NOAA Climate Science and Services Monthly Climate Update

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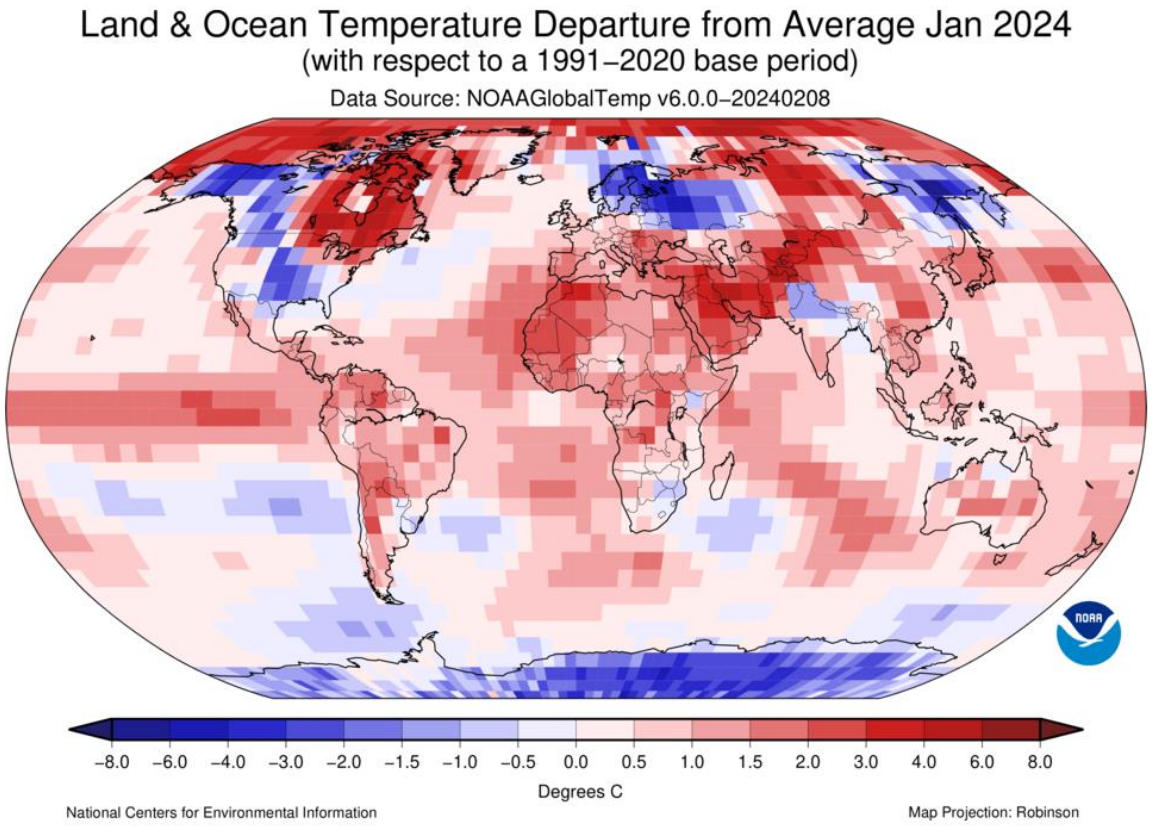
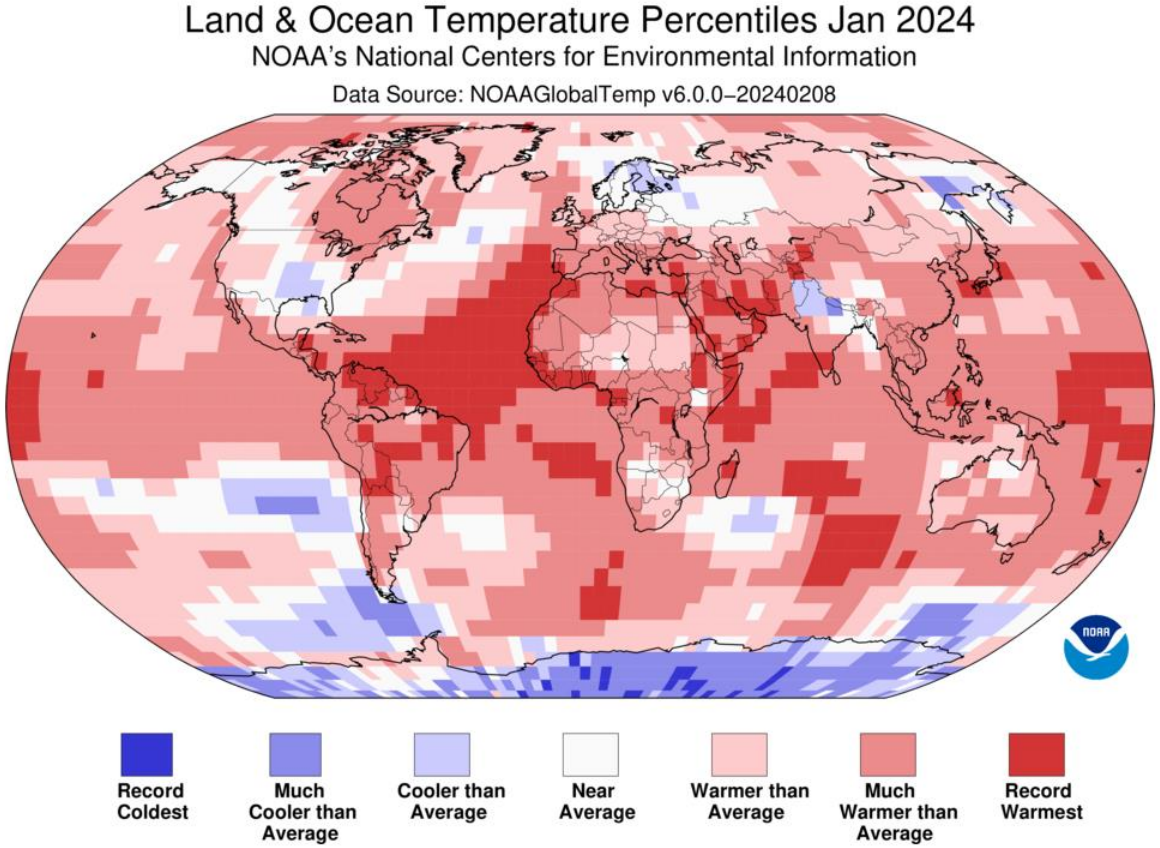
January 2024

January 2024 Global Temperature

The global temperature record dates back to 1850 (175 years)



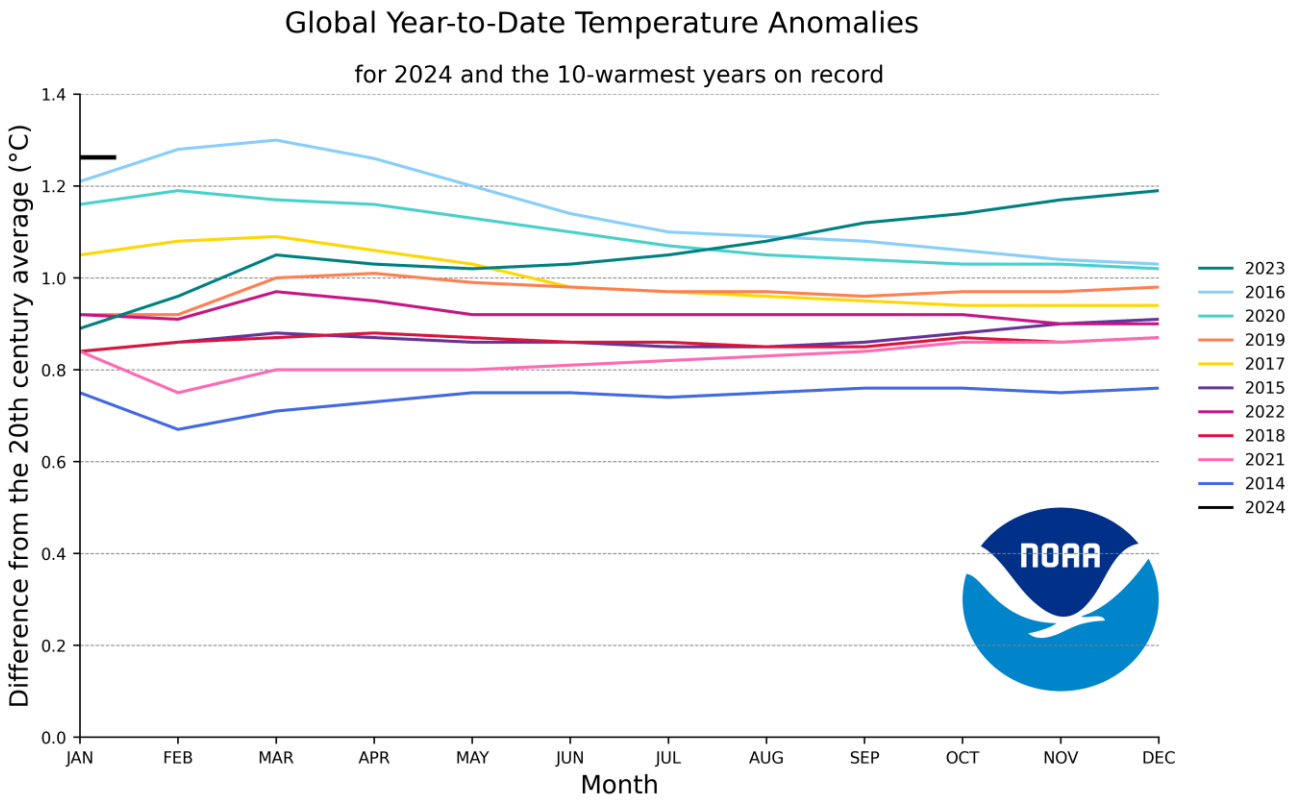


- **Global Land & Ocean:** +1.27°C/ +2.29°F; **warmest** for January on record
- **Global Land-only:** +1.82°C / +3.28°F; **3rd warmest** for January on record
- **Global Ocean-only:** +1.03°C / +1.85°F; **warmest** for January on record

January Global Temperature

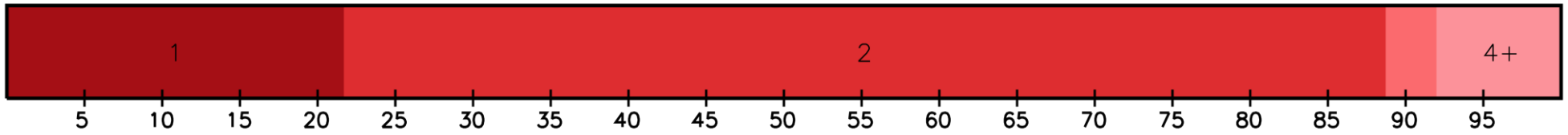
The global temperature record dates back to 1850 (175 years)

Global Land & Ocean: +1.27°C (+2.29°F); the ***warmest*** January on record



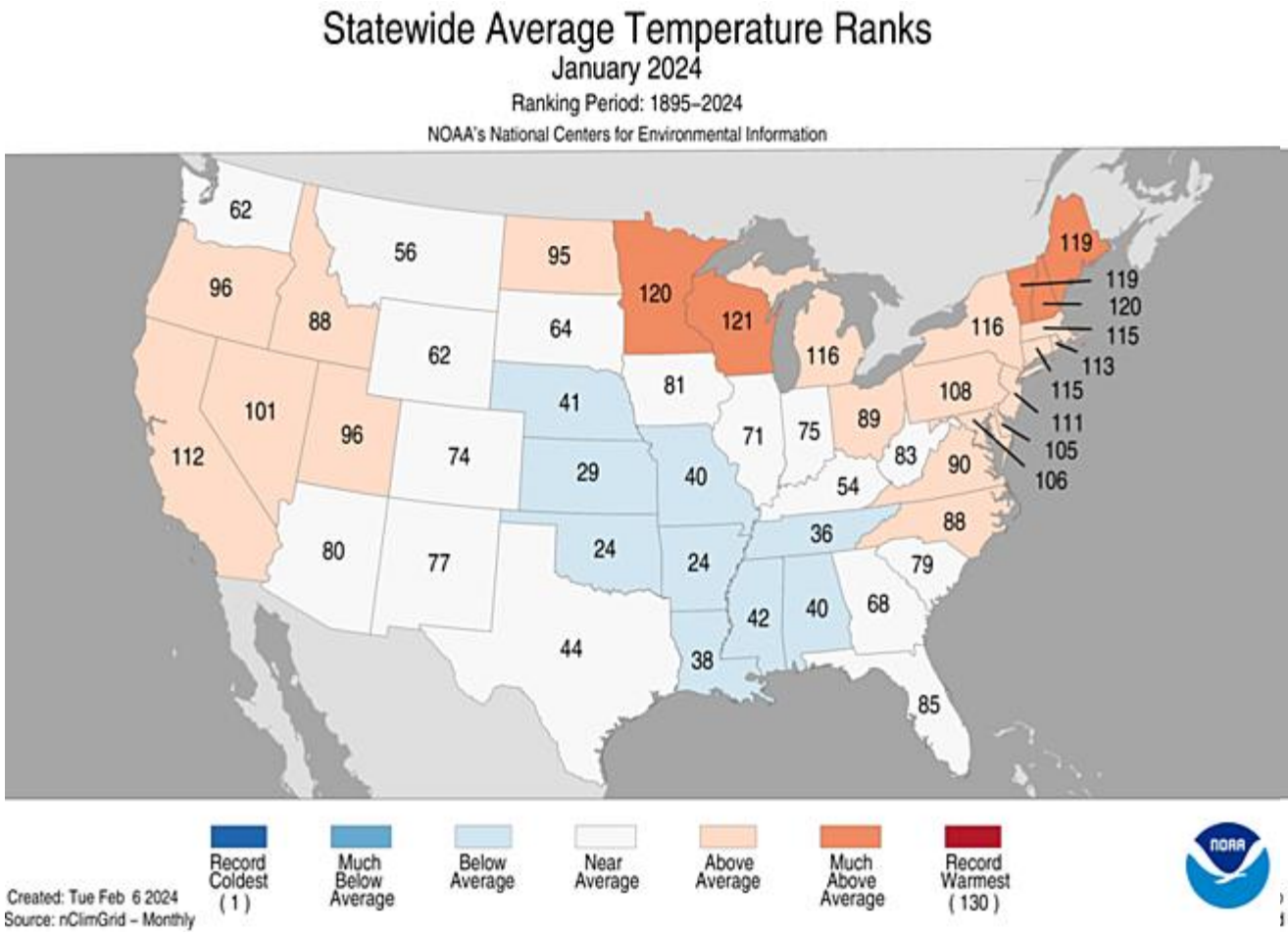
~22% chance 2024 will be warmest year on record

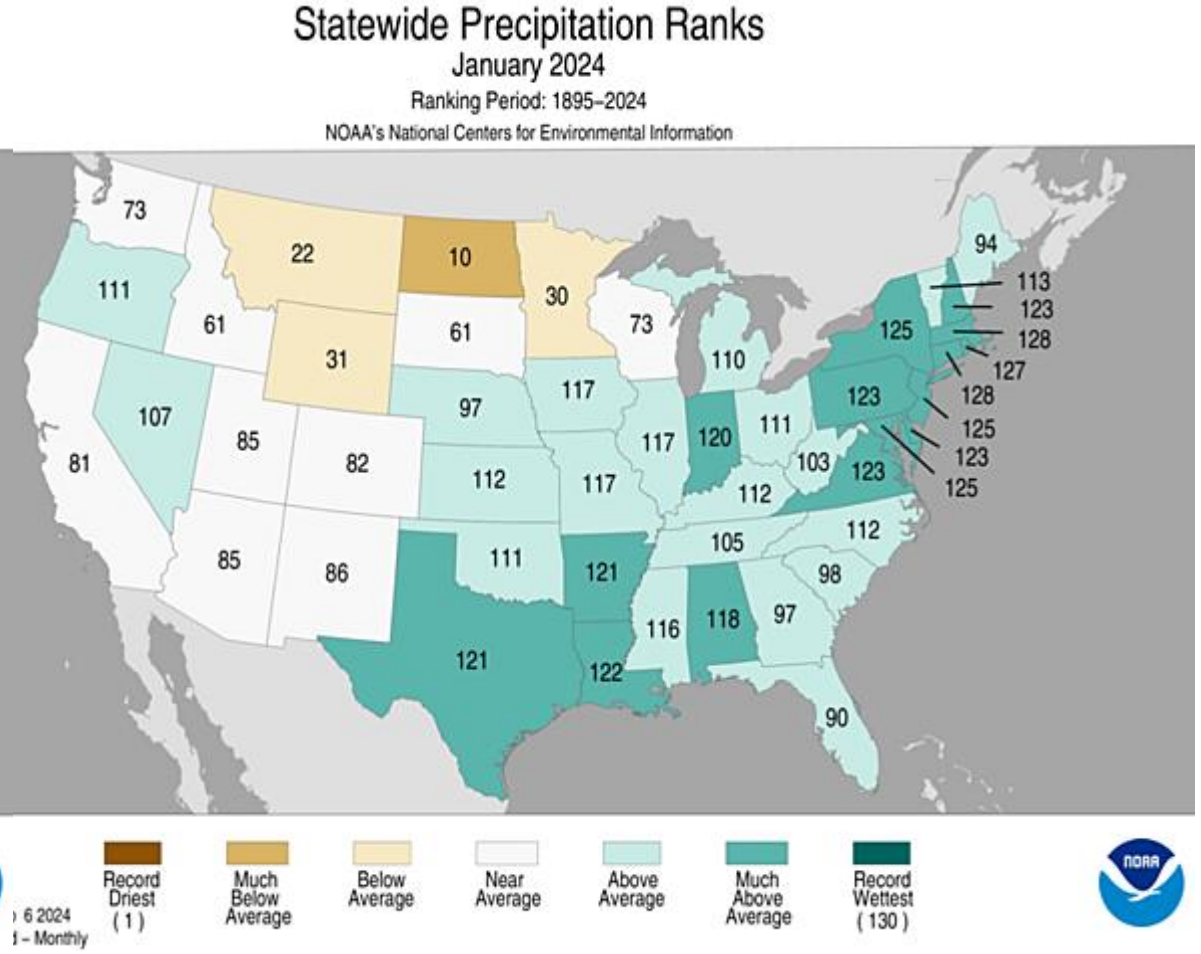
~99% chance 2024 will be a top 5 year



Contiguous U.S. January 2024

The U.S. temperature record dates back to 1895 (130 years)



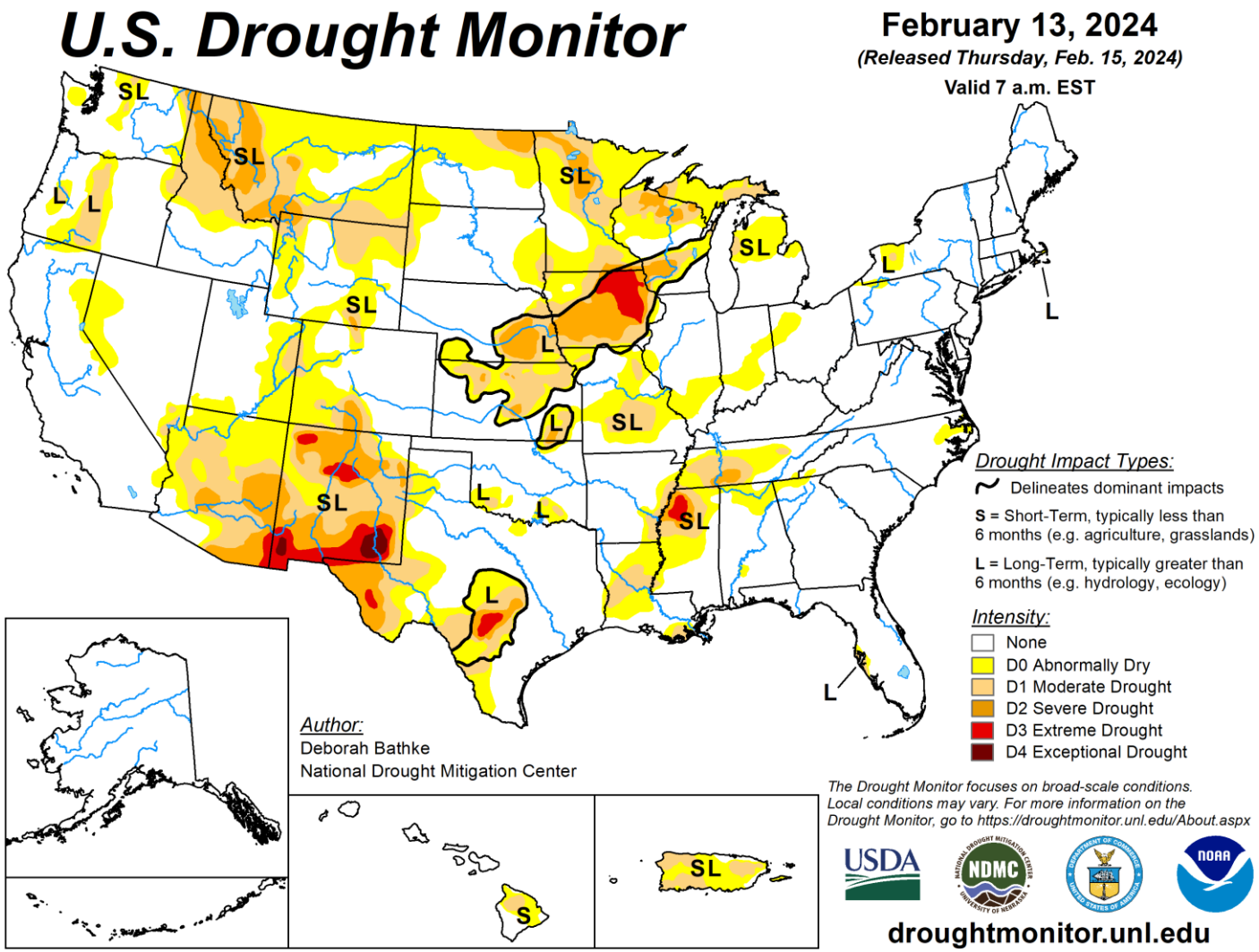


- **Temperature:** 31.8°F, +1.6°F; **near average**
- **Precipitation:** 3.18 inches, +0.87 inch; **10th wettest**

Current U.S. Drought

~19.5% of the contiguous U.S. is in drought (down ~13.5% since early January)

- **Drought conditions lessened/ diminished:** Northwest, Southwest, Midwest & c Plains. Significant drought contraction in c TX & from lower MS River Valley to VA
- **Drought conditions expanded/ intensified:** n Rockies
- **Outside the contiguous U.S.:** Drought coverage lessened across Hawaii & expanded across Puerto Rico



NOAAGlobalTemp Version 6.0.0

Product Development & Production Team:
Boyin Huang, Matt Manne, Russ Vose, Xungang Yin, Huai-Min Zhang
Climate Monitoring and Report Team: Karin Gleason, Scott Applequist, Ahira Sanchez-Lugo

National Centers for Environmental Information (NCEI)

February 15, 2024

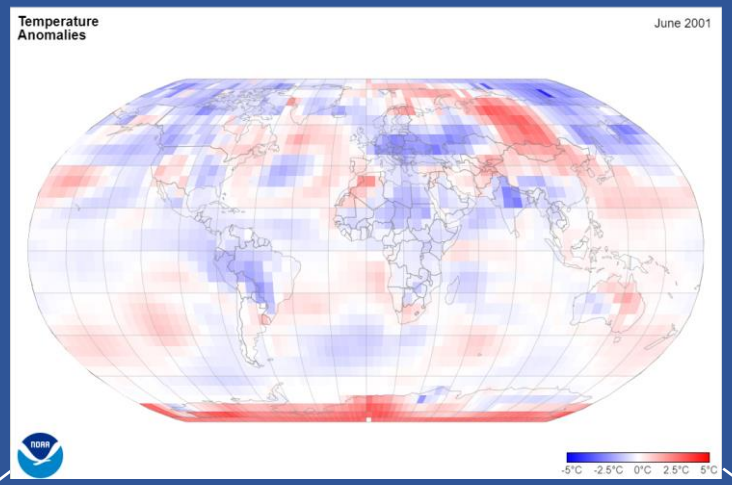
About NOAAGlobalTemp

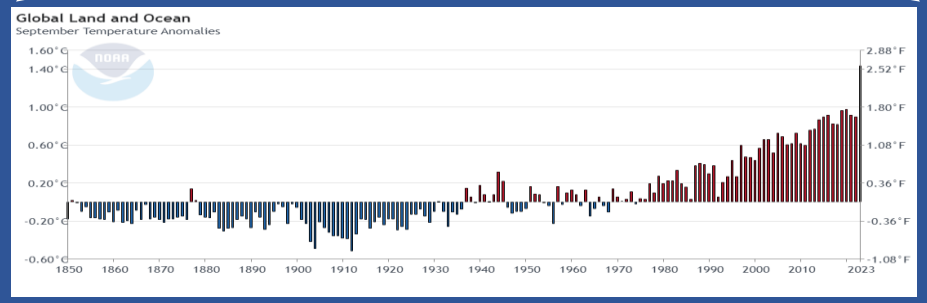
It is

- a foundational dataset
- for research/assessment

It consists of

- surface air temperature over land and the Arctic
- Sea surface temperature in oceans





Coverage & Resolution

Spatial:

- Global coverage
- 5°x5° Grids

Temporal:

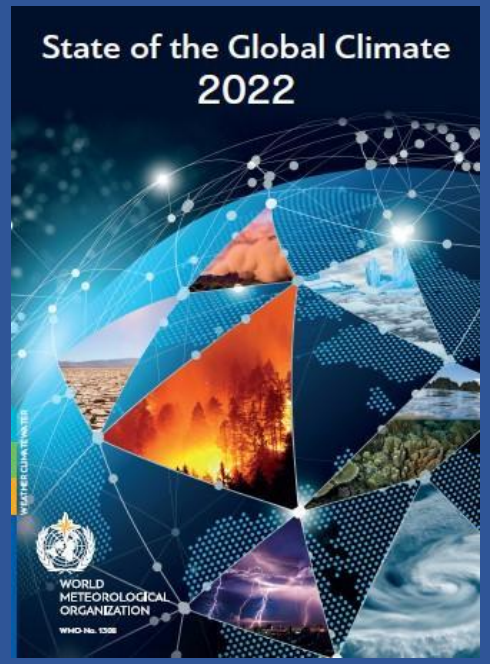
- 1850-present
- Monthly

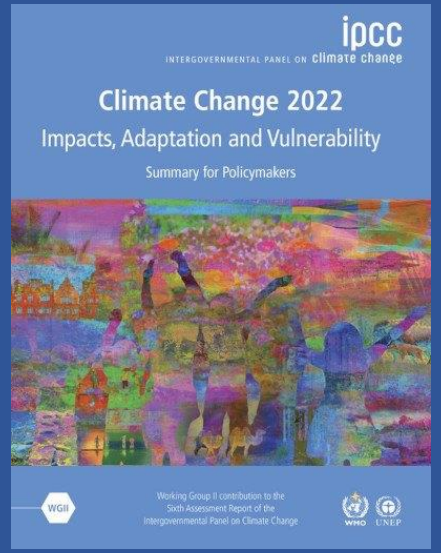
Applications

Widely used worldwide for scientific research, climate monitoring, and climate assessment:

Examples:

- **NCEI**: Climate Monitoring
- **WMO**: State of the Global Climate
- **IPCC** report

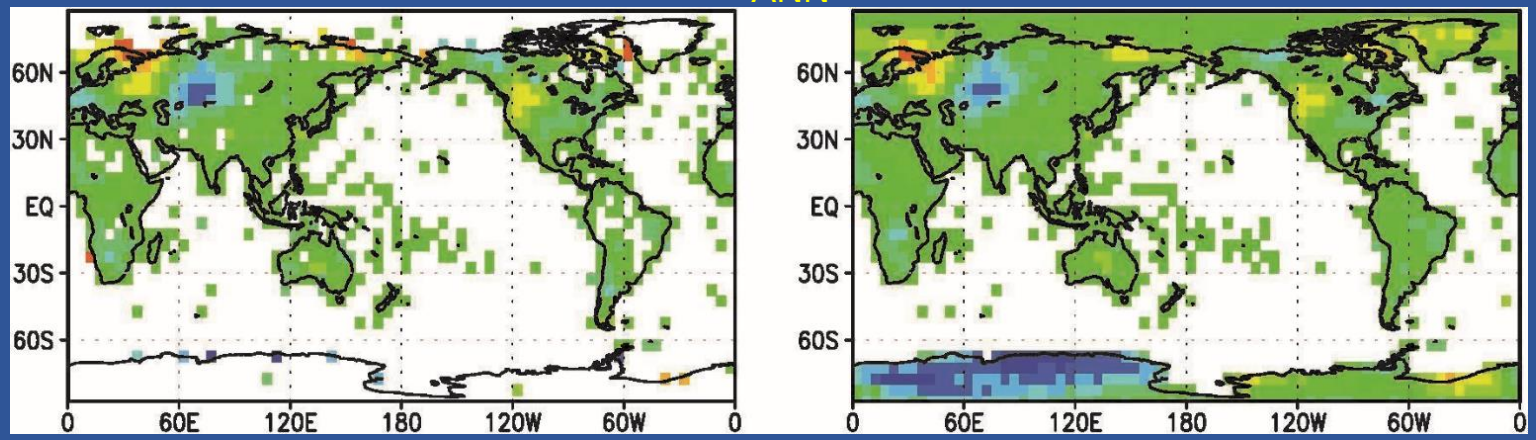




Motivation for Version 6 Update

v5.1 to v6 update:
"To improve the product by using a state-of-the-art technology. "

Original land/Arctic boxes → EOT / ANN → Gaps filled

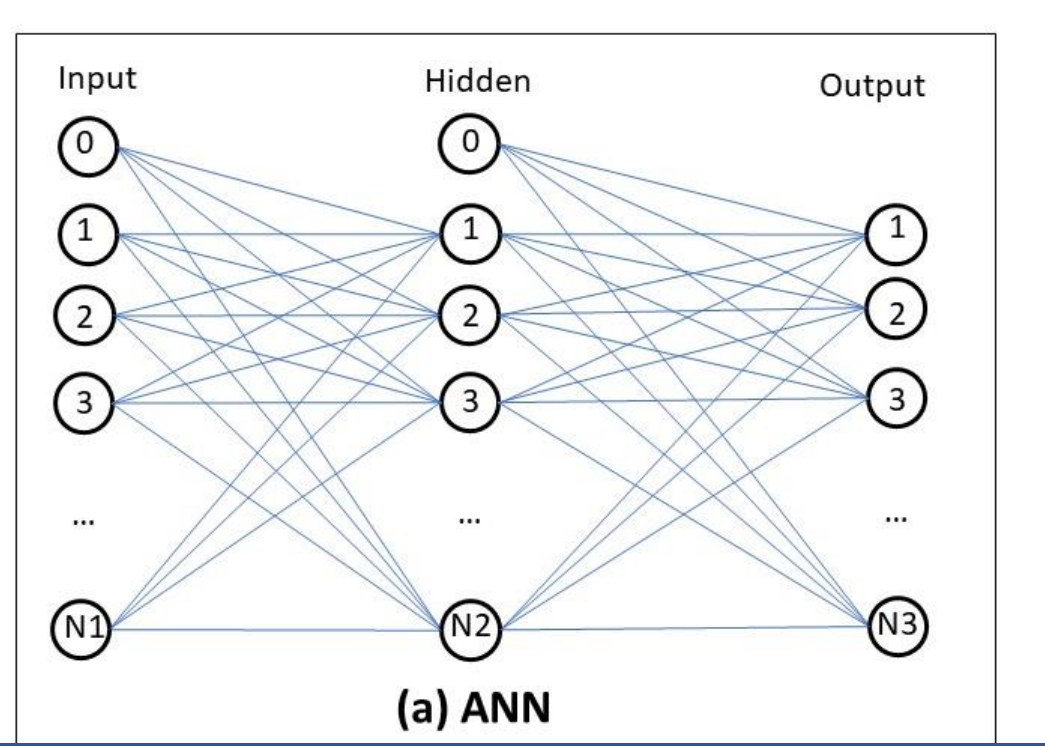


Performance comparison:

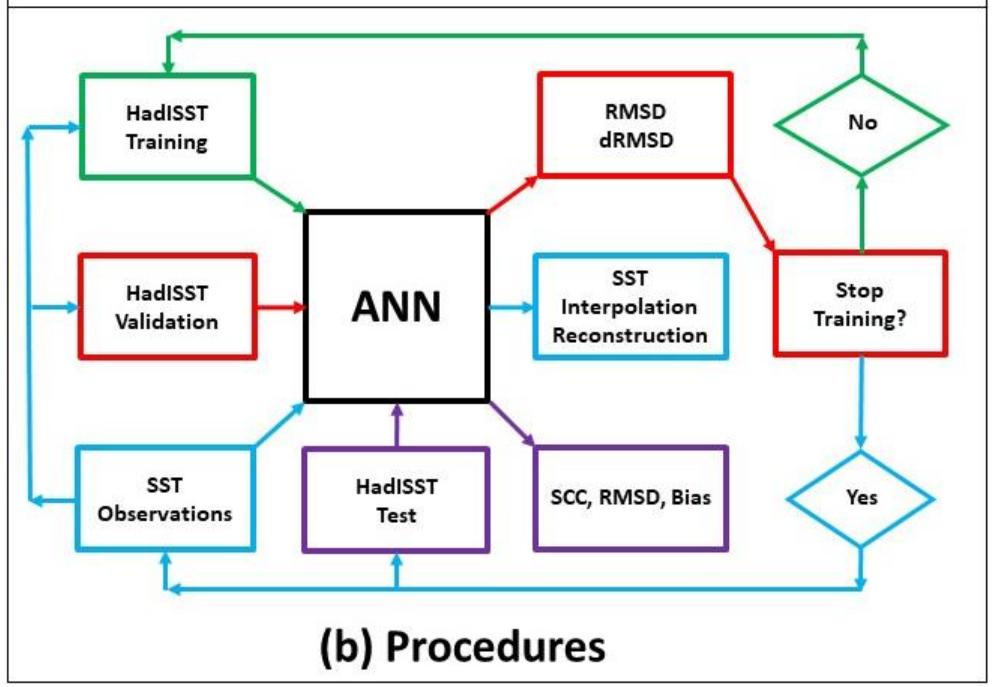
- EOT: can struggle in observation-sparse area
- ANN: improved performance in observation-sparse areas

Abbreviations **EOT**: *Empirical Orthogonal Teleconnection* **ANN**: *Artificial Neural Network*

ANN System in NOAAGlobalTemp



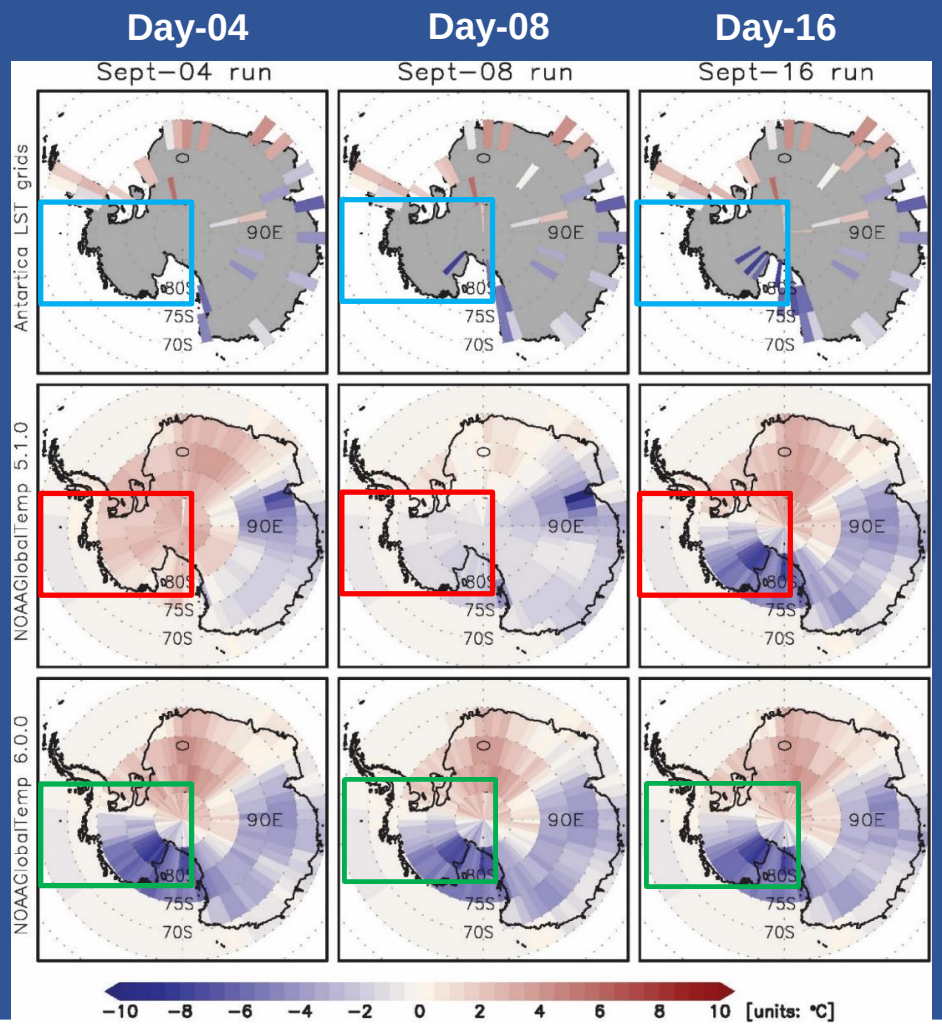
(a) ANN



(b) Procedures

New Version: More Stable and Reliable

***Example*: 2023-08 daily runs**



Impacts from data sparsity

In Day-04/08: fewer observations

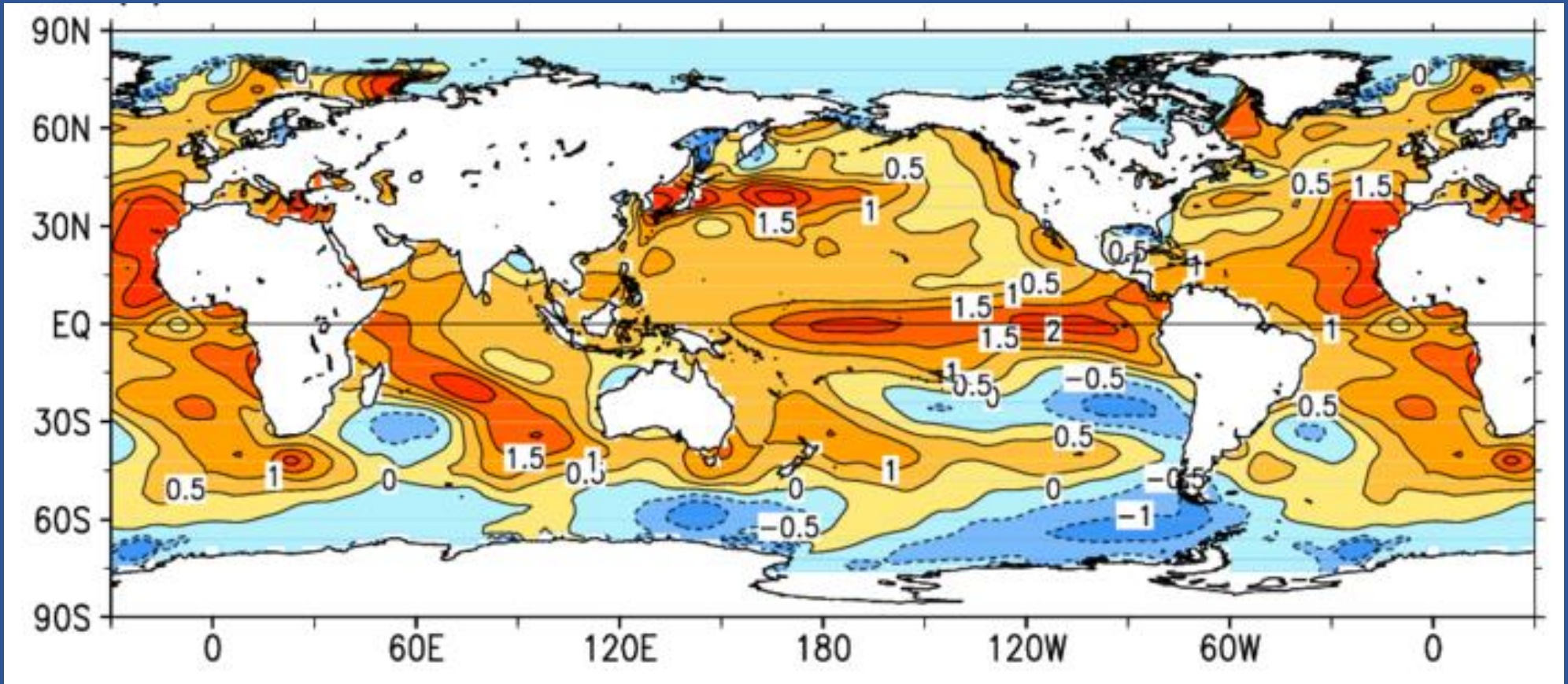
⇩

Former EOT: Cold anomaly not resolved in early days

New AI/ML ANN: successful in early days, with sparse data coverage

Same ERSSTv5 Sea Surface Temperature in Both NOAAGlobalTemp v5.1 and v6

ERSSTv5, Jan 2024

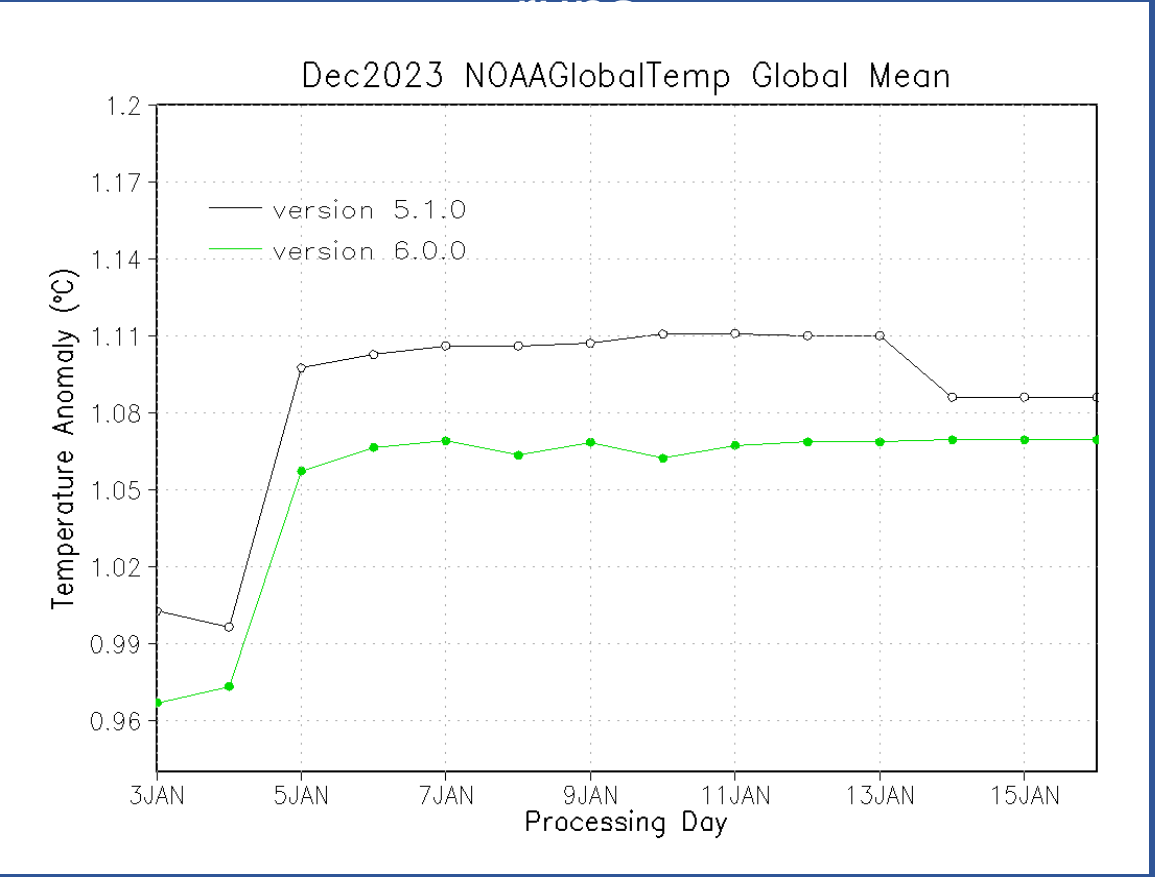


New Version: More Stable and Reliable

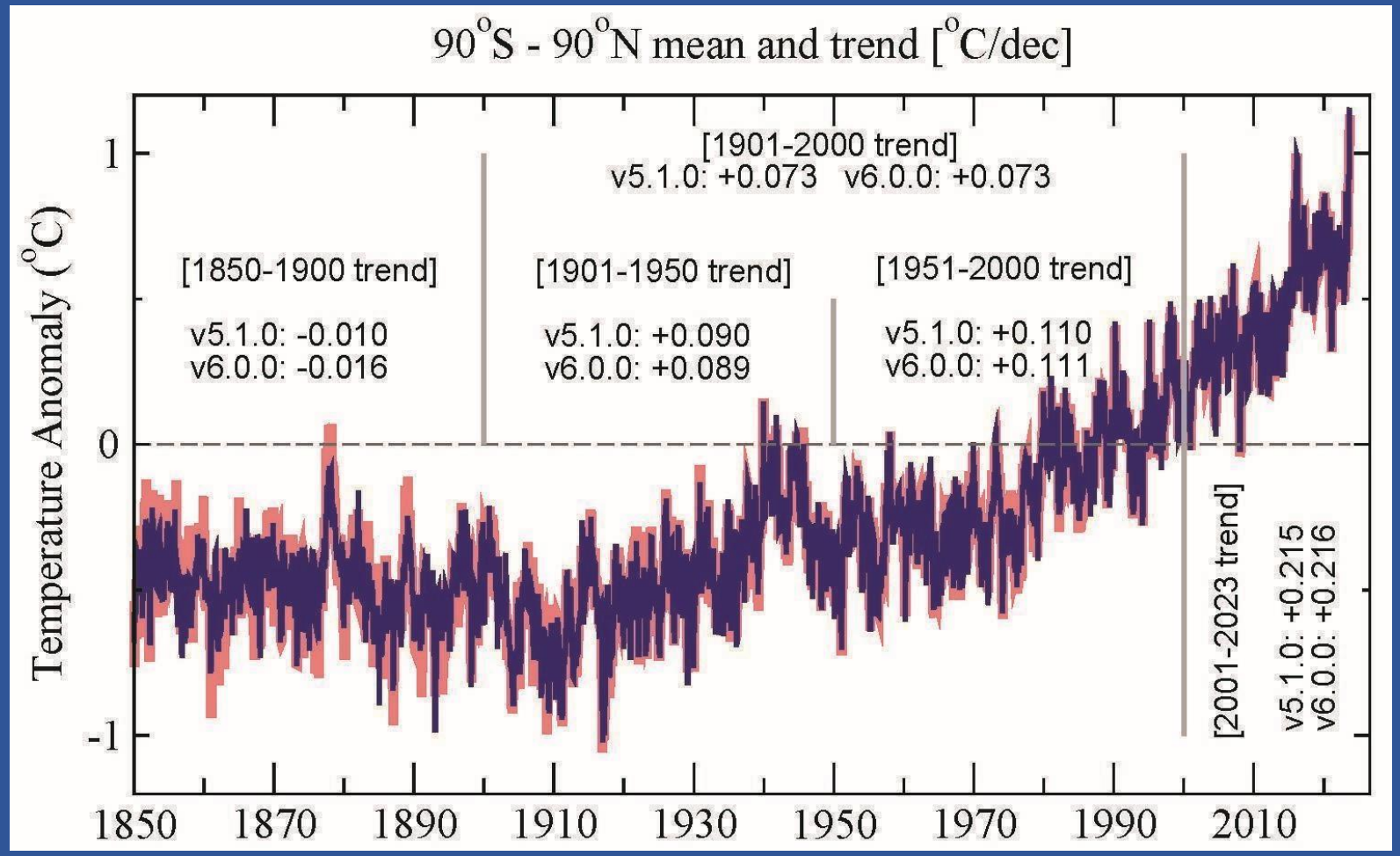
Sensitivity to delayed observations:

- v5.1: sensitive to data coverage - *warmer anomaly during time with delayed data*
- V6: more stable
- Enables early data release

Global mean temperature from daily runs



Comparison: Global Mean Temperature



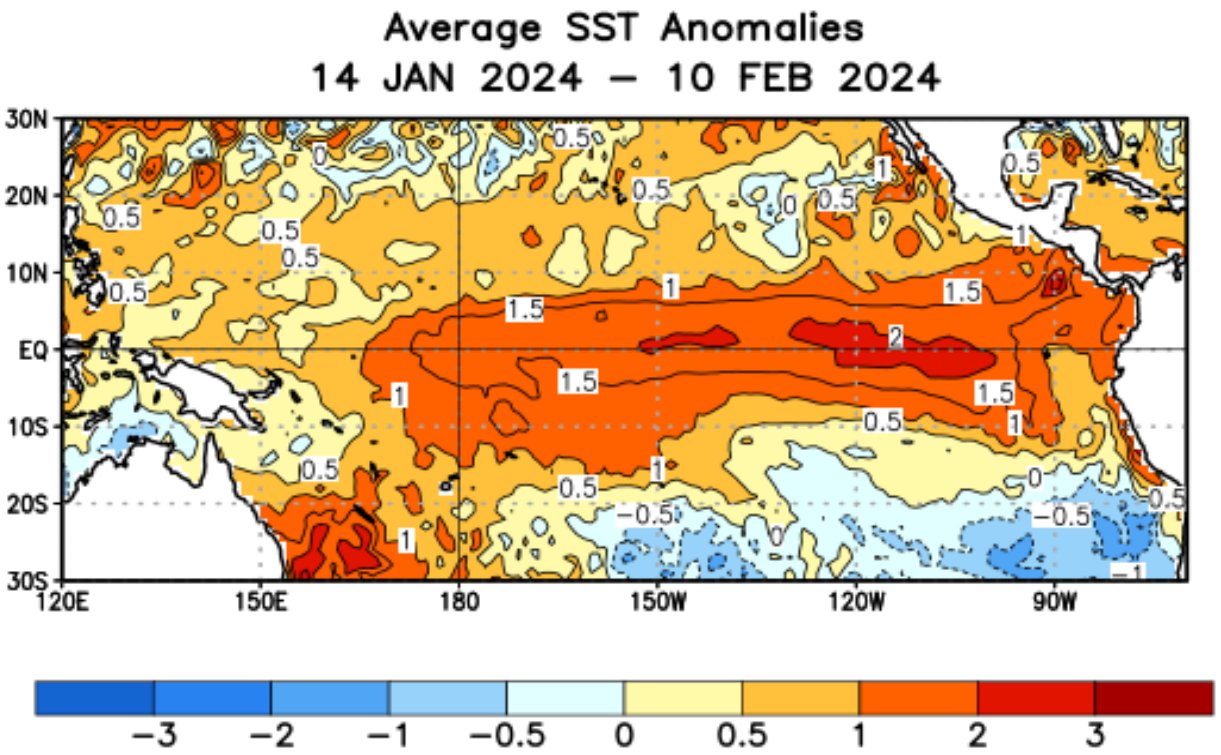
Between v5.1 and v6:

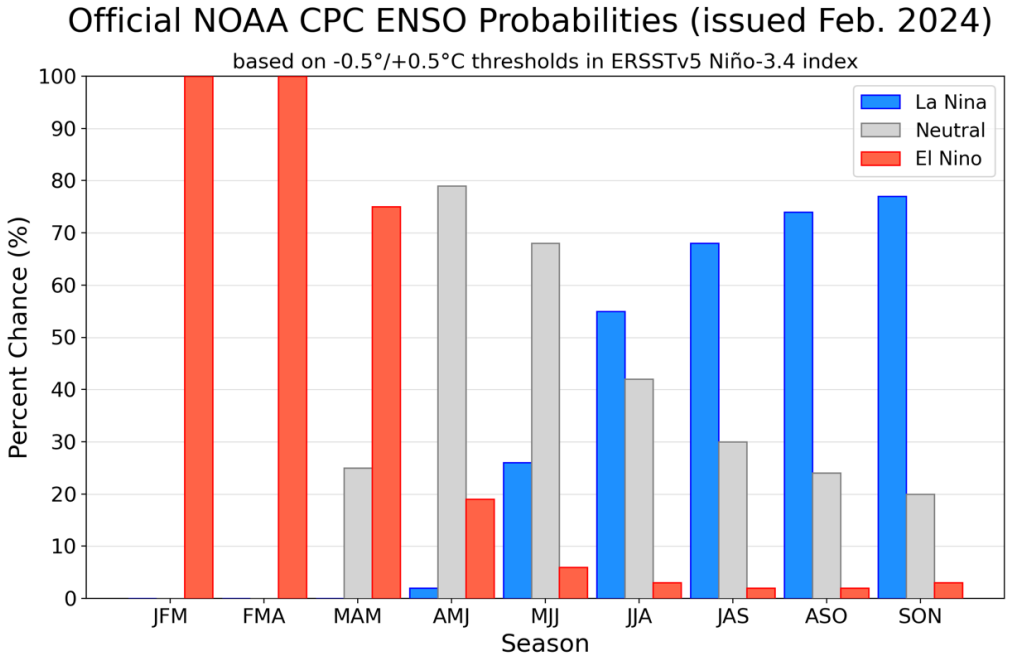
- Since 1901: period trends are the same (~0.01°C)
- In pre-industrial times, higher difference due to low number of obs

Summary

- The NOAAGlobalTemp has been updated to version 6
- The version 6 enhances in data, methodology, and performance over its prevision versions

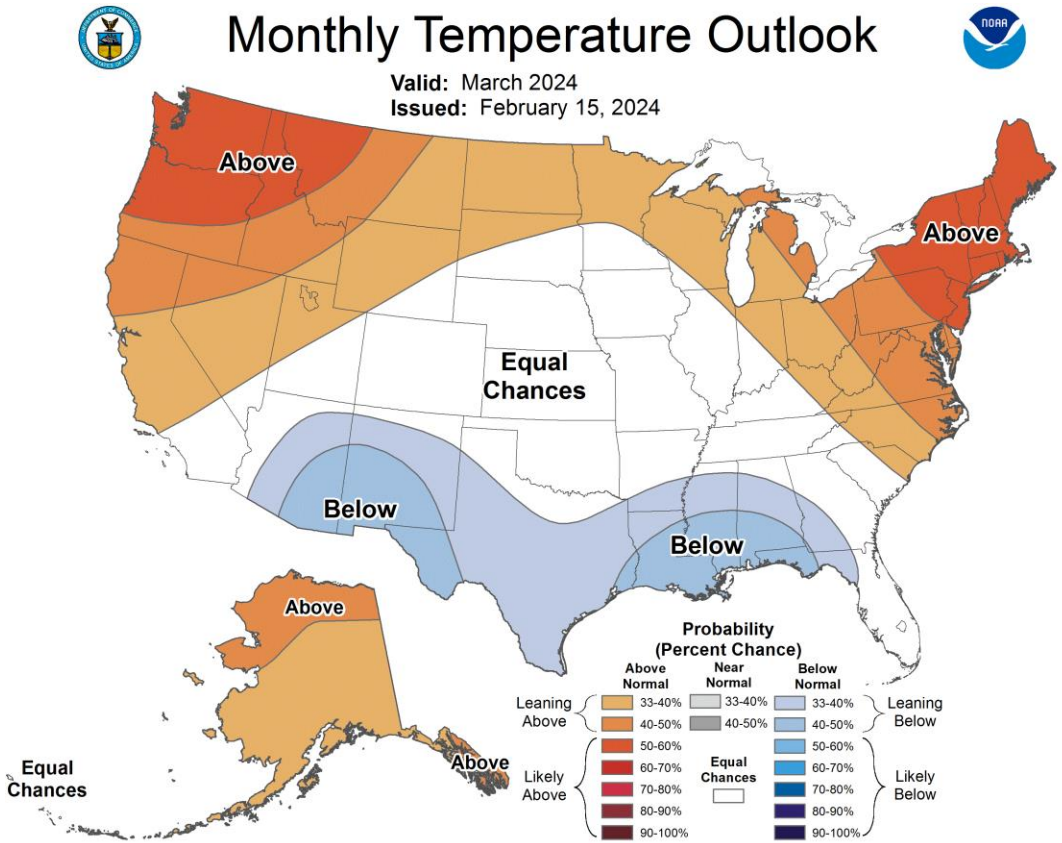
Sea Surface Temperatures and ENSO

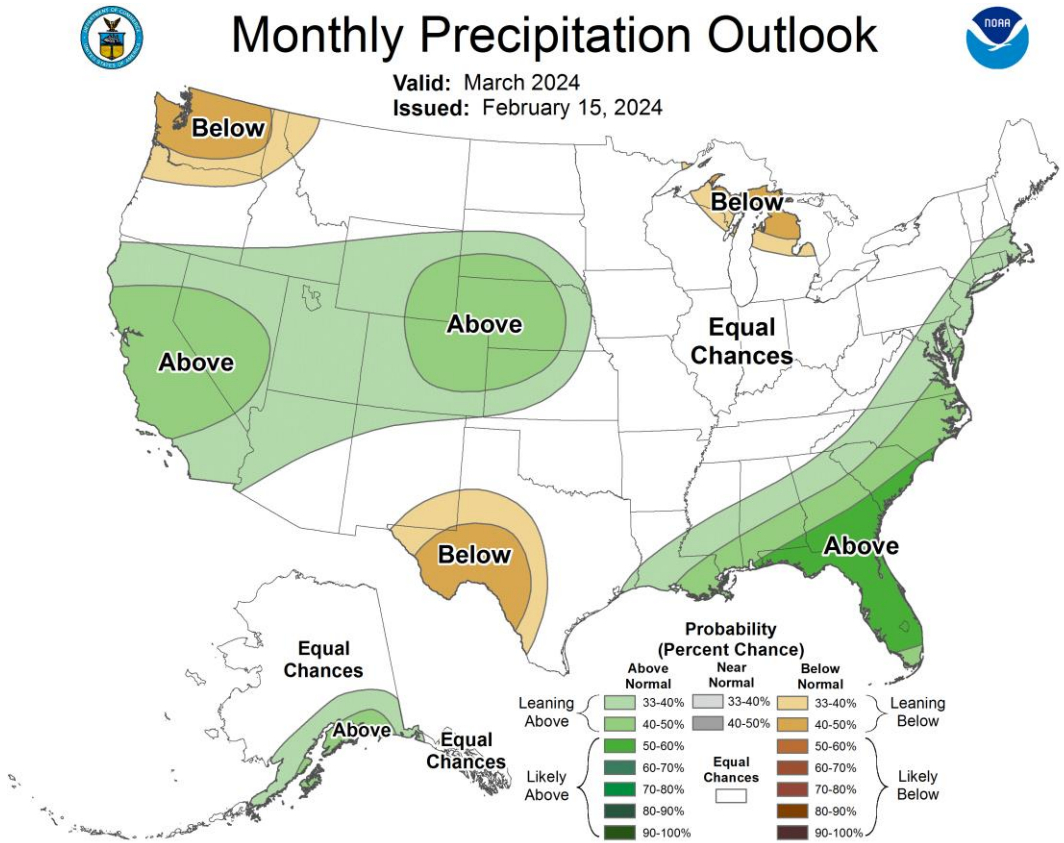




- Sea surface temperatures remain above normal across much of the Pacific Ocean near the equator
- El Niño is expected to quickly transition to neutral ENSO conditions in the next couple months and then to La Niña in summer or autumn

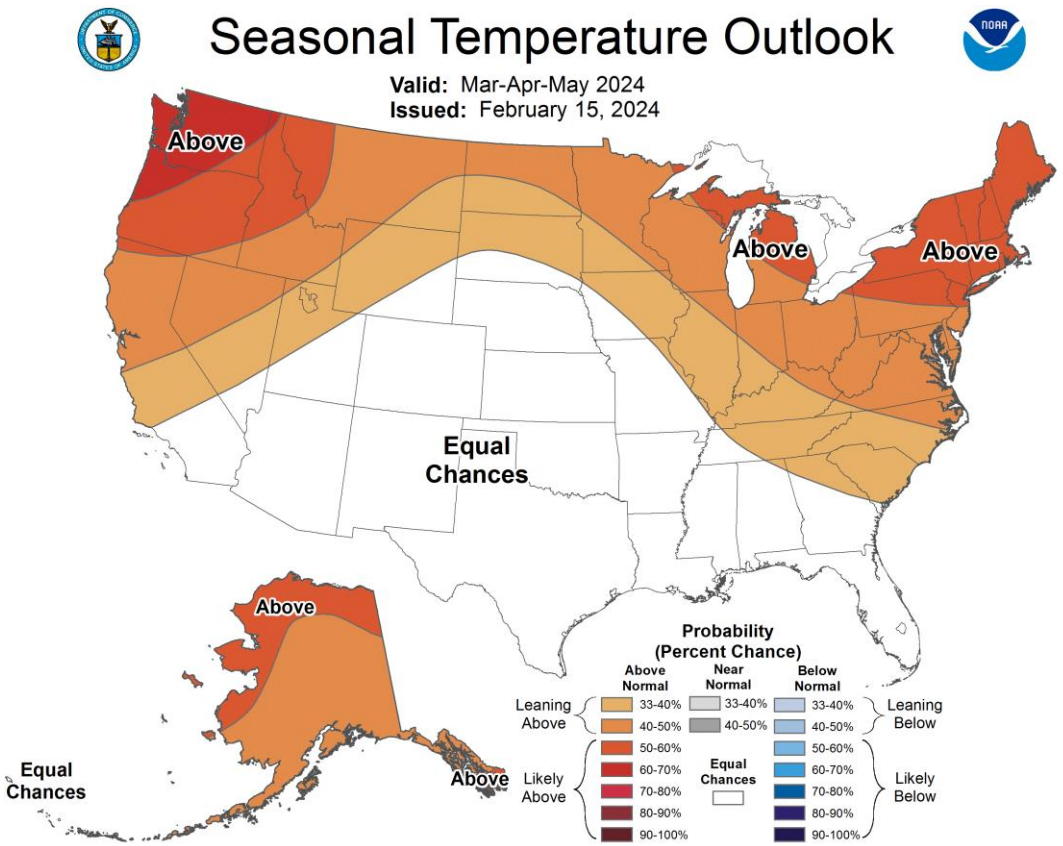
Monthly Forecast (March)

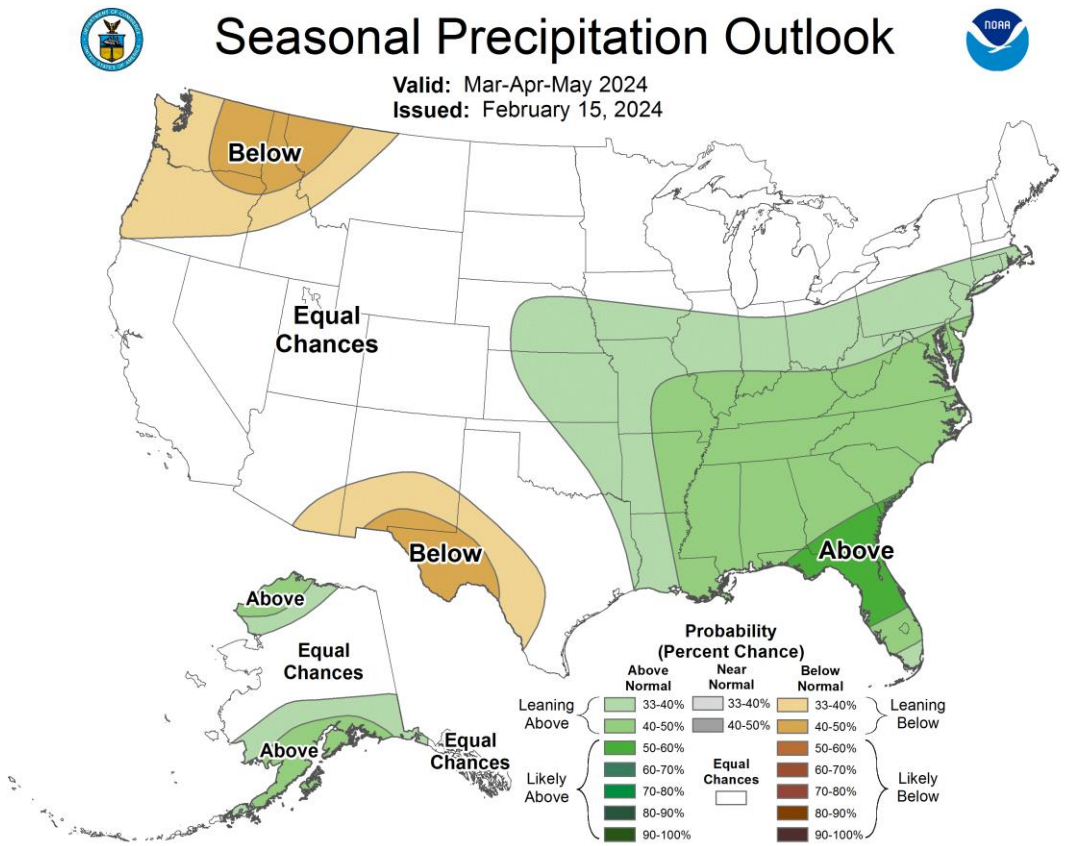




- El Niño continues to impact the temperature and precipitation patterns during March, along with shorter timescale climate patterns

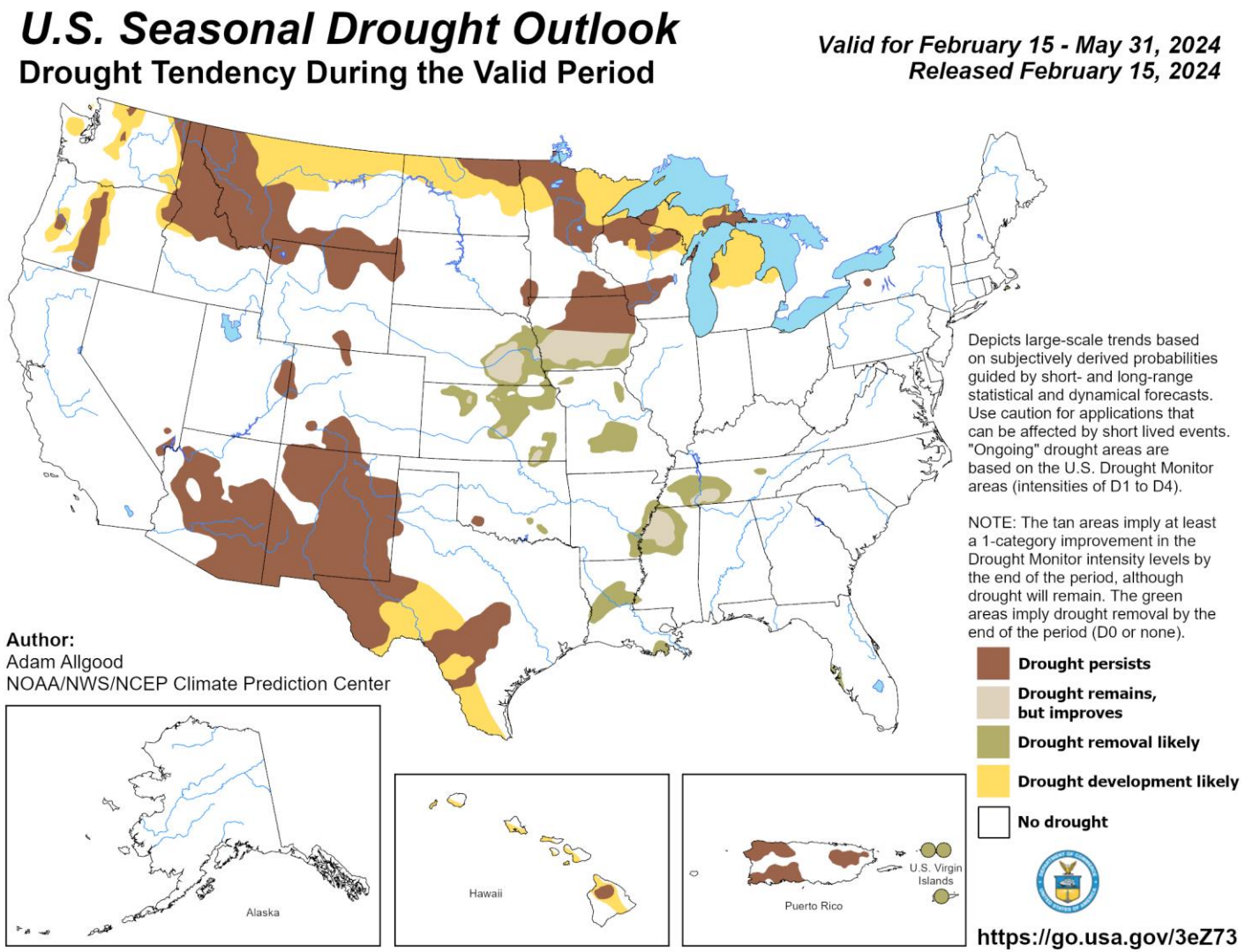
Three-Month Forecast (Mar-Apr-May)





- El Niño impacts the temperature and precipitation patterns during the March-April-May season, as well as longer term climate trends

Drought Outlook



- Drought is expected to develop or persist for areas of the northern U.S., as well as the Southwest.
- Drought is likely to improve or be removed in the next 3 months in the central Great Plains and lower Mississippi Valley.

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

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