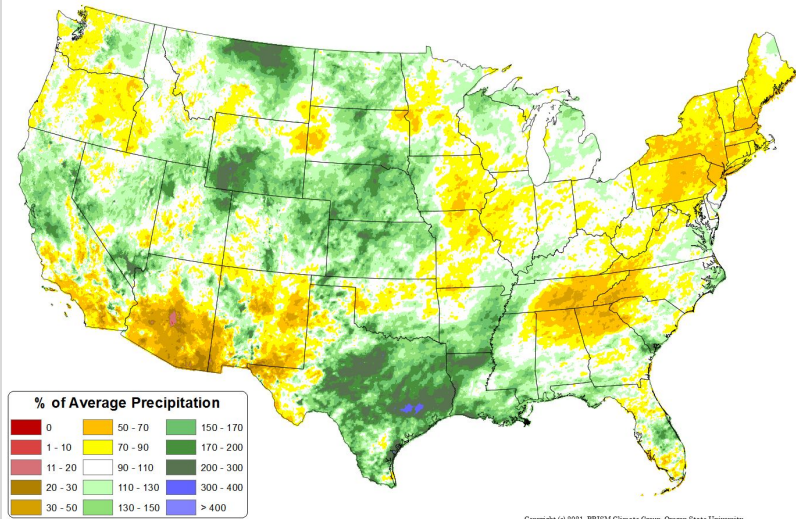
Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



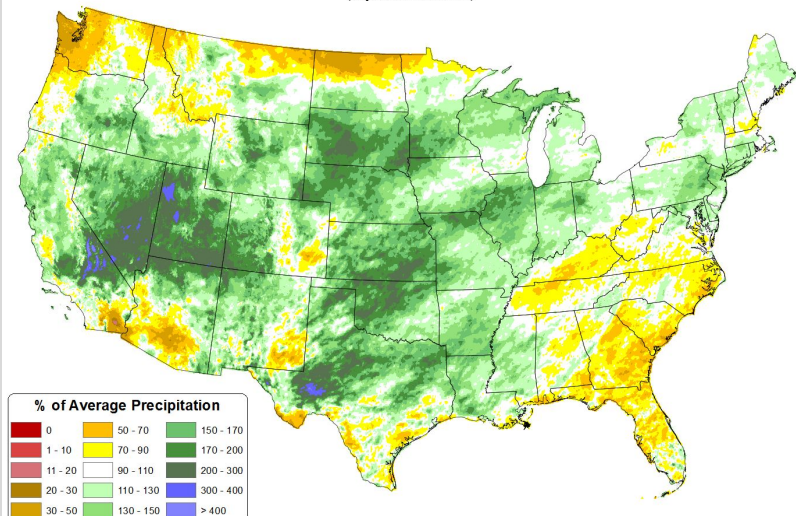
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Total Precipitation Anomaly: Mar 2016 - May 2016
Period ending 7 AM EST 31 May 2016
Base period: 1991-2020
(Map created 16 Nov 2021)



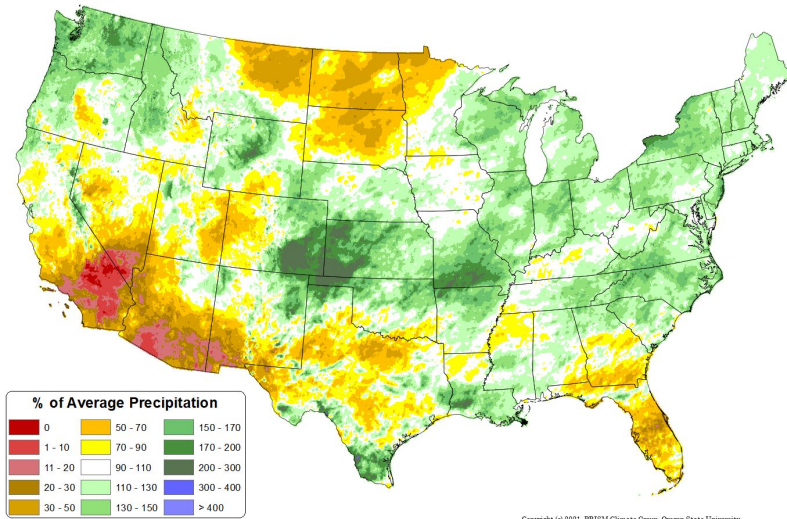
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Total Precipitation Anomaly: Mar 2019 - May 2019
Period ending 7 AM EST 31 May 2019
Base period: 1991-2020
(Map created 16 Nov 2021)



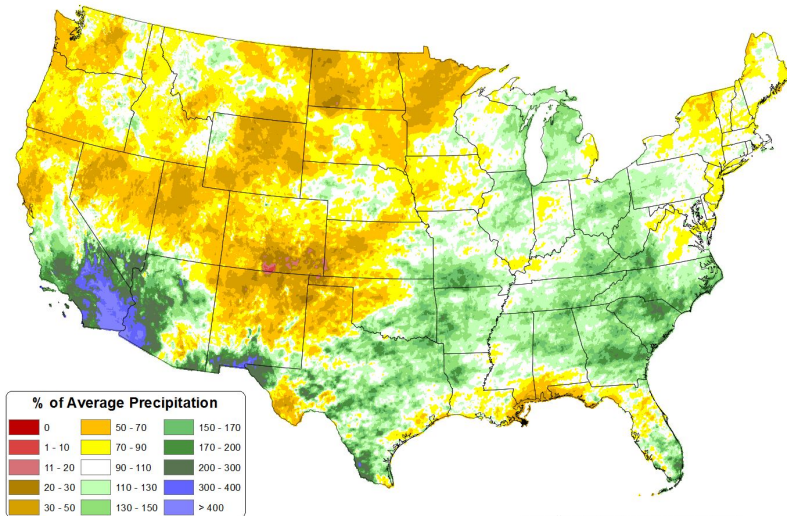
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Total Precipitation Anomaly: Mar 2017 - May 2017
Period ending 7 AM EST 31 May 2017
Base period: 1991-2020
(Map created 16 Nov 2021)



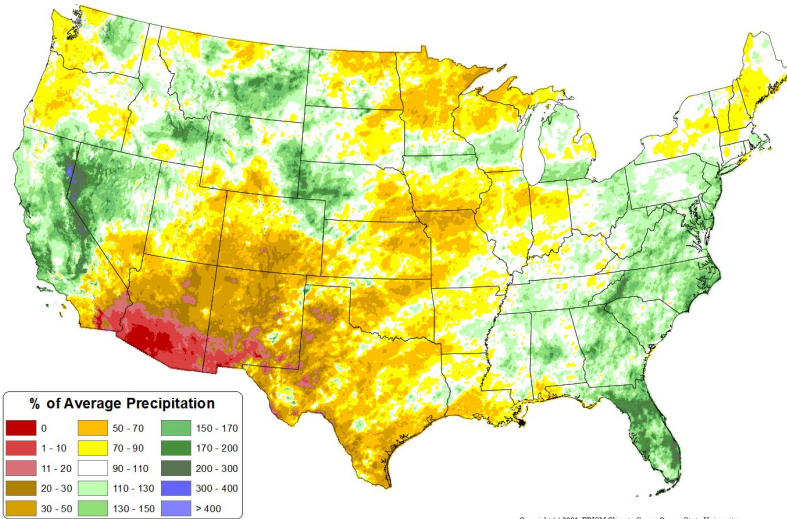
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Total Precipitation Anomaly: Mar 2020 - May 2020
Period ending 7 AM EST 31 May 2020
Base period: 1991-2020
(Map created 16 Nov 2021)



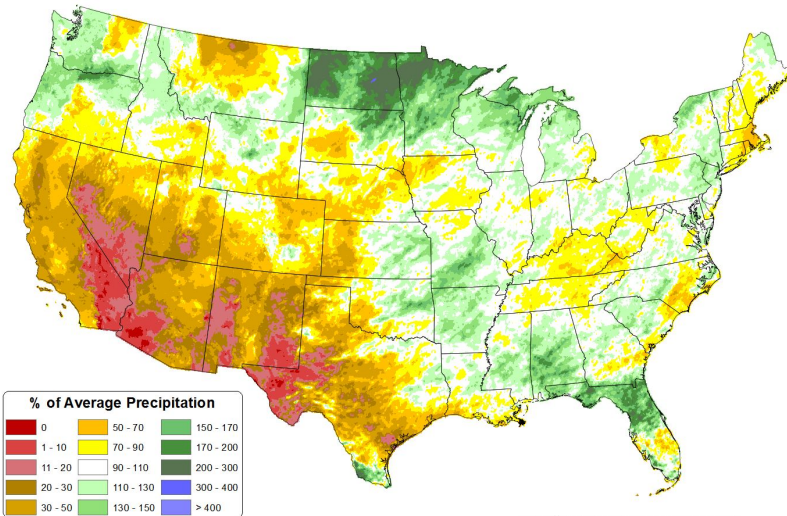
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Total Precipitation Anomaly: Mar 2018 - May 2018
Period ending 7 AM EST 31 May 2018
Base period: 1991-2020
(Map created 16 Nov 2021)



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Total Precipitation Anomaly: Mar 2022 - May 2022
Period ending 7 AM EST 31 May 2022
Base period: 1991-2020
(Map created 26 Oct 2022)



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MAM Precipitation Difference from Average - 2016-21

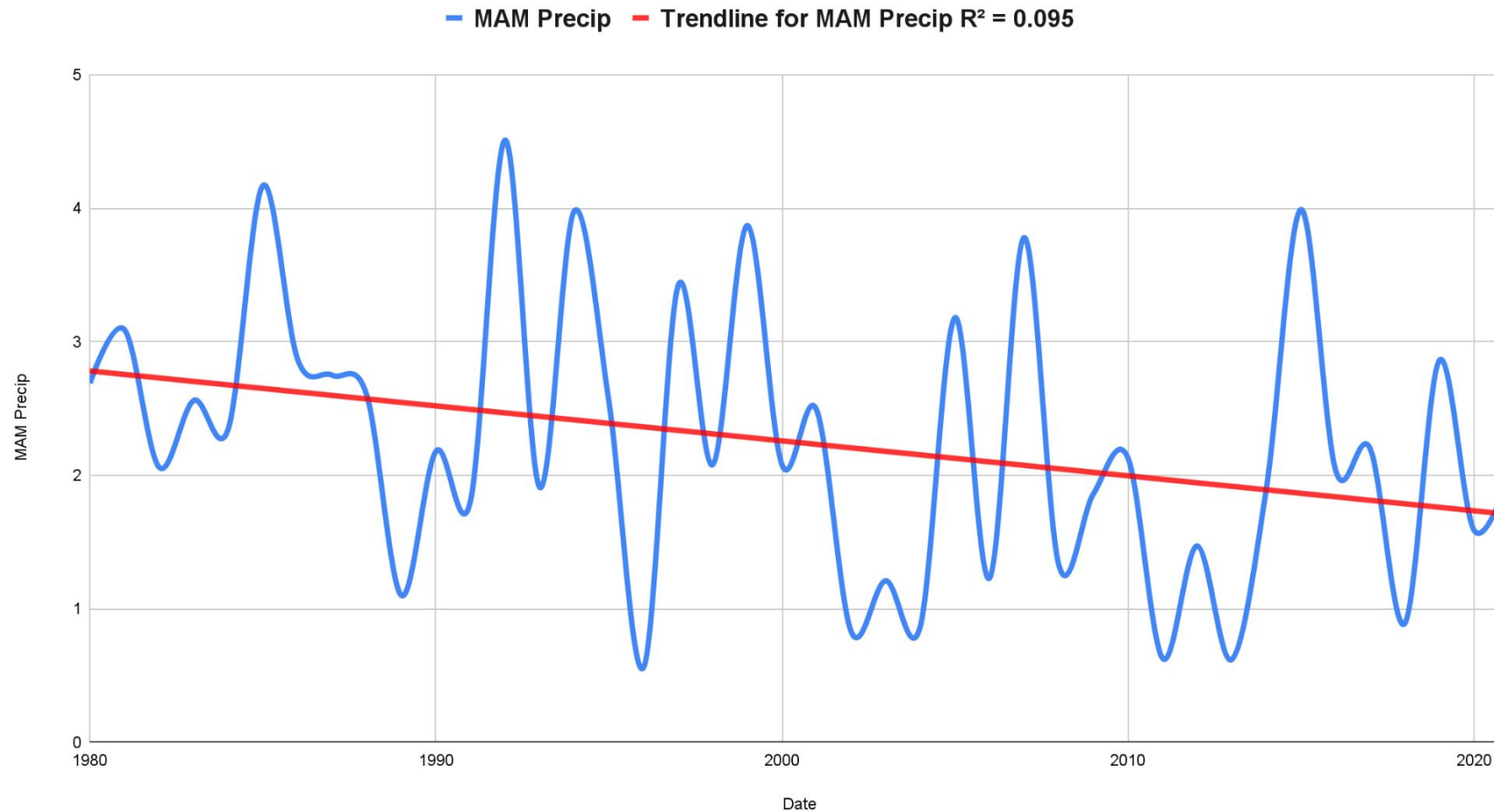
Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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NM March, April, May (MAM) Precipitation 1980-2022



1980-2021 Spring (MAM) Precipitation

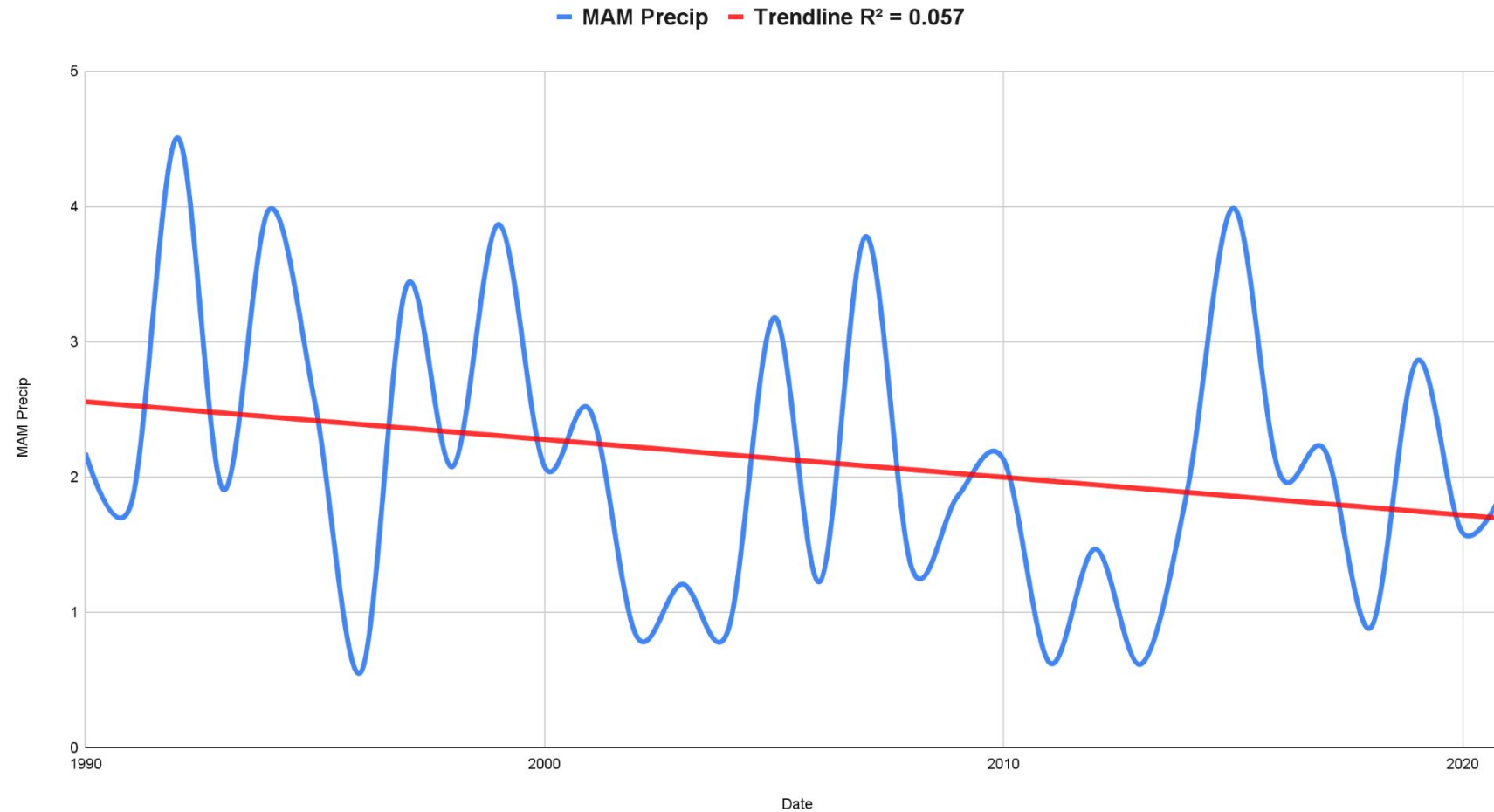
Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



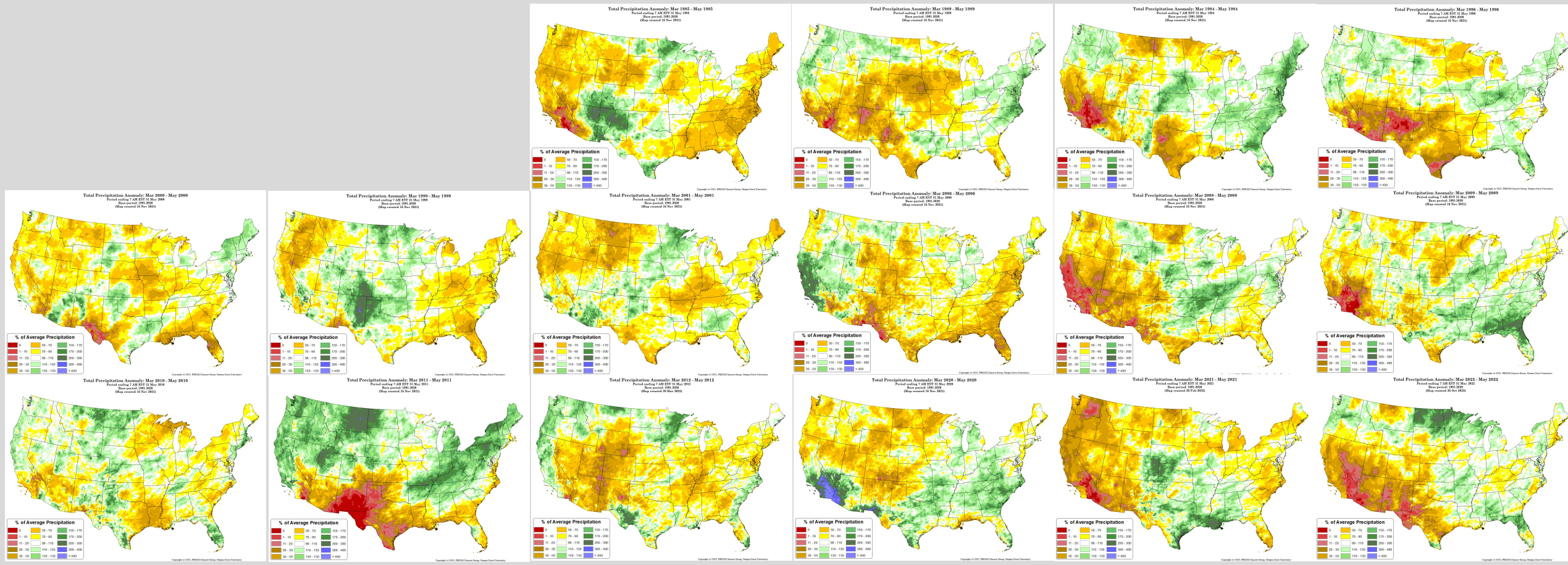
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NM MAM Precipitation 1990-2021

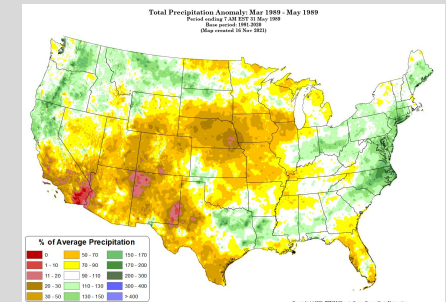


1990-2021 Spring Precipitation (MAM)

Trending Windier, Warmer and Drier



Trending Windier, Warmer and Drier



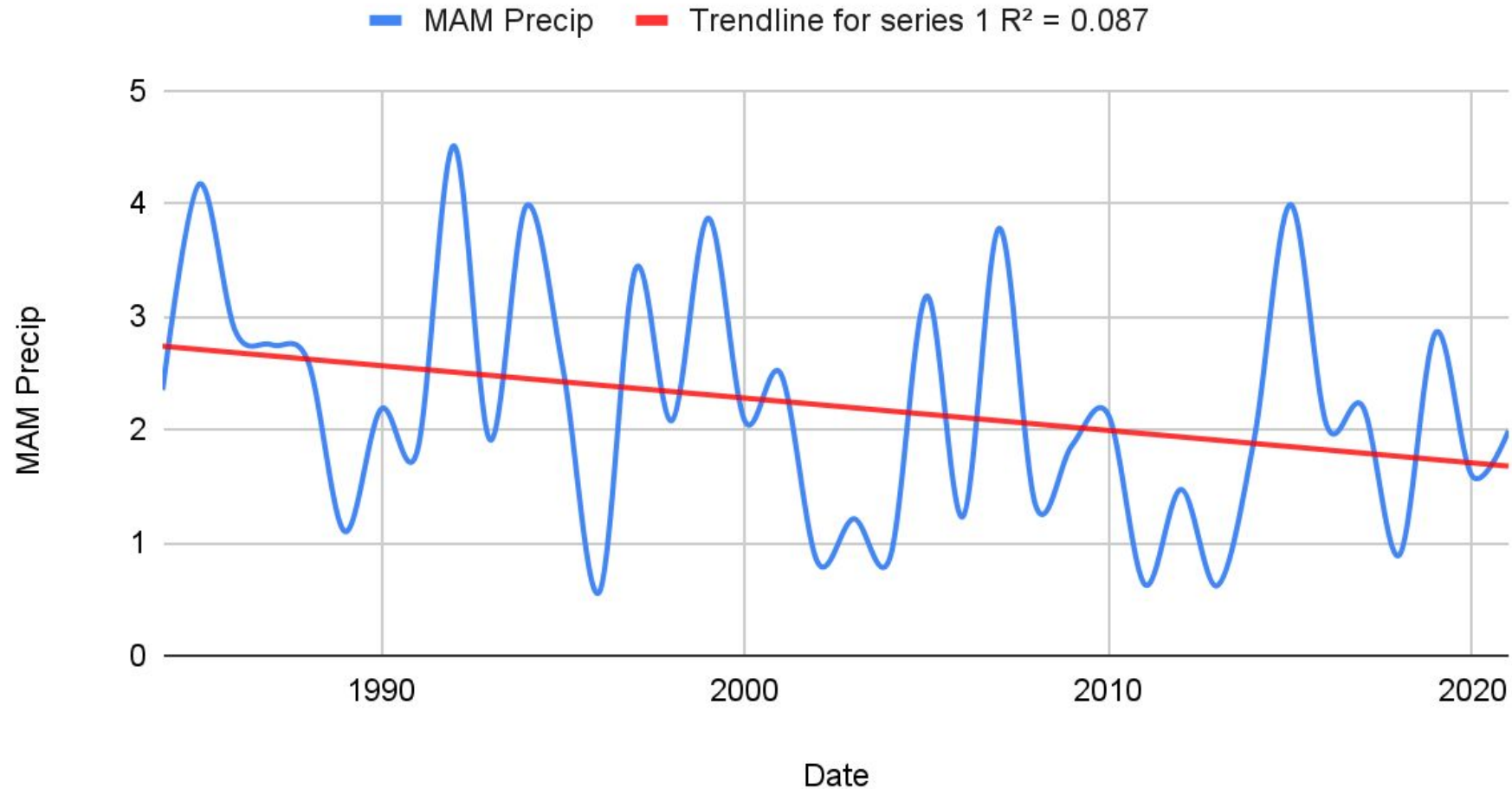
Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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MAM Precipitation During La Niña



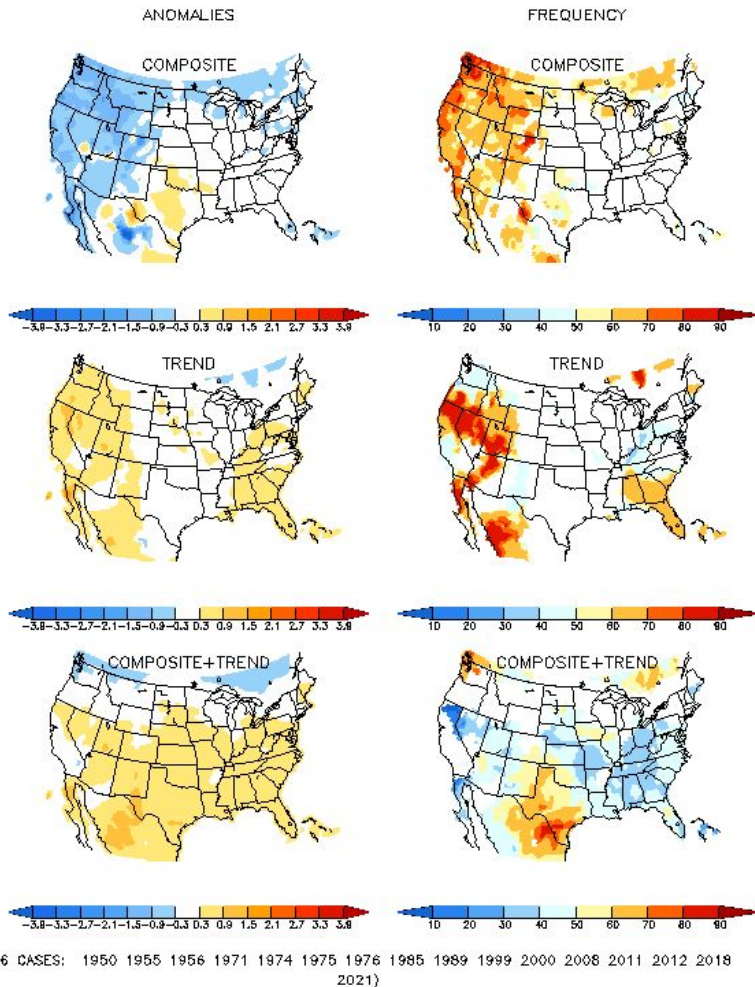
Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier

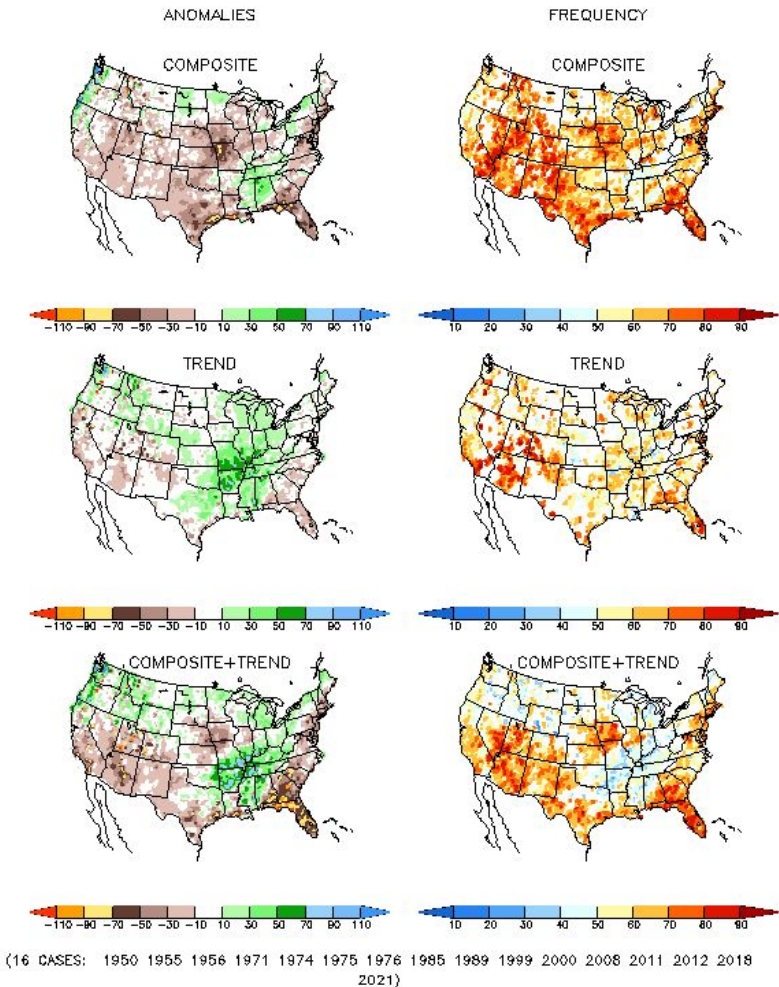


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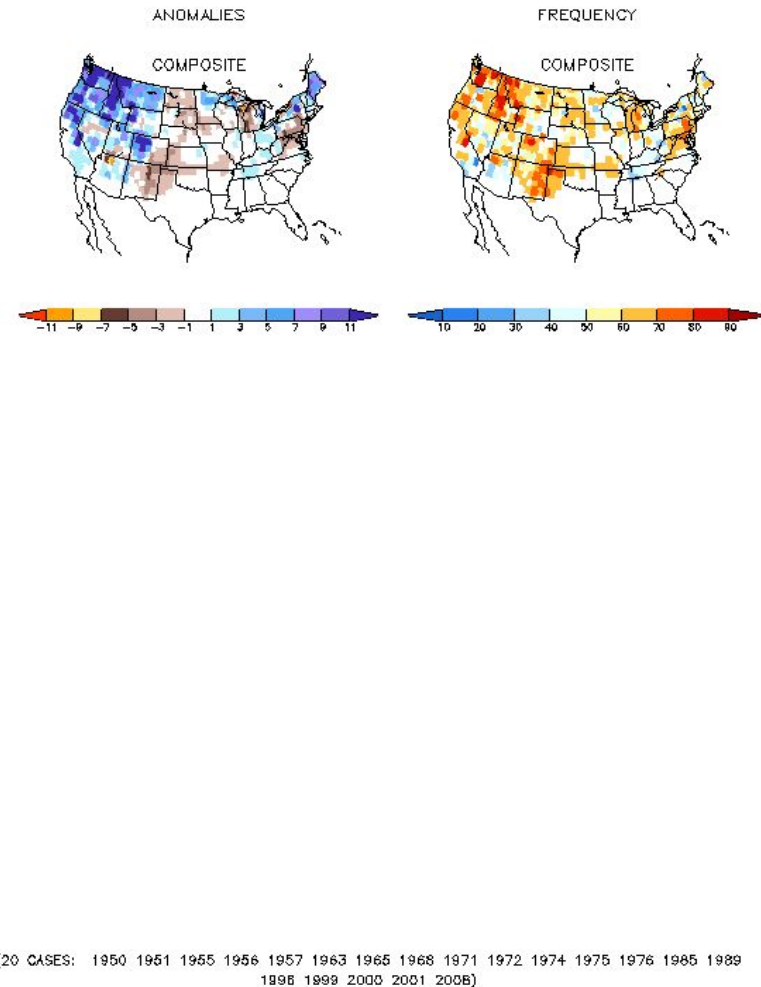
MAM LA NINA TEMPERATURE ANOMALIES (C)
AND FREQUENCY OF OCCURRENCE (%)



MAM LA NINA PRECIPITATION ANOMALIES (MM)
AND FREQUENCY OF OCCURRENCE (%)



DJF LA NINA SNOW ANOMALIES (IN)
AND FREQUENCY OF OCCURRENCE (%)

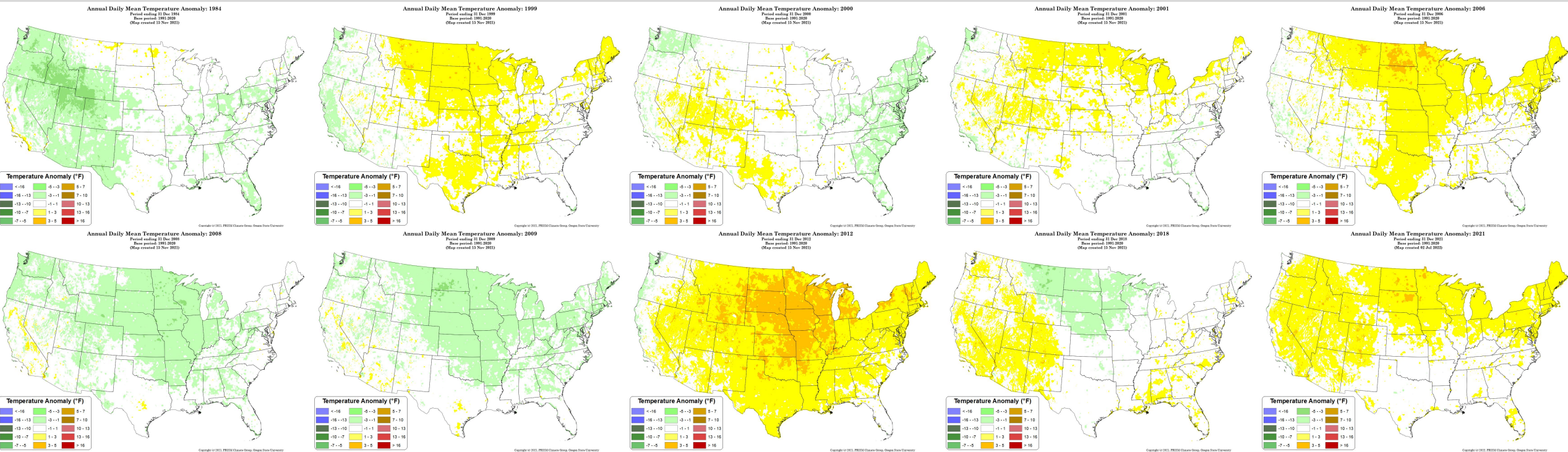


Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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Summary

- ❖ Spring temperatures (both maximum but especially minimums) are increasing
- ❖ Spring precipitation in New Mexico is gradually decreasing
- ❖ Spring (MAM) precipitation in New Mexico during La Niña is decreasing at a faster rate compared to the overall spring (MAM) rate

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Albuquerque, NM
andrew.church@noaa.gov

Observed Changes In Spring During La Niña

Trending Windier, Warmer and Drier



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A few notable quotes about the 2022-23 La Niña/ENSO and Climate Change in general from one of the World's Leading Climate Scientists

In addition to raising temperature, global warming increases evaporation of surface waters into the atmosphere, drying areas that have had little rain. Warmer air increases the amount of water vapor the atmosphere can hold, and the thirstier atmosphere sucks moisture from the surface.

The La Niña cooling in the tropical Pacific can readily reverse, with an El Niño pattern effectively pumping heat out of the ocean and into the atmosphere. A preliminary analysis colleagues and I conducted suggests that the global ocean heat content is at record-high levels. Exceptionally warm deep waters in the tropical western Pacific right now suggest prospects for the next El Niño event in 2023, potentially resulting in more global temperature records in 2024 as some ocean heat returns to the atmosphere.

All La Niñas are not the same, however. Because of how sea temperatures responded to the heat in the extratropics, the environment today is very different than it was two years ago. Warmth in the North Pacific could have consequences for the “pineapple express” and other West Coast U.S. storms this coming winter.

Kevin Trenberth - Distinguished Scholar, NCAR;
Affiliated Faculty, University of Auckland