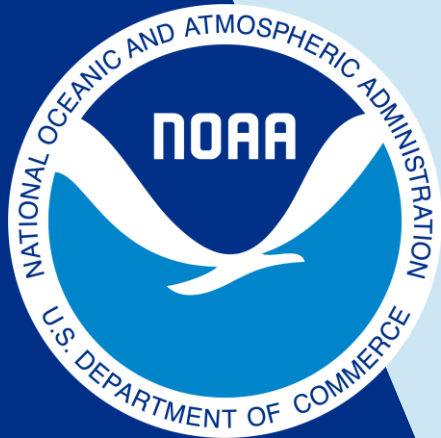


NOAA Climate Science and Services Monthly Climate Update



Karin Gleason

Climatologist, Monitoring Section Chief, NOAA National Centers for Environmental Information (NCEI)

Matt Rosencrans

Meteorologist, NOAA Climate Prediction Center (CPC)

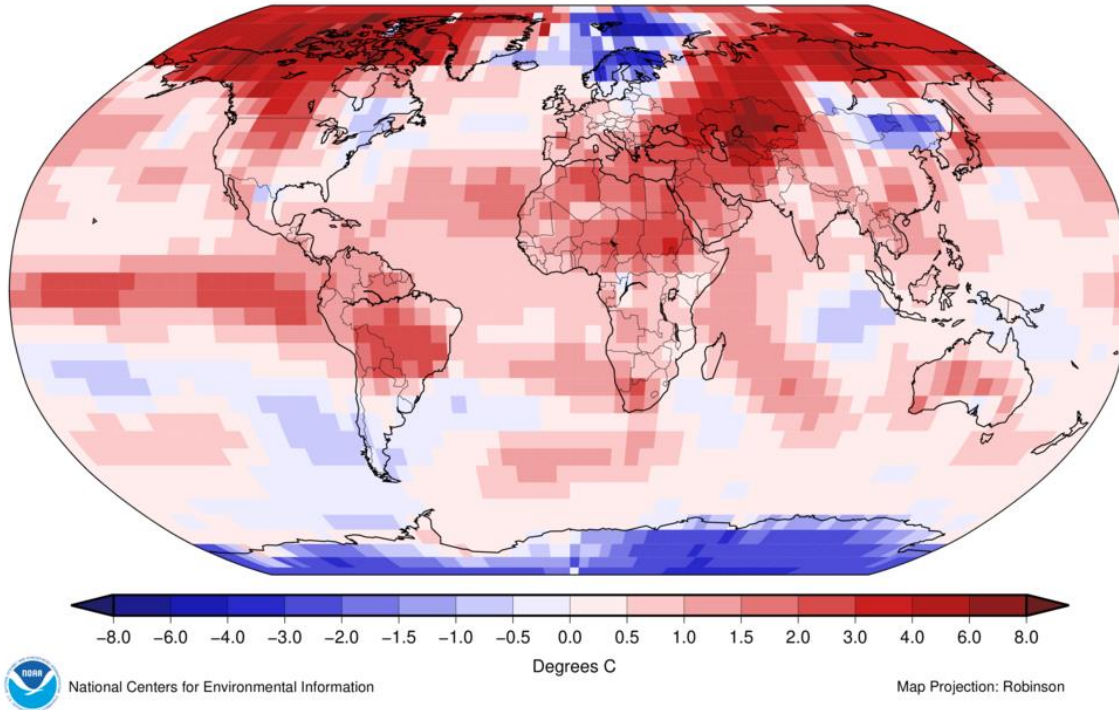
National Oceanic and
Atmospheric Administration

November 2023

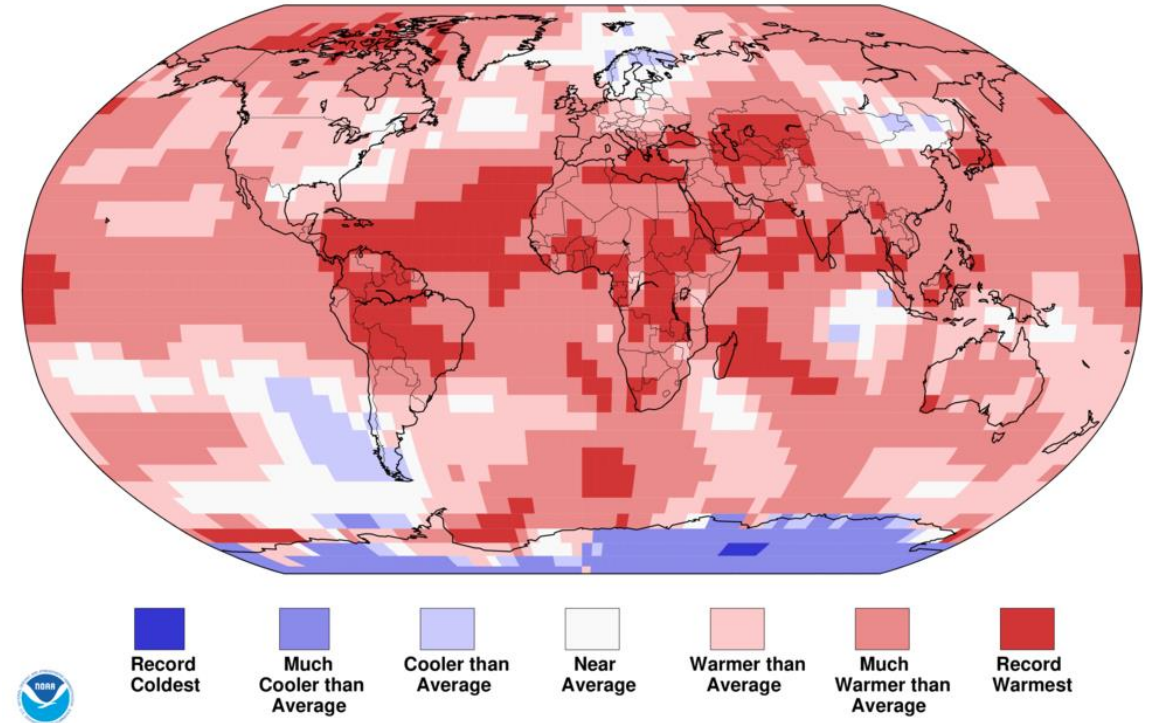
November 2023 Global Temperature

The global temperature record dates back to 1850 (174 years)

Land & Ocean Temperature Departure from Average Nov 2023
(with respect to a 1991–2020 base period)
Data Source: NOAAGlobalTemp v5.1.0–20231208



Land & Ocean Temperature Percentiles Nov 2023
NOAA's National Centers for Environmental Information
Data Source: NOAAGlobalTemp v5.1.0–20231208



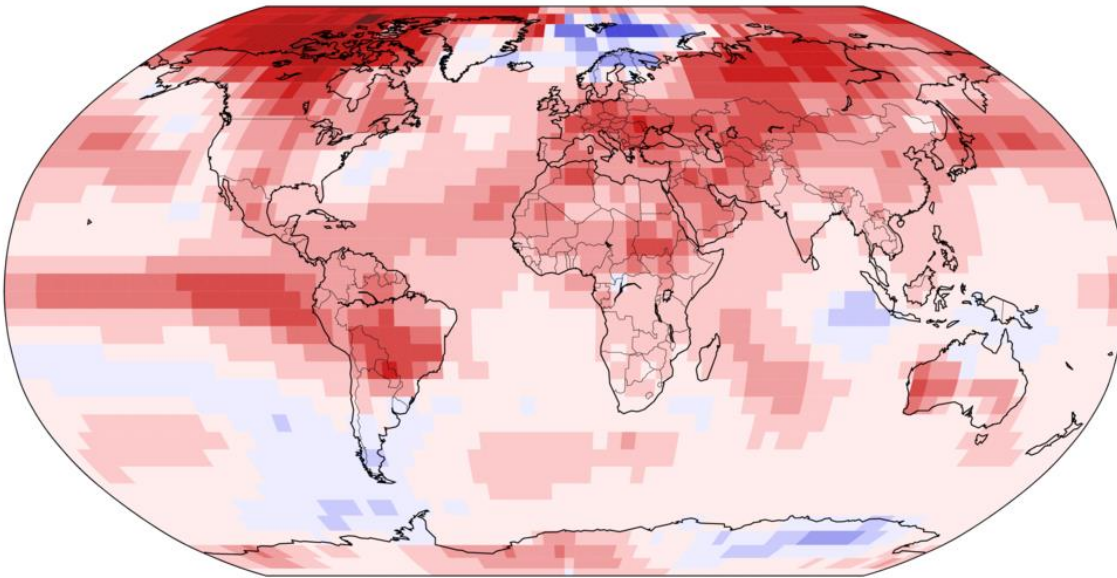
- **Global Land & Ocean: +1.44°C / +2.59°F; warmest** for November on record
- **Global Land-only: +2.42°C / +4.36°F; warmest** for November on record
- **Global Ocean-only: +1.00°C / +1.80°F; warmest** for November on record

September-November 2023 Global Temperature

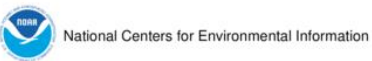
The global temperature record dates back to 1850 (174 years)

Land & Ocean Temperature Departure from Average Sep 2023–Nov 2023
(with respect to a 1991–2020 base period)

Data Source: NOAA GlobalTemp v5.1.0–20231208



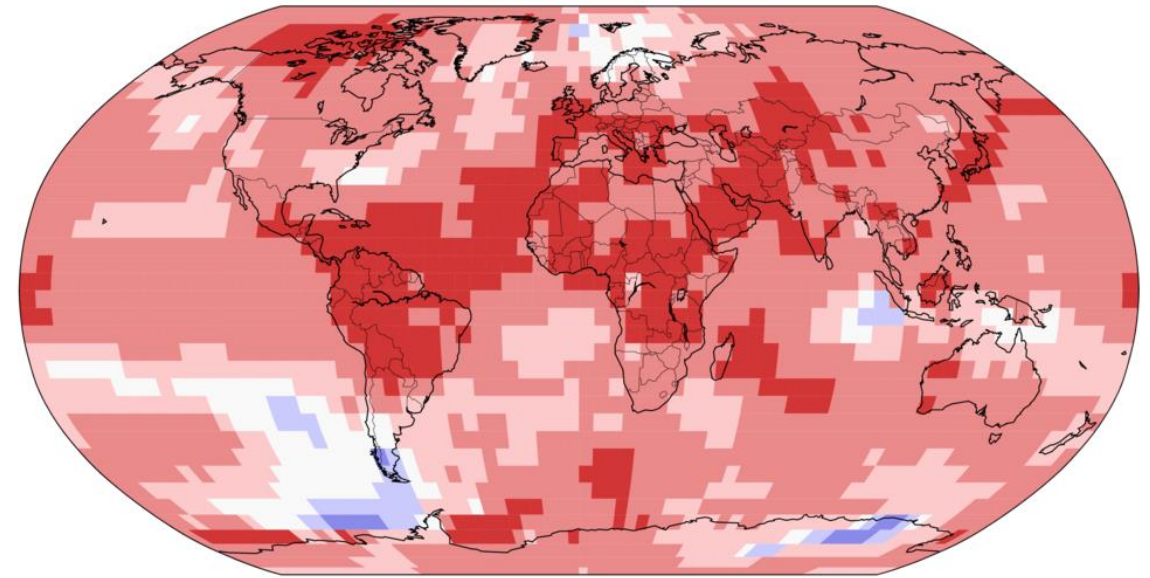
-8.0 -6.0 -4.0 -3.0 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 3.0 4.0 6.0 8.0
Degrees C
7 Map Projection: Robinson



Land & Ocean Temperature Percentiles Sep 2023–Nov 2023

NOAA's National Centers for Environmental Information

Data Source: NOAA GlobalTemp v5.1.0–20231208



Record Coldest Much Cooler than Average Cooler than Average Near Average Warmer than Average Much Warmer than Average Record Warmest



- **Global Land & Ocean: +1.41°C / +2.54°F; warmest for November on record**
- **Global Land-only: +2.29°C / +4.12°F; warmest for November on record**
- **Global Ocean-only: +1.02°C / +1.84°F; warmest for November on record**



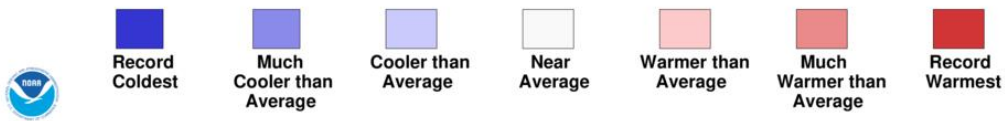
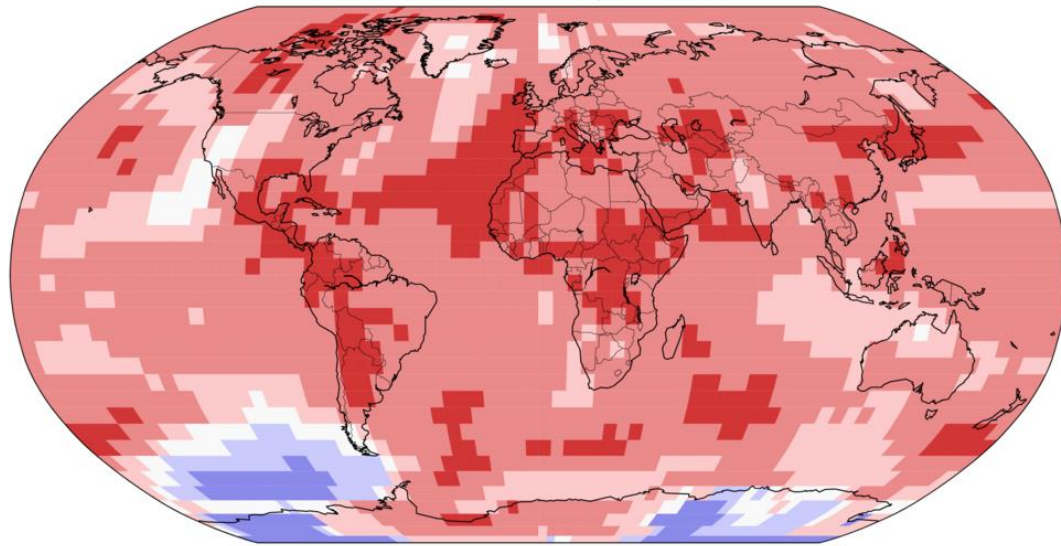
January-November Global Temperature

The global temperature record dates back to 1850 (174 years)

Land & Ocean Temperature Percentiles Jan–Nov 2023

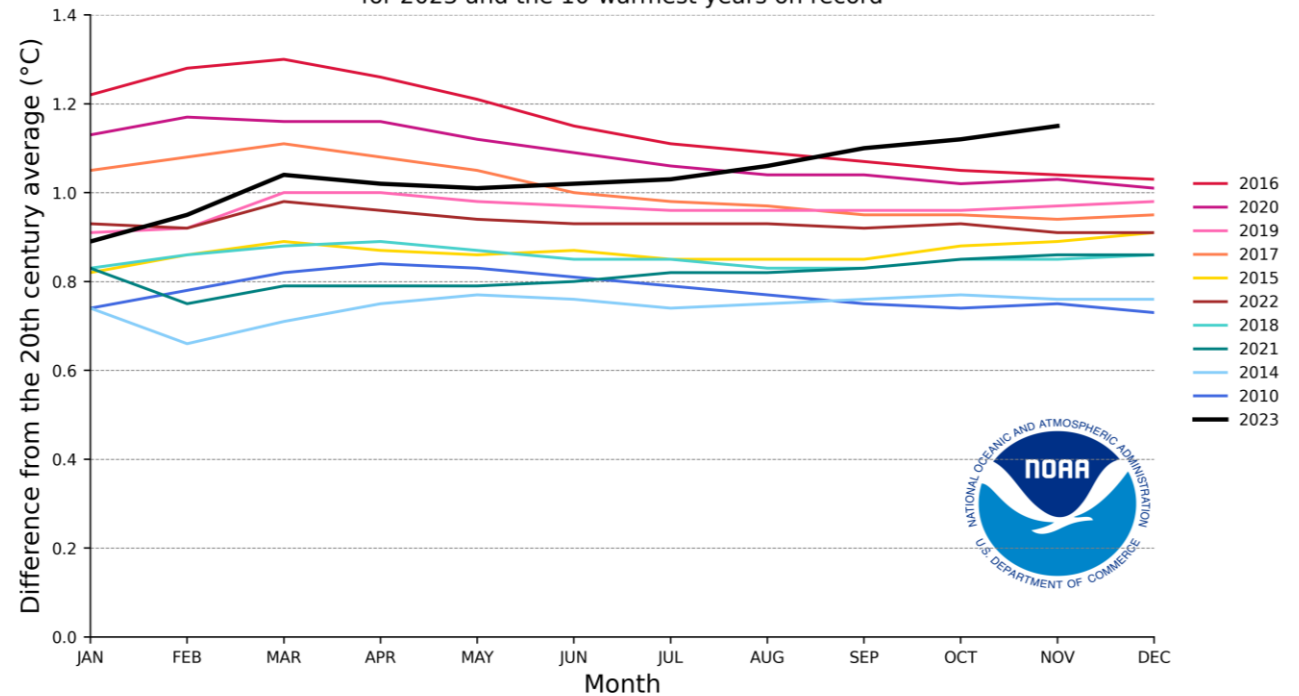
NOAA's National Centers for Environmental Information

Data Source: NOAAGlobalTemp v5.1.0–20231208

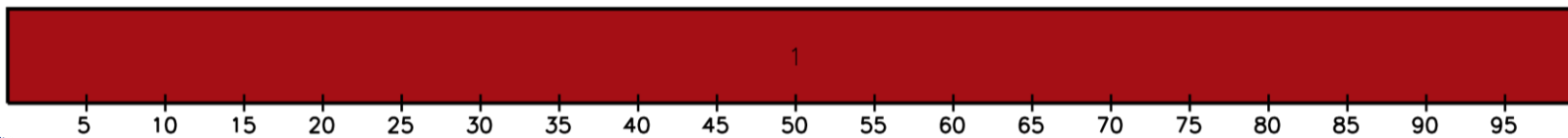


Global Year-to-Date Temperature Anomalies

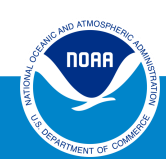
for 2023 and the 10-warmest years on record



Global Land & Ocean: +1.15°C (2.07°F); the *warmest* January-November on record



Virtually certain 2023 will be warmest year on record



Contiguous U.S. November 2023

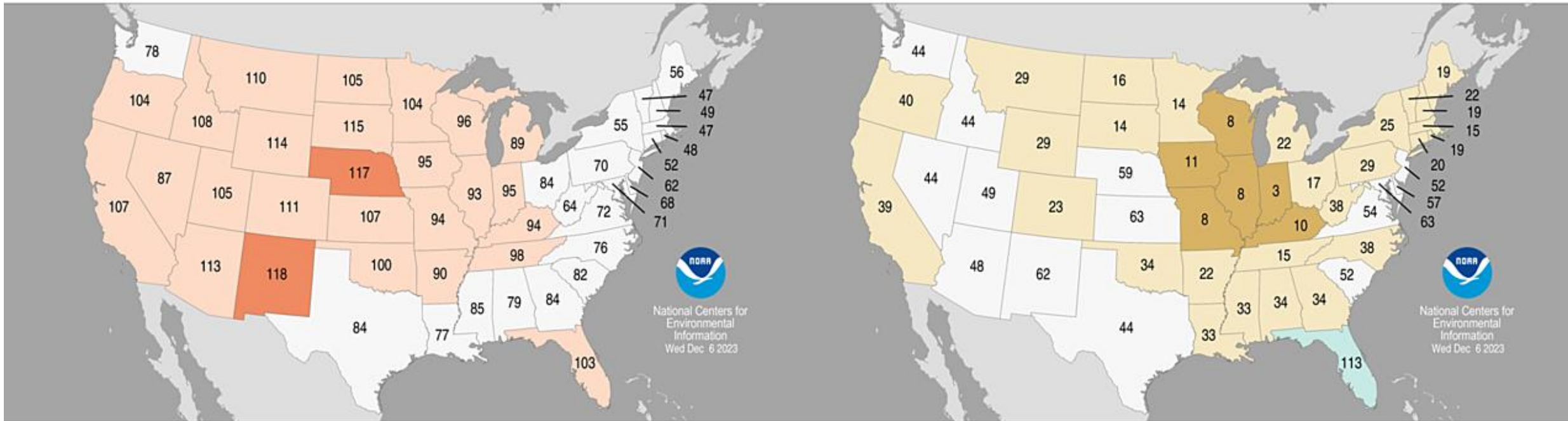
The U.S. temperature record dates back to 1895 (129 years)

Statewide Average Temperature Ranks

November 2023
Period: 1895–2023

Statewide Precipitation Ranks

November 2023
Period: 1895–2023



- **Temperature:** 44.4°F, +2.7°F; 19th warmest
- **Precipitation:** 1.38 inches, -0.85 inch; 12th driest

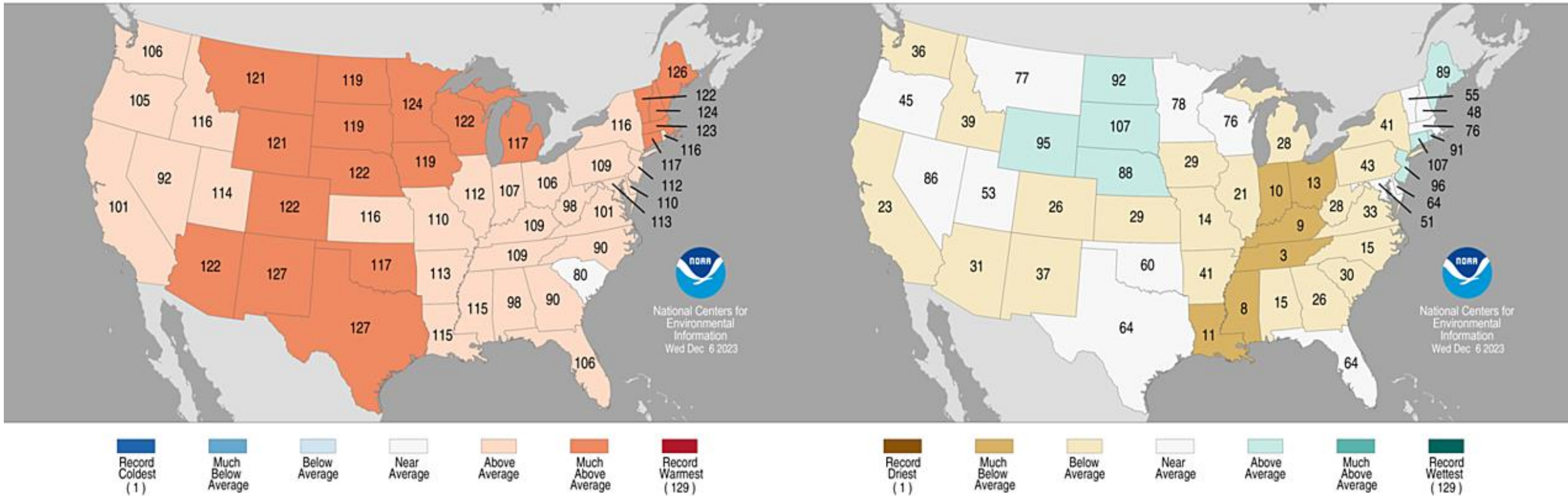


Contiguous U.S. September-November 2023

The U.S. temperature record dates back to 1895 (129 years)

Statewide Average Temperature Ranks
September – November 2023
Period: 1895–2023

Statewide Precipitation Ranks
September – November 2023
Period: 1895–2023



- **Temperature:** 56.1°F, +2.5°F; **6th warmest**
- **Precipitation:** 5.66 inches, -1.22 inch; **15th driest**

Contiguous U.S. January-November 2023

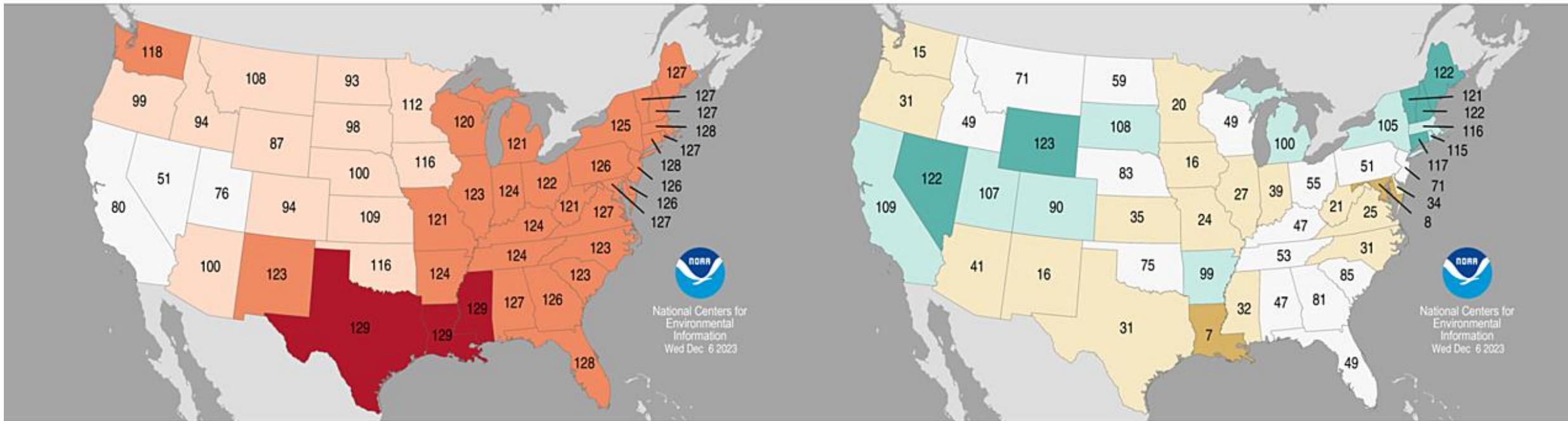
The U.S. temperature record dates back to 1895 (129 years)

Statewide Average Temperature Ranks

January – November 2023
Period: 1895–2023

Statewide Precipitation Ranks

January – November 2023
Period: 1895–2023



- **Temperature:** 55.8°F, +2.0°F; **10th warmest**
- **Precipitation:** 25.89 inches, -0.70 inch; **below average**



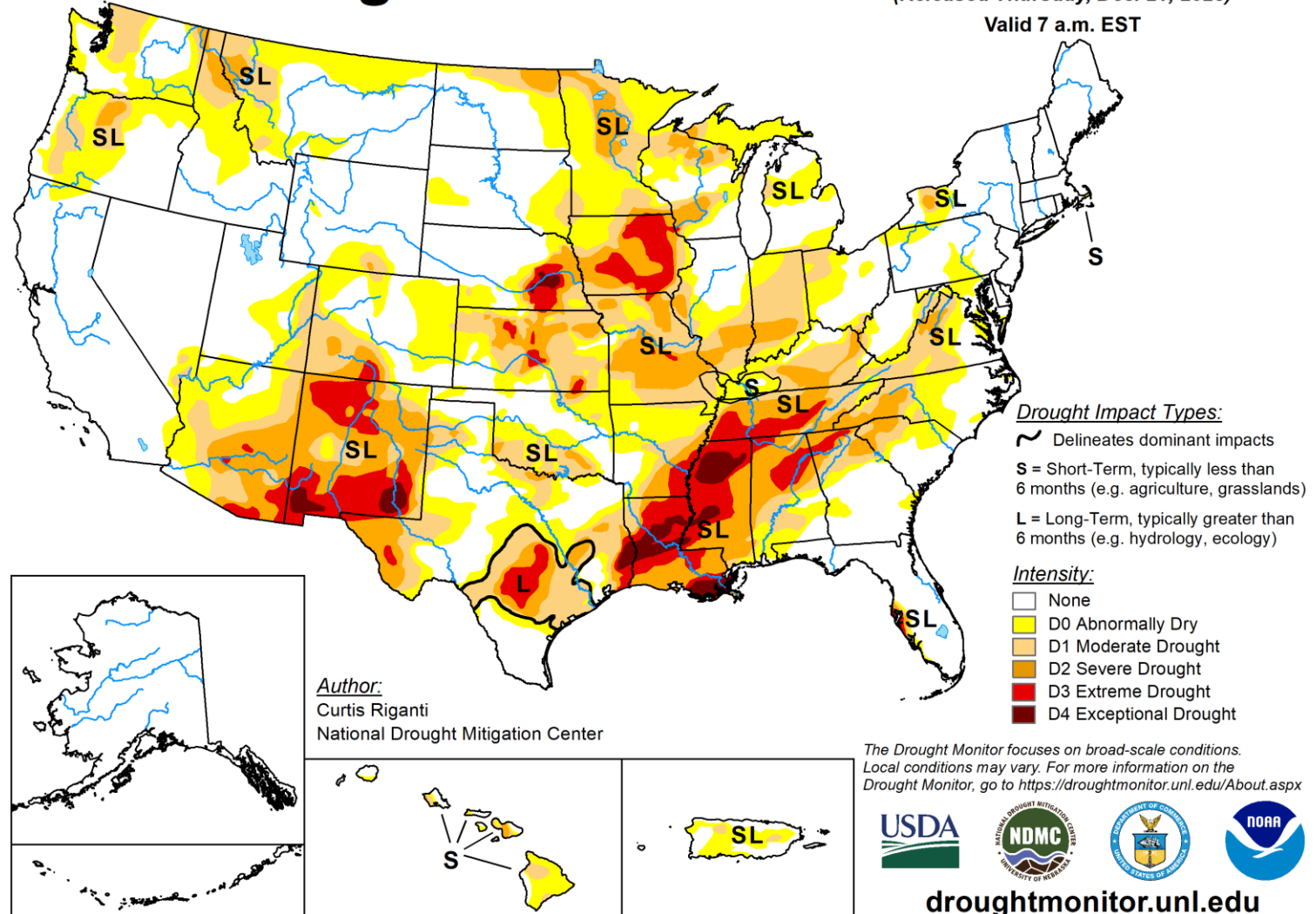
Current U.S. Drought

~33.3% of the contiguous U.S. is in drought (down ~4% since early November)

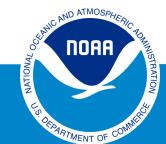
- Drought conditions lessened/diminished: Northwest & Northern Tier, Texas & Gulf Coast, Carolinas and Virginia
- Drought conditions expanded/intensified: Midwest
- Outside the contiguous U.S.: Drought coverage lessened across Hawaii

U.S. Drought Monitor

December 19, 2023
(Released Thursday, Dec. 21, 2023)
Valid 7 a.m. EST

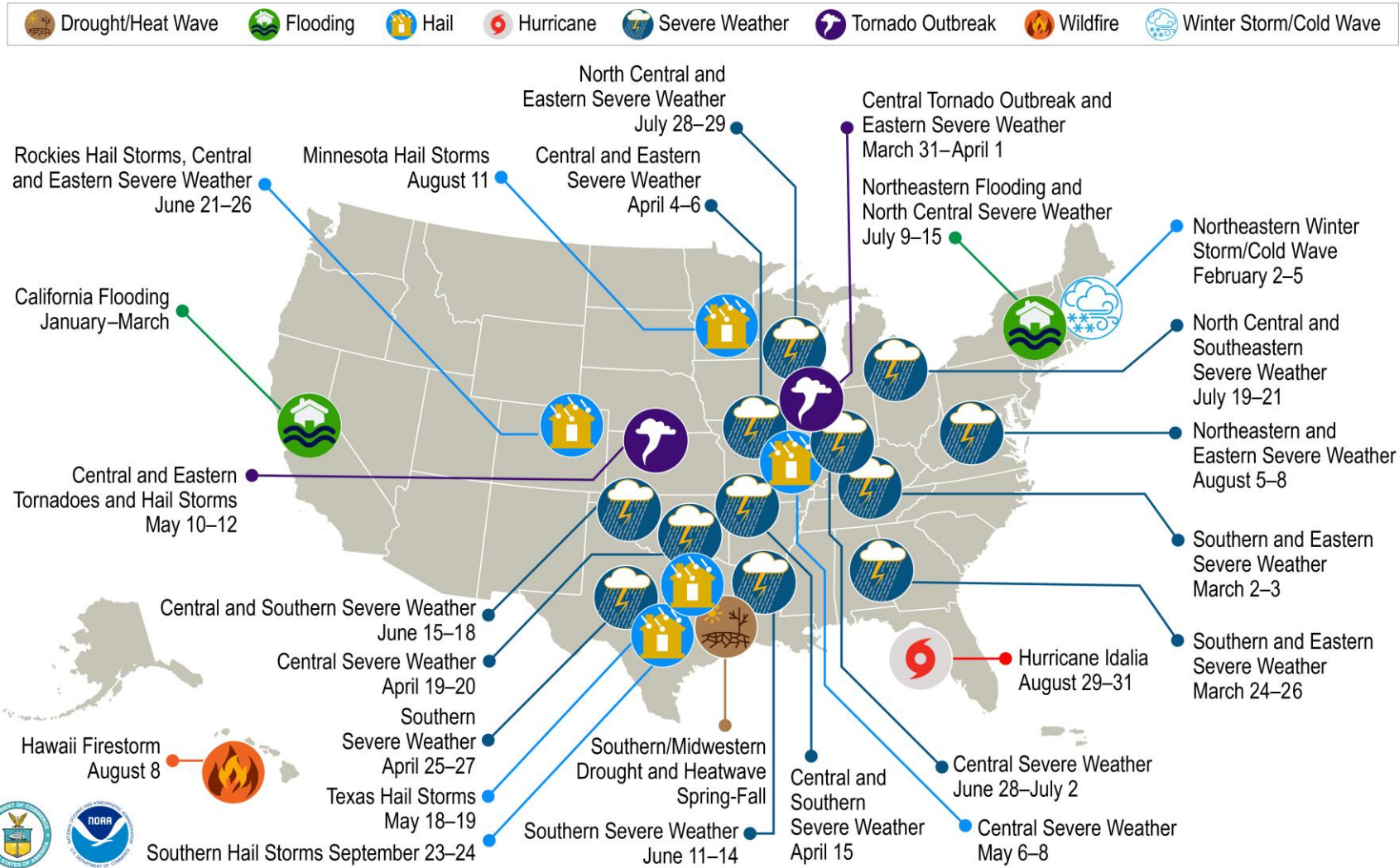


droughtmonitor.unl.edu

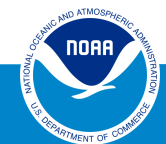


Billion Dollar Weather & Climate Disasters

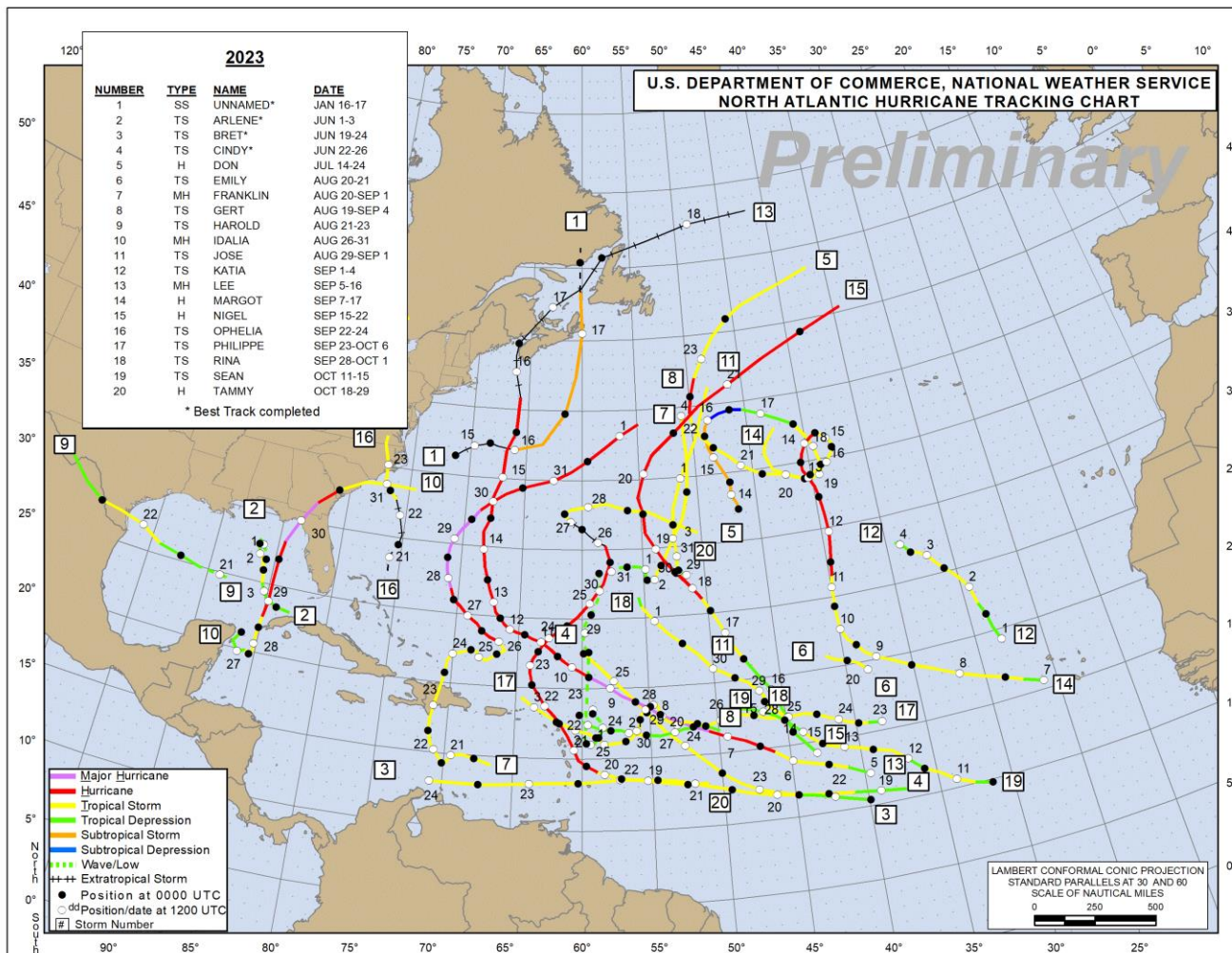
U.S. 2023 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the 25 separate billion-dollar weather and climate disasters that impacted the United States through November 2023.



2023 Atlantic Hurricane Season

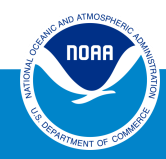


Category	Observed	Normal
Named storms	20	14
Hurricanes	7	7
Major Hurr	3	3
ACE	145 kts ² (150%)	96.7 kts ²

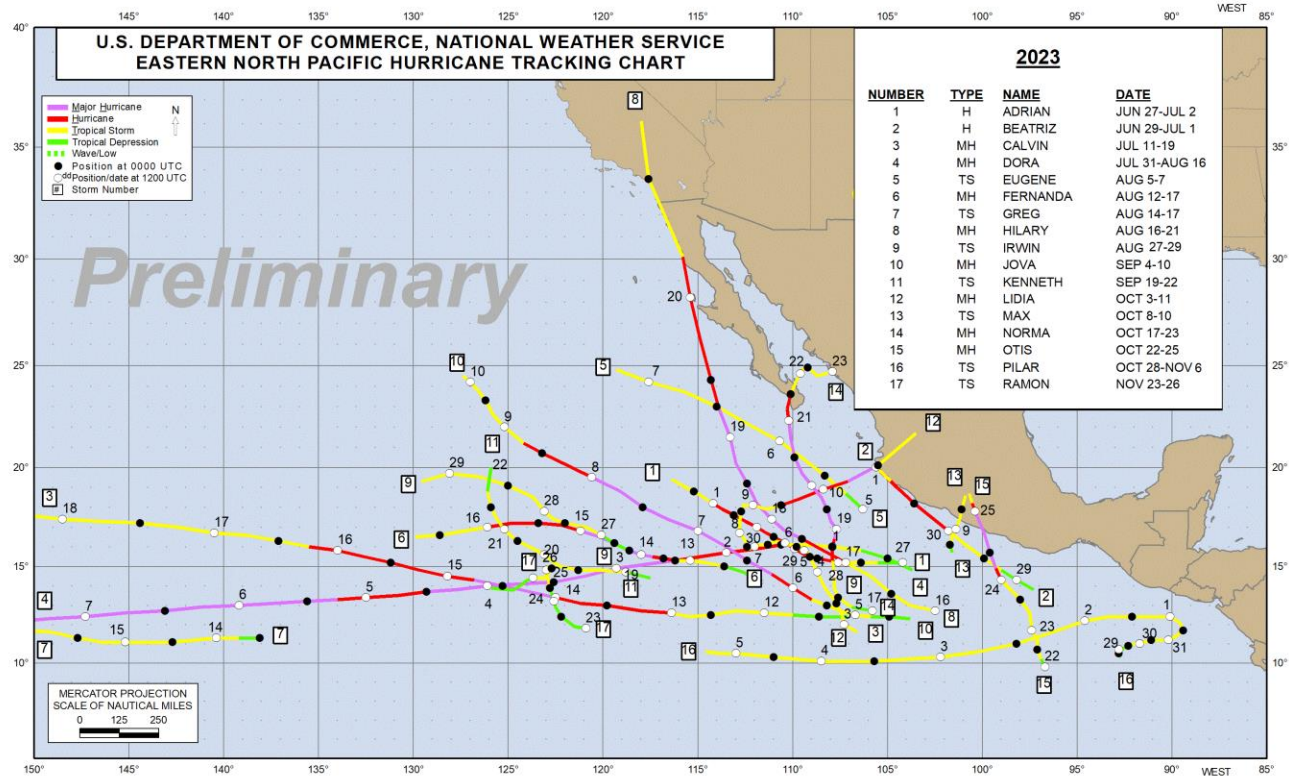
4th most Named storms on record (1950 onward)

Hurricane Idalia – only landfalling hurricane, bringing inundation of 7-12 feet.

Tropical Storm Ophelia caused flooding in North Carolina.

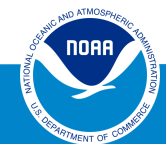


2023 East Pacific Hurricane Season



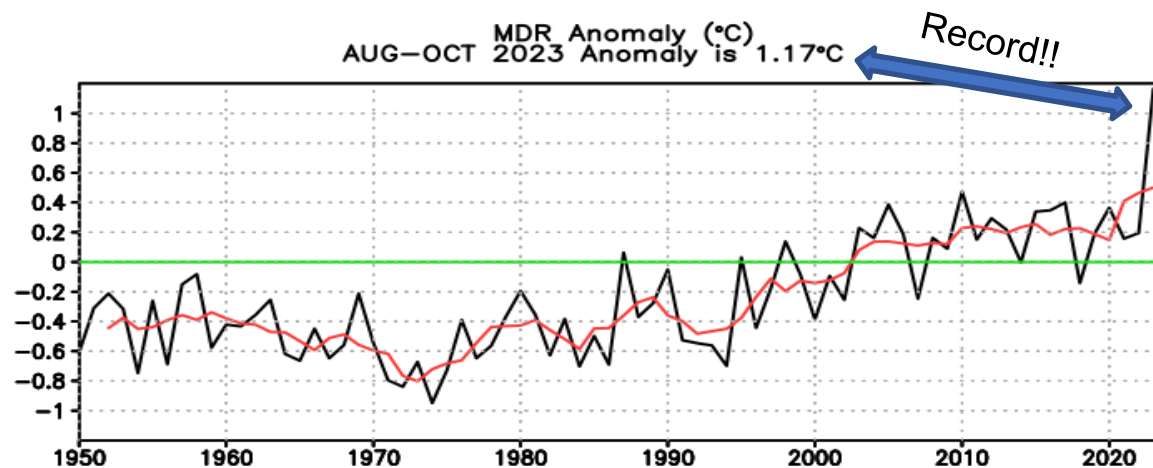
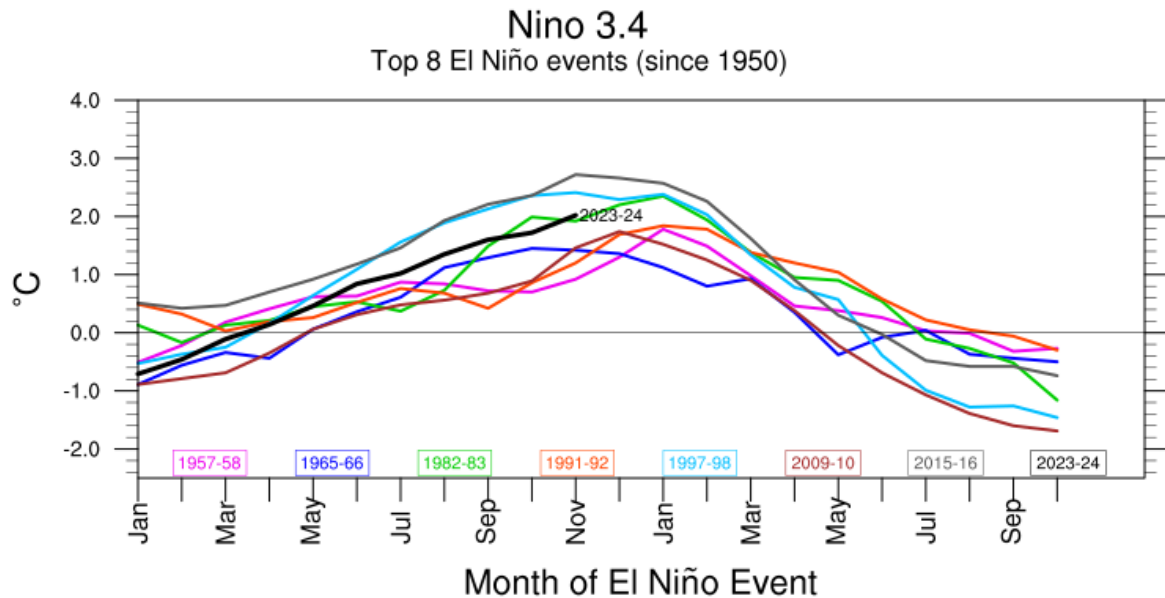
Category	Observed	Normal
Named storms	17	15
Hurricanes	10	8
Major Hurr	8	4
ACE	133 kts ² (137%)	97.2 kts ²

Hurricane Otis - Strongest east Pacific basin hurricane landfall in the modern era
 165 mph (Cat5)
 Hurricane Hilary – First issuance of tropical watches and warnings by NHC for California

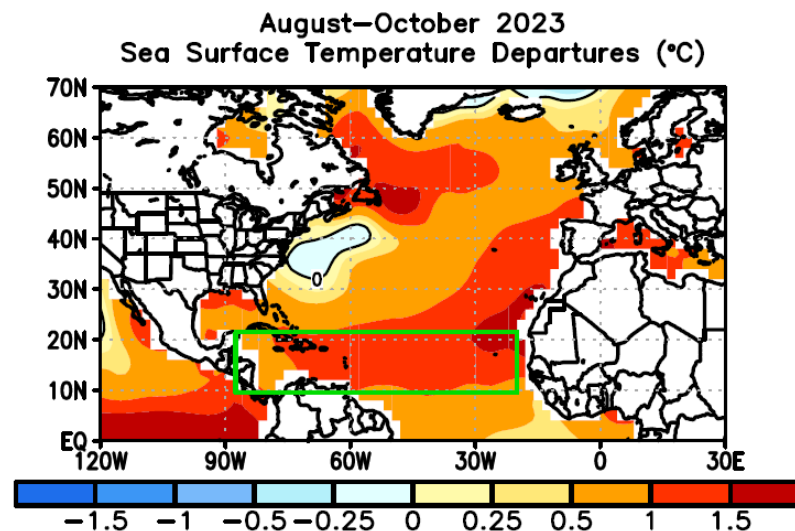


2023 Atlantic Hurricane Season

Two major climate forcings – El Niño and record warm Atlantic Sea Surface Temperatures
 El Niño usually means less tropical activity, while warm SSTs typically mean more.



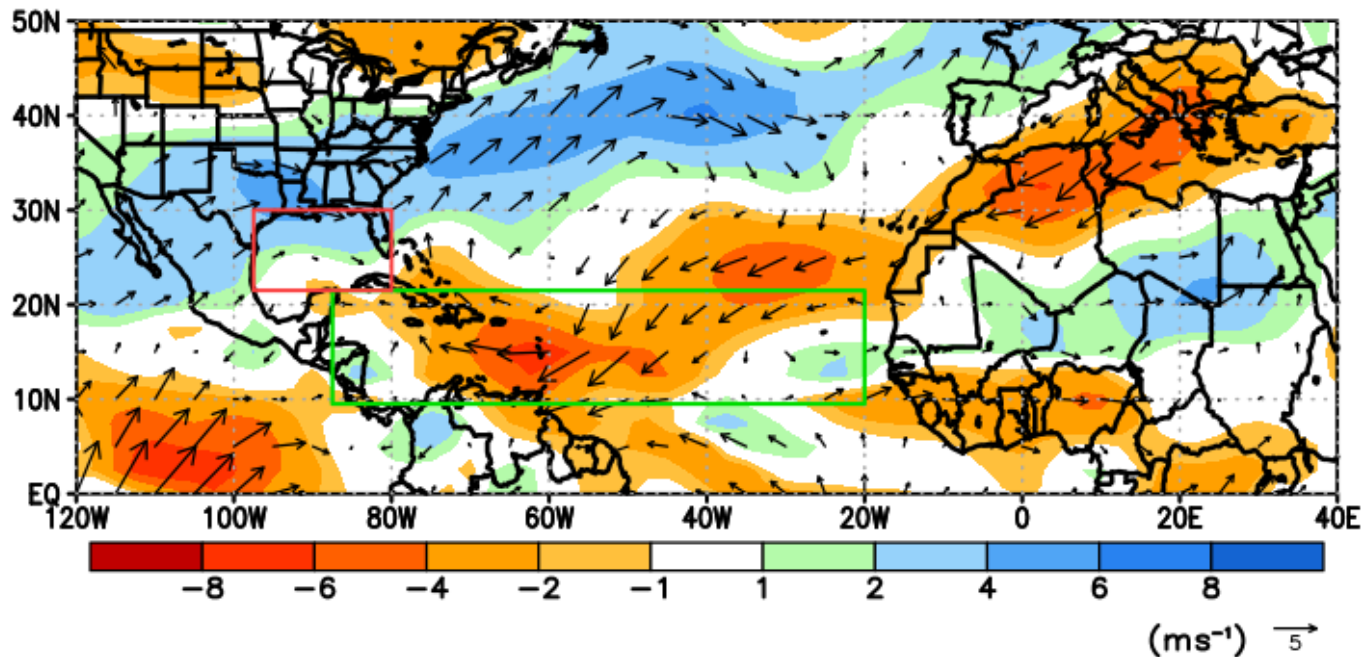
Given that we had the 4th most on record, initial thoughts are that the Atlantic SSTs (local conditions) dominated, but El Niño may have impacted the season in other ways.



2023 Atlantic Hurricane Season

August–October 2023

200–850–hPa Vertical Wind Shear Anomaly



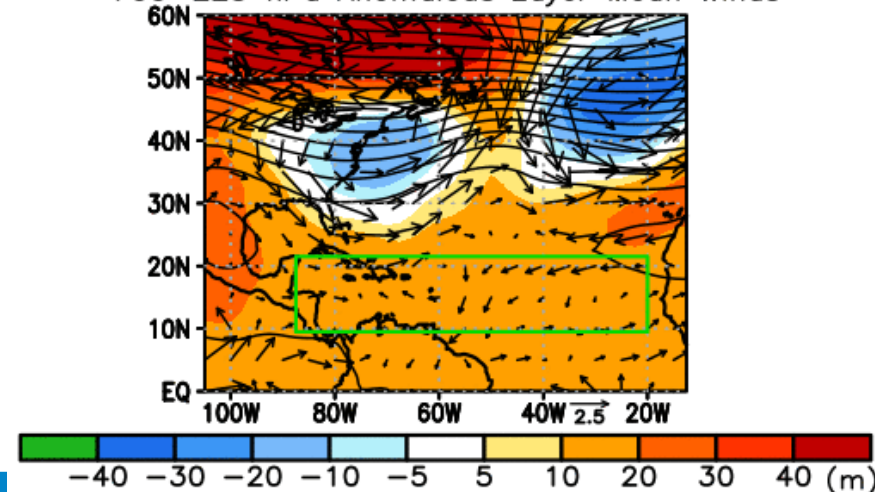
Wind Shear was relatively high over the Gulf of Mexico and Western Caribbean – Very typical of El Niño impacts.

Wind Shear was quite low over the main development region (MDR) (8th lowest since 1950).

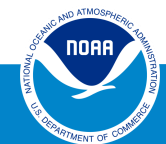
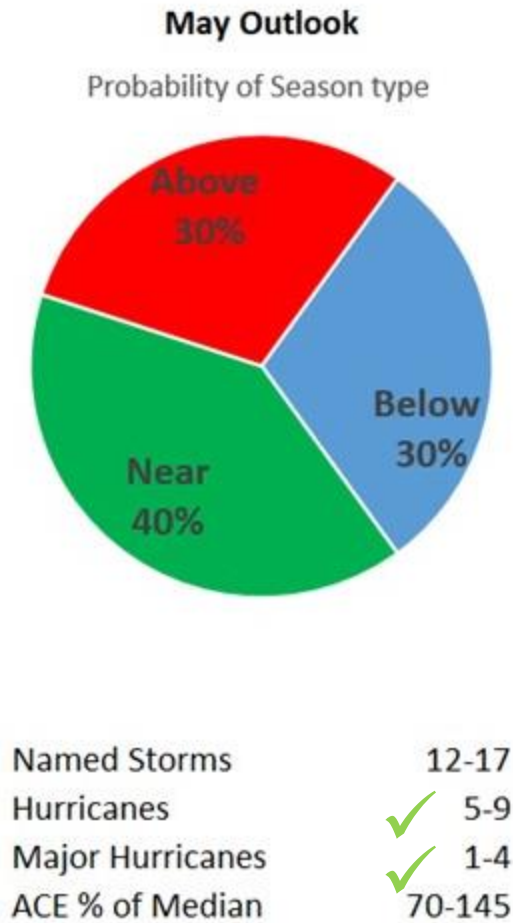
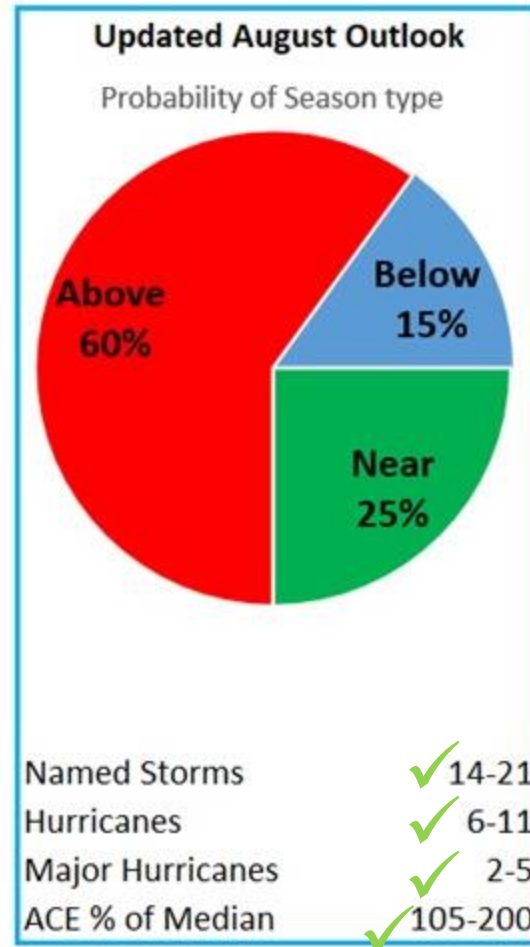
60% of named storms (12) formed in MDR (higher fraction than normal), while only 10% formed in the Gulf of Mexico (2), a lower fraction than normal.

Overall, the steering currents that determine the hurricane paths were directed away from the coast of the U.S, resulting in a low amount of landfalling storms despite high activity.

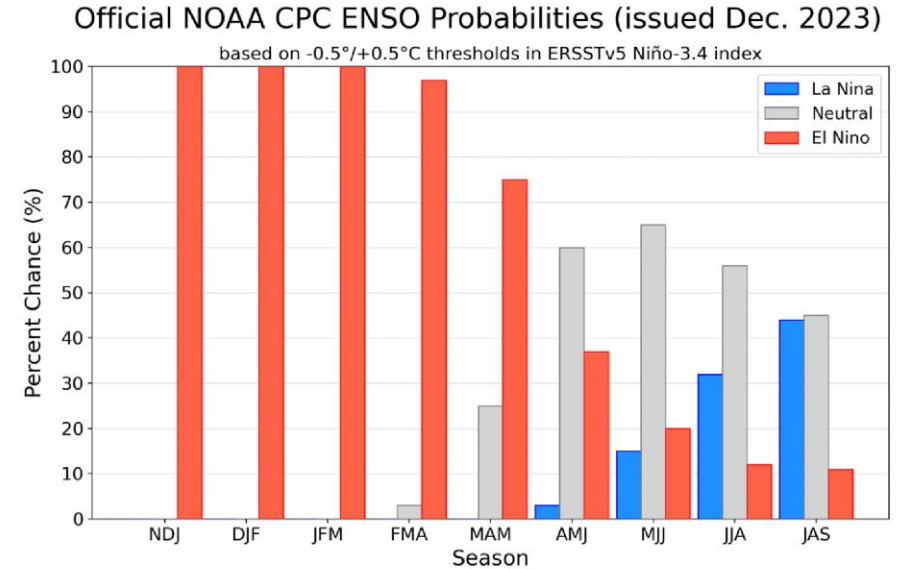
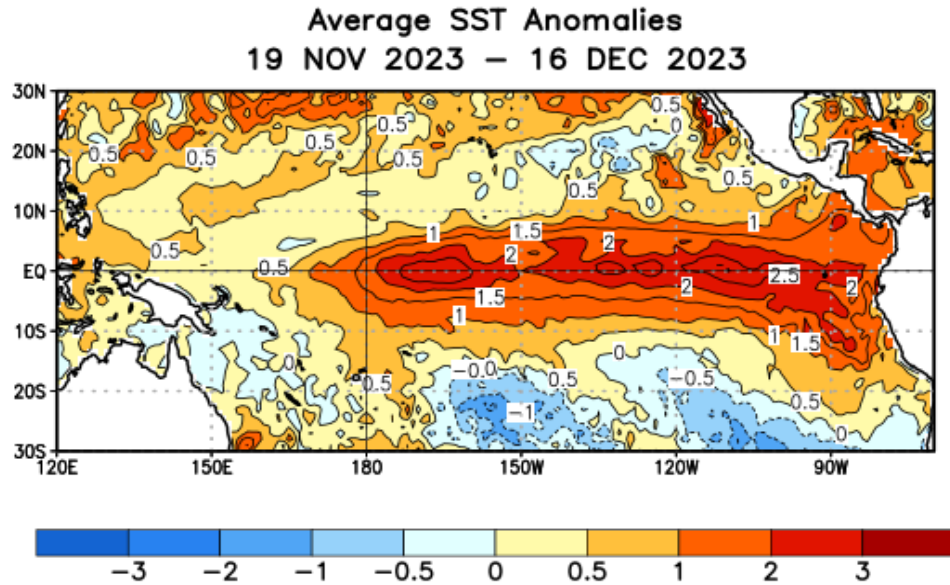
AUG–OCT 2023 500 Heights and Anomalies
700–225 hPa Anomalous Layer Mean Winds



2023 Atlantic Hurricane Season Preliminary Verification



Sea Surface Temperatures and ENSO



- Sea surface temperatures

- In the last four weeks, equatorial SSTs were above average across most of the Pacific Ocean, with near average SSTs in the western Pacific Ocean.
- The tropical Pacific atmospheric anomalies are consistent with El Niño.

- ENSO forecast

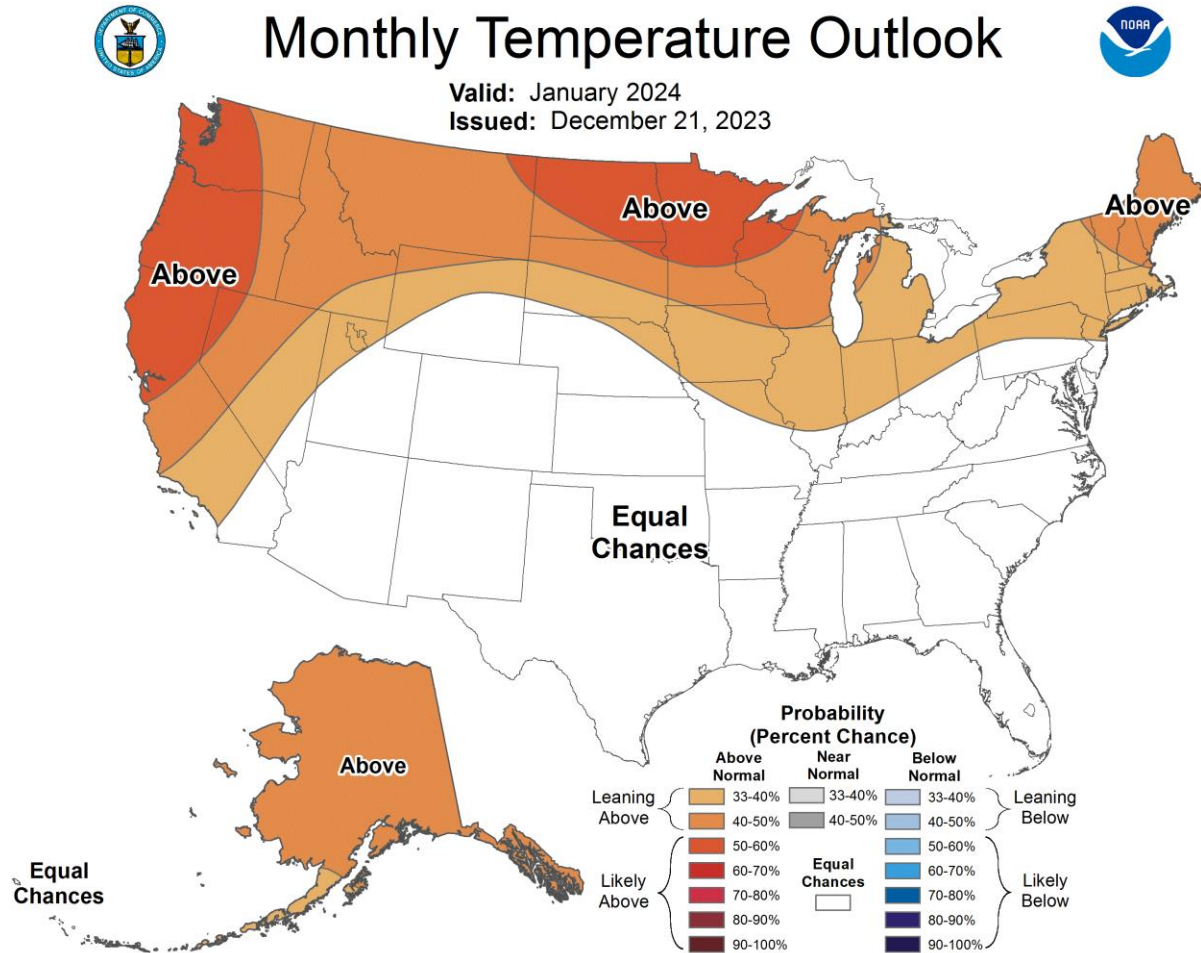
- El Niño is expected to continue through the Northern Hemisphere winter, with a transition to ENSO-neutral favored during April-June 2024 (60% chance).
- There is now a 54% chance of a "historically strong" El Niño during the November-January season ($\geq 2.0^{\circ}\text{C}$ in Niño-3.4)

Monthly Forecast (January)

January Average
Temperature Probability

Monthly Temperature Outlook

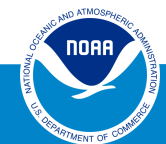
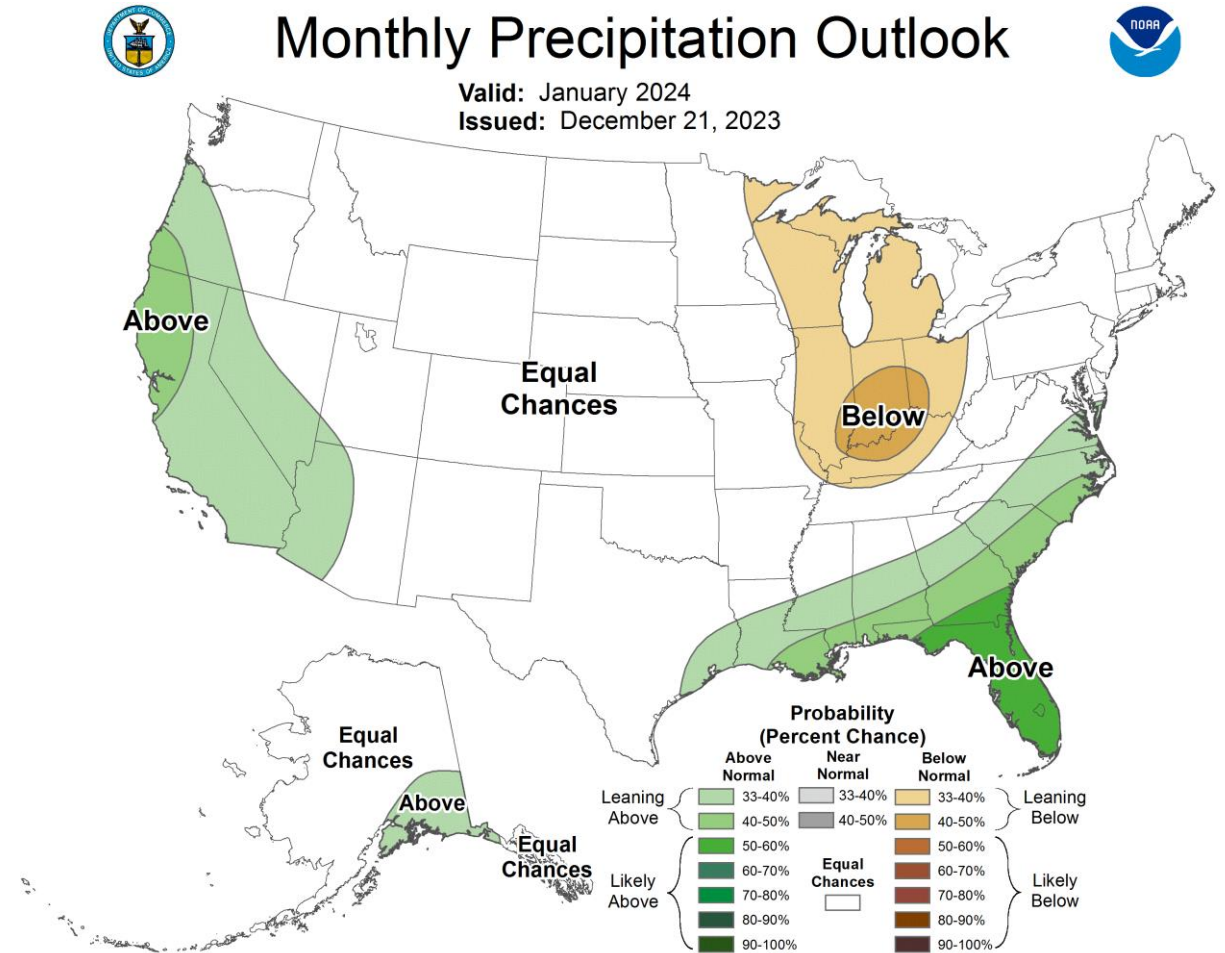
Valid: January 2024
Issued: December 21, 2023



January Total
Precipitation Probability

Monthly Precipitation Outlook

Valid: January 2024
Issued: December 21, 2023



Three-Month Forecast (Jan-Feb-Mar)

Jan-Feb-Mar Average
Temperature Probability

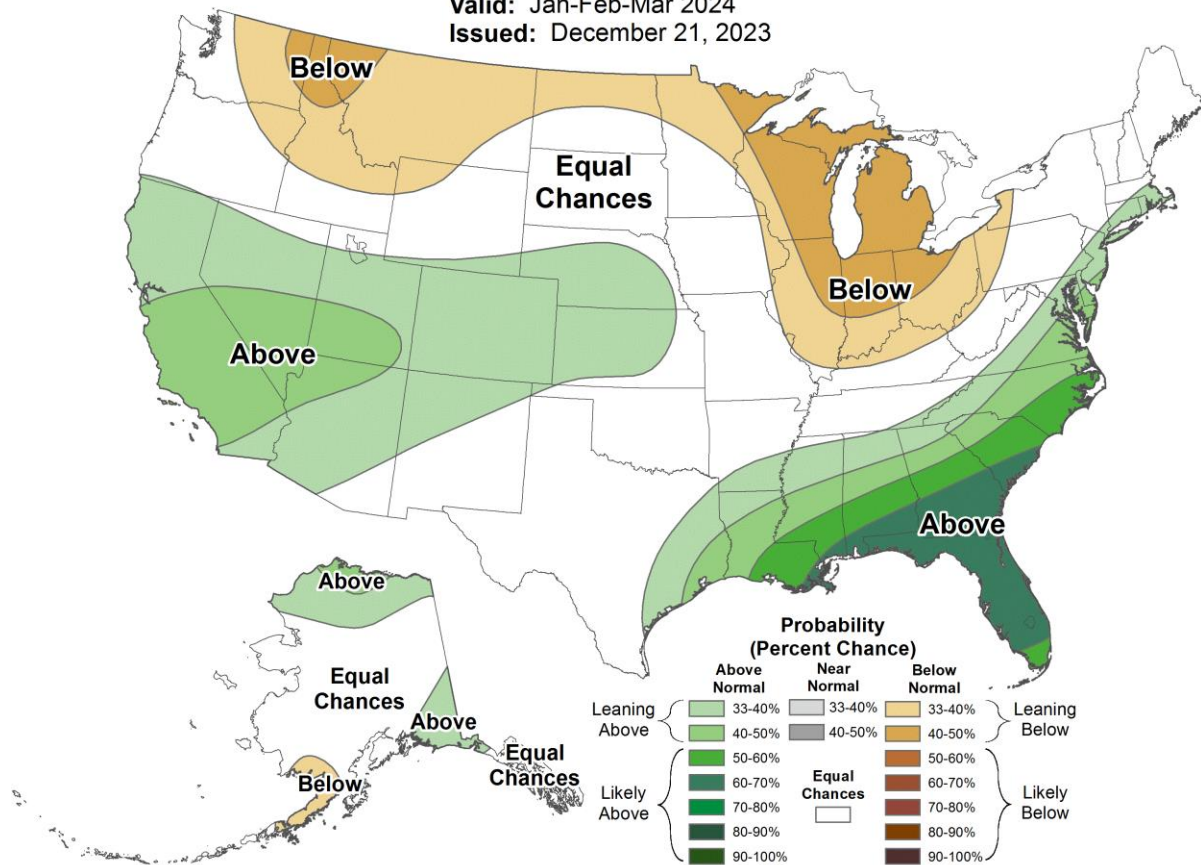
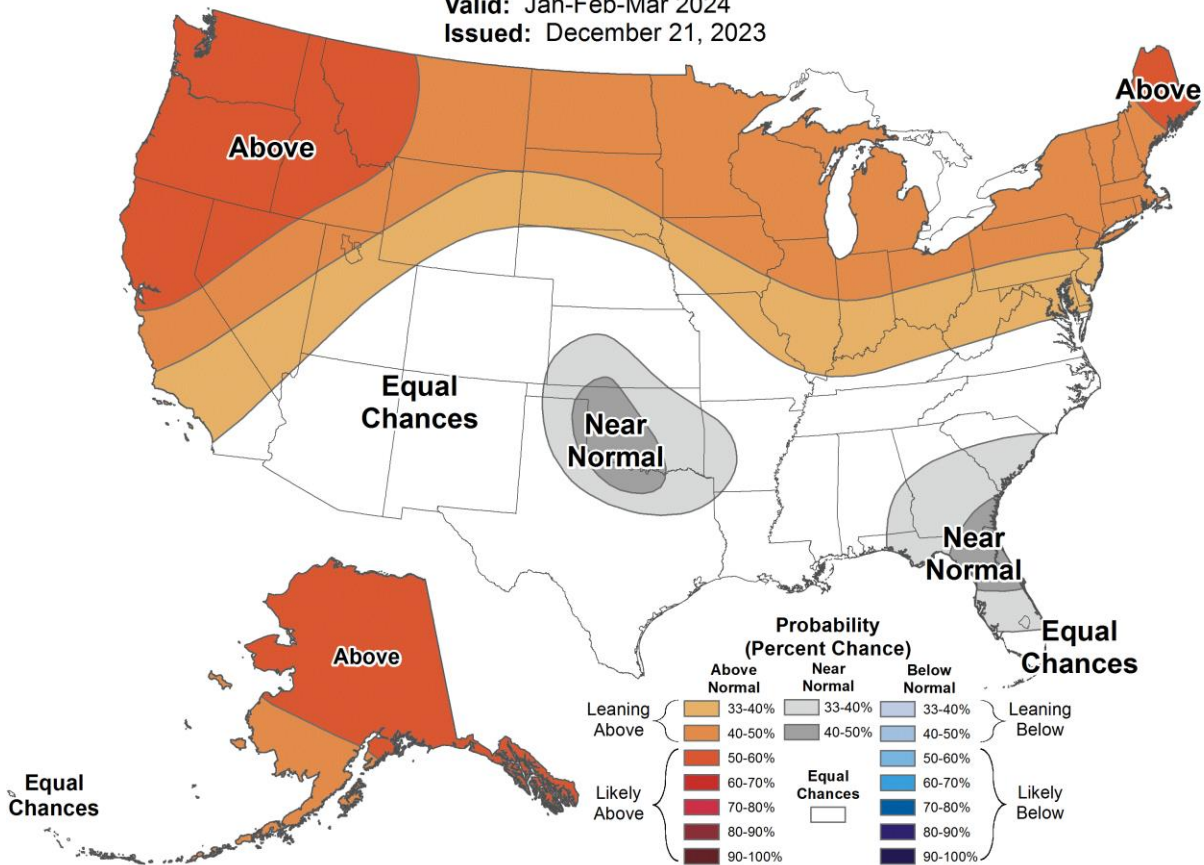
Jan-Feb-Mar Total
Precipitation Probability

Seasonal Temperature Outlook

Seasonal Precipitation Outlook

Valid: Jan-Feb-Mar 2024
Issued: December 21, 2023

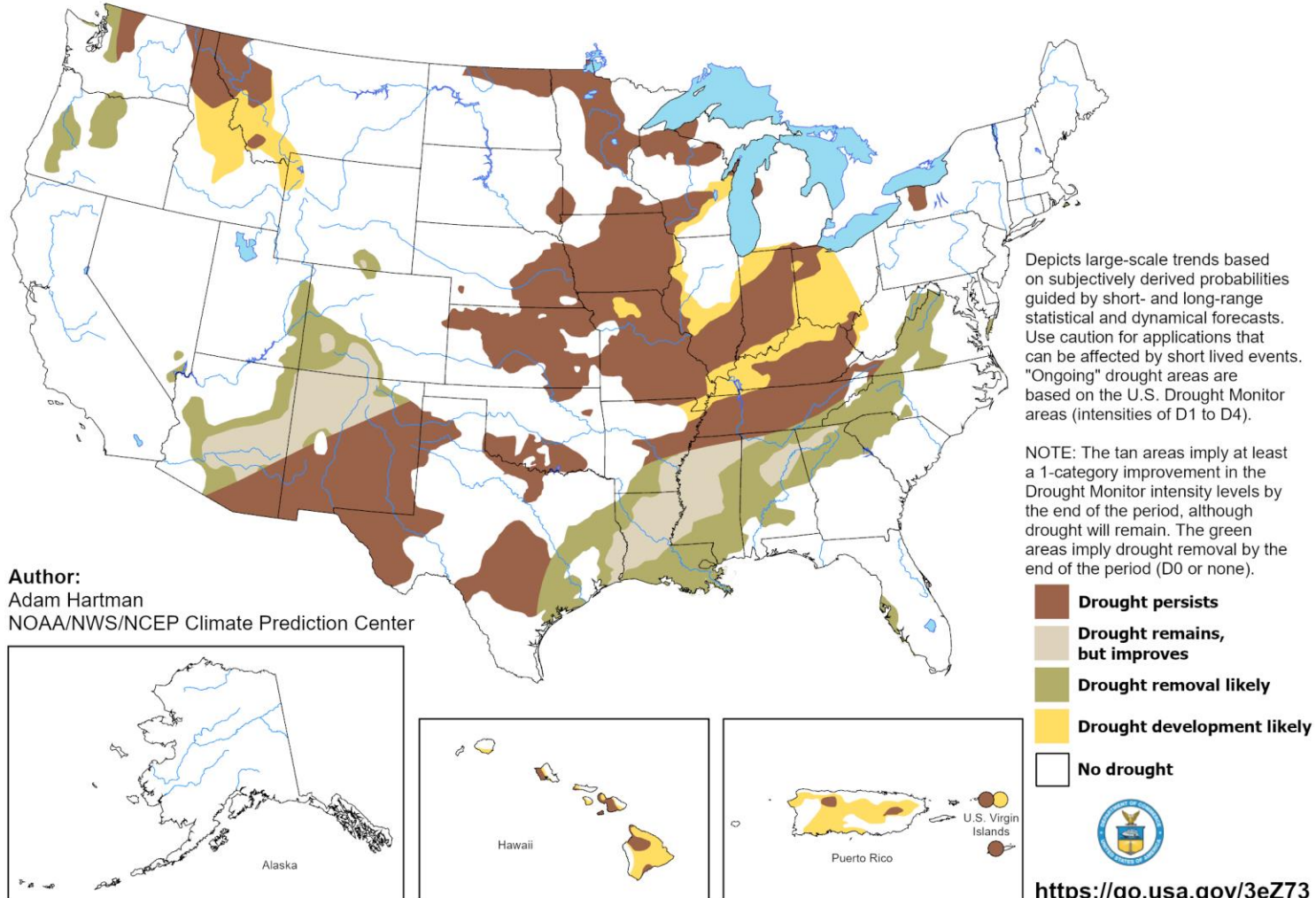
Valid: Jan-Feb-Mar 2024
Issued: December 21, 2023



Drought Outlook

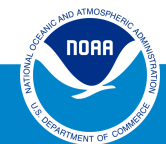
U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for December 21, 2023 - March 31, 2024
Released December 21, 2023



Author:
Adam Hartman
NOAA/NWS/NCEP Climate Prediction Center

<https://go.usa.gov/3eZ73>



For More Information



Today's presentation:

- <https://www.ncei.noaa.gov/access/monitoring/monthly-report/briefings>

NOAA's National Centers for Environmental Information: www.ncei.noaa.gov

- Monthly climate reports (U.S. & Global): <https://www.ncei.noaa.gov/access/monitoring/monthly-report/>
- Dates for upcoming reports: <https://www.ncei.noaa.gov/access/monitoring/dyk/monthly-releases>

NOAA's Climate Prediction Center: www.cpc.ncep.noaa.gov

U.S. Drought Monitor: www.drought.gov

Climate portal: www.climate.gov

NOAA media contacts: john.jones-bateman@noaa.gov, 202-424-0929 (NOAA/NESDIS PAO)

