



Climate Variability and Trends In Florida - Impacts on Our Water Resources



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*Florida Water and Climate
Alliance*

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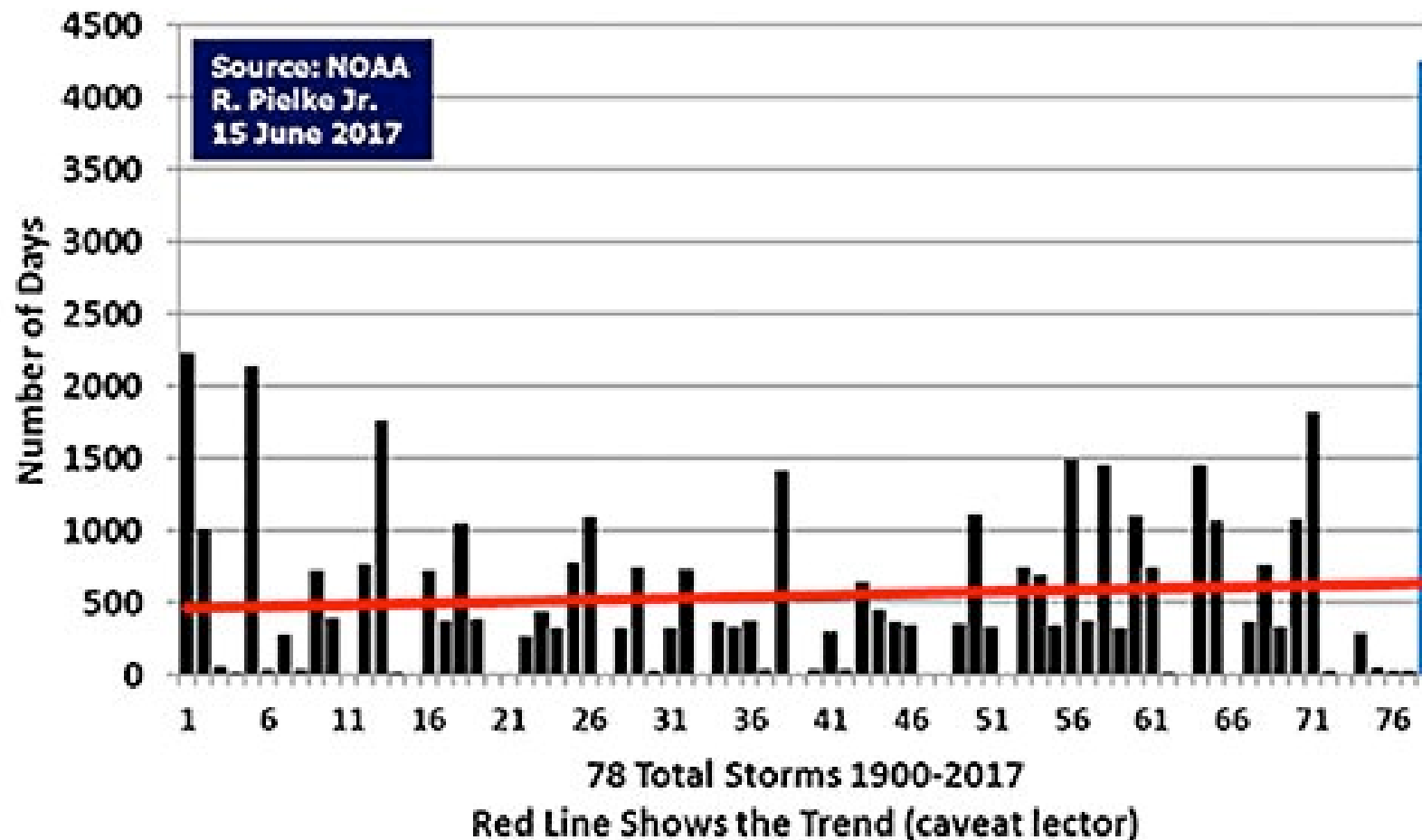
Climate/Weather Threats



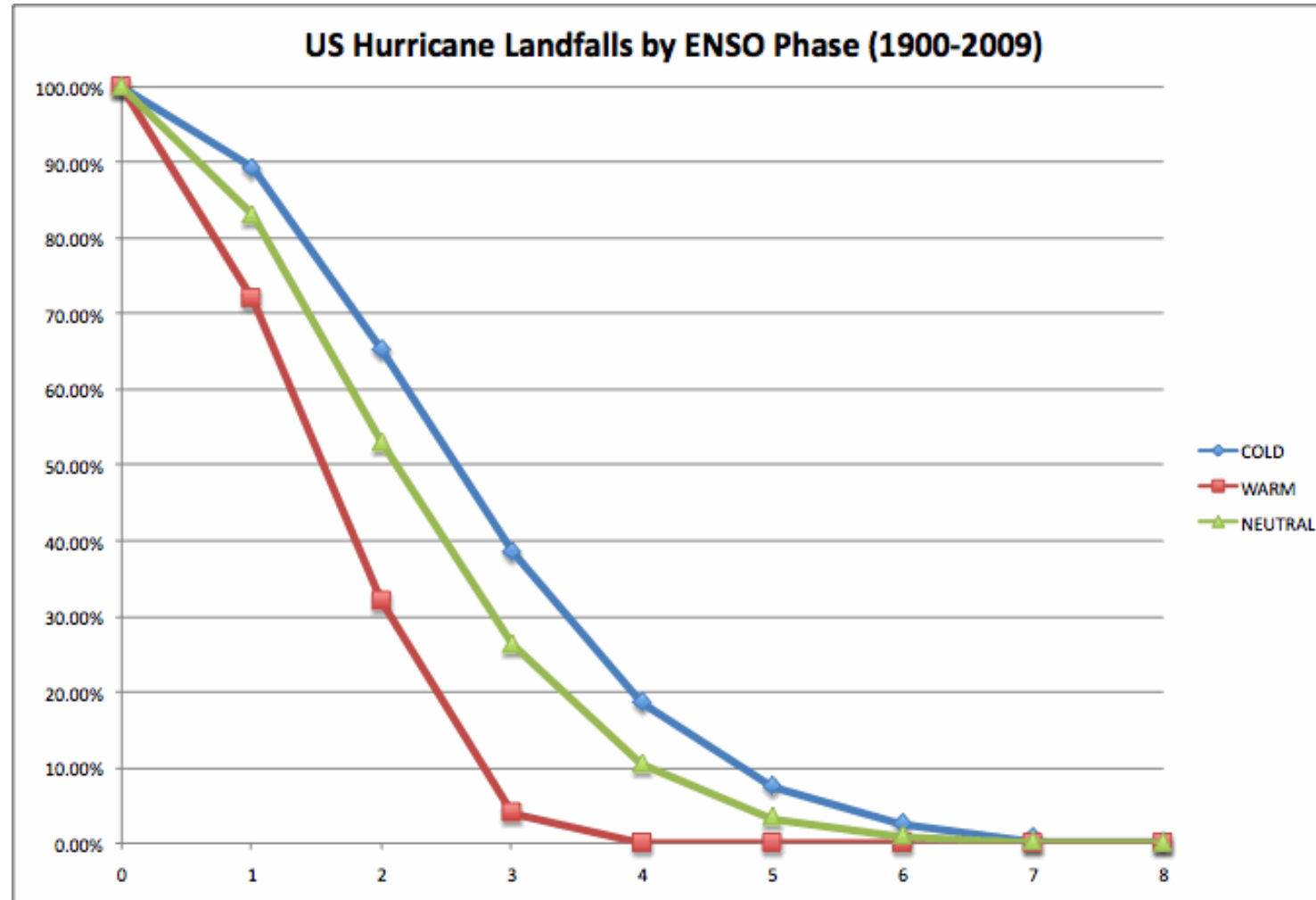
- Changes in temperature, extreme temperature
- Extreme rainfall and flooding
- Drought
- Sea level rise
- Hurricanes and tropical storms
- Severe weather

Hurricane “Drought”

Days Between Major Hurricane (Cat 3, 4, 5) Landfalls in
the US:
1900 to 15 June 2017



Hurricane Landfall Probabilities



Hurricane Season



2021 Hurricane season

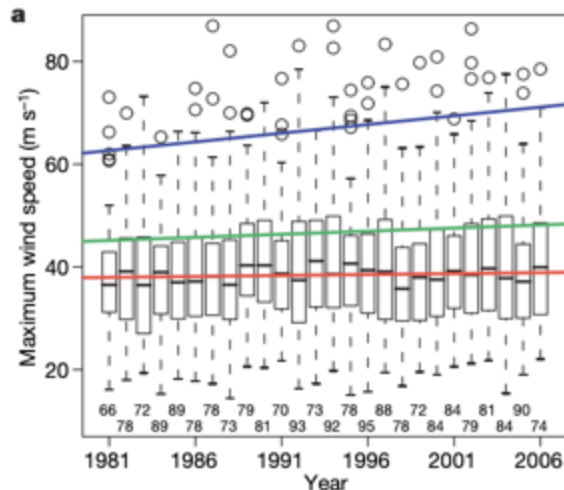
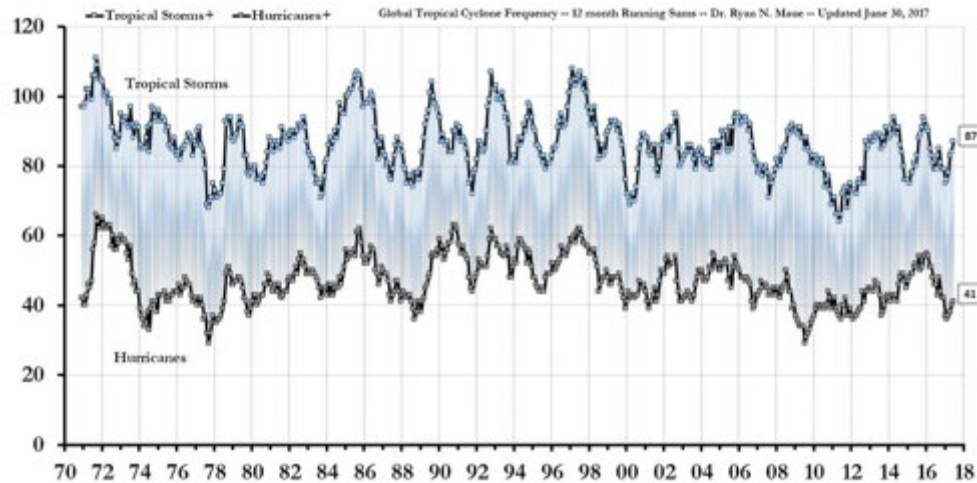
- 20 named storms, 7 hurricanes, 4 majors
- 6 landfalls on the Gulf Coast
- TS Claudette, Fred bring heavy rain



2020 Hurricane Season

- Record 30 named storms, 14 hurricanes, 7 majors
- 10 landfalls on the Gulf Coast
- Hurricane Sally, Sept. 16

Changes in Tropical Cyclones

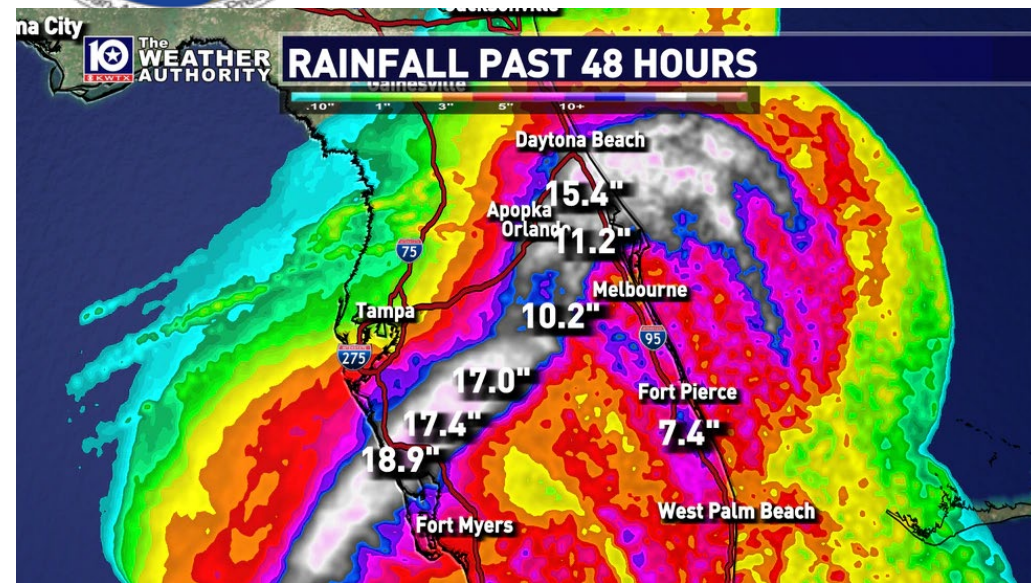


- The number of tropical cyclones has remained unchanged globally
- The strongest hurricanes are getting stronger (Elsner, et al. 2008)
- Increasing rainfall from tropical cyclones (Maxwell, et al. 2021)
- Forward motion may be getting slower, tracks may be shifting north
- Rapid intensification becoming more common

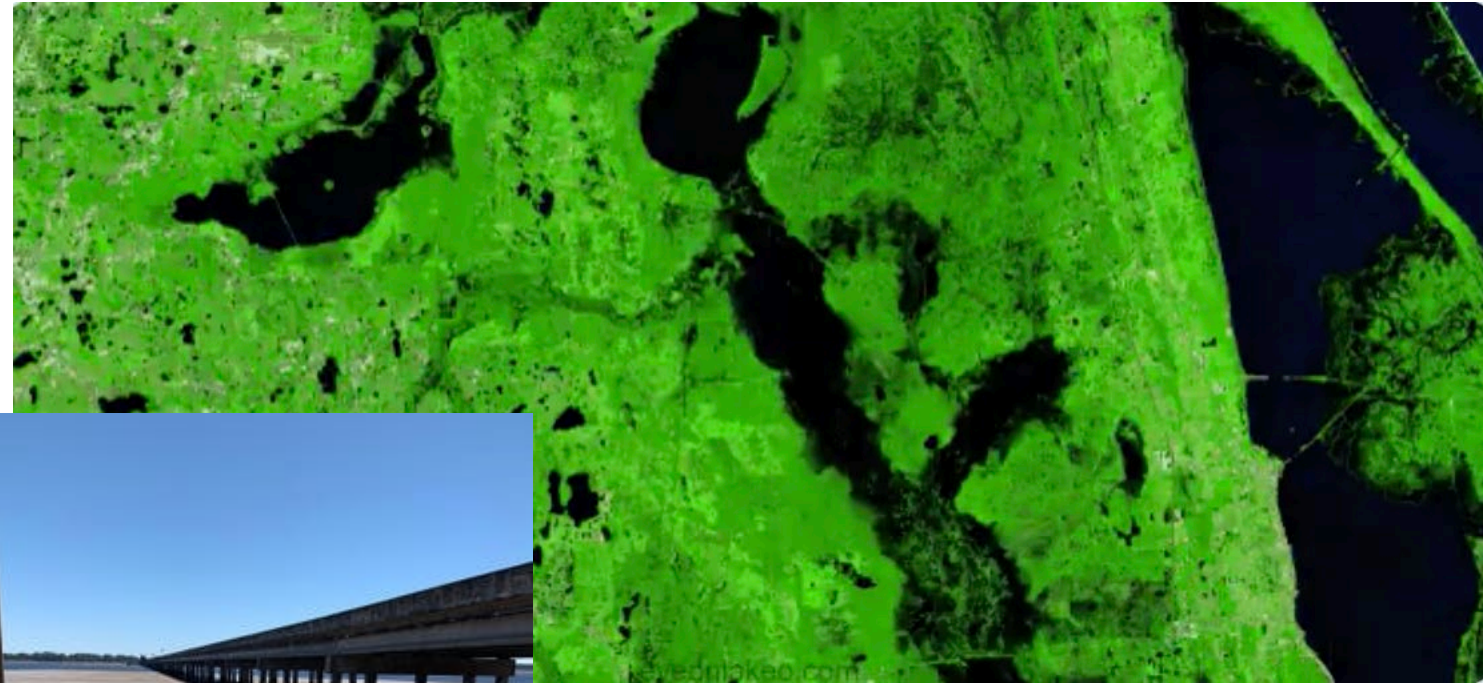
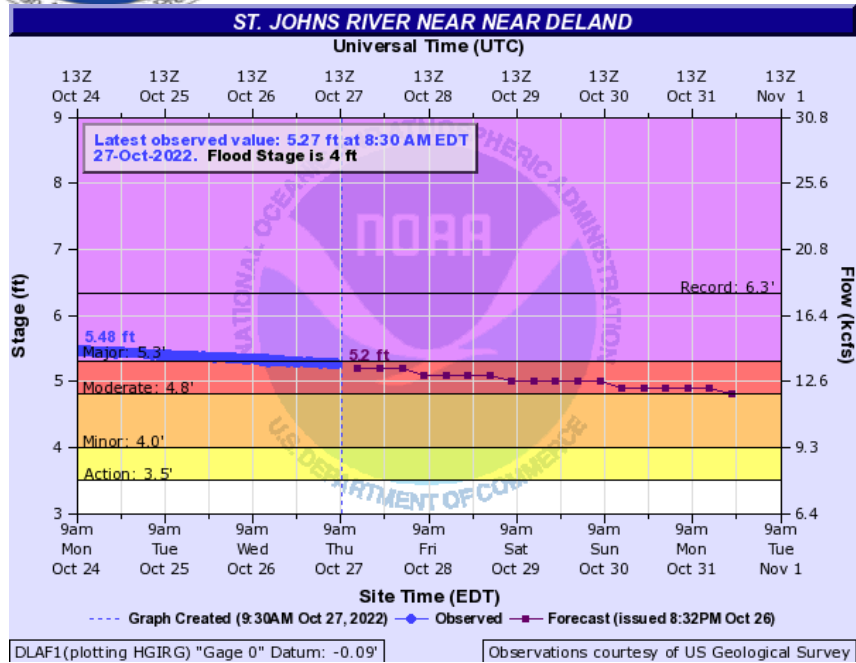
Hurricane Ian

Changing climate checklist

- Increased intensity – 5th most powerful storm to hit the U.S.
- Storm surge – worsened by sea level rise
- Rainfall – flooding rainfall over a large swath of the State
- Hurricane potential – Gulf sea surface temperatures 1-2 C above normal
- Rapid intensification

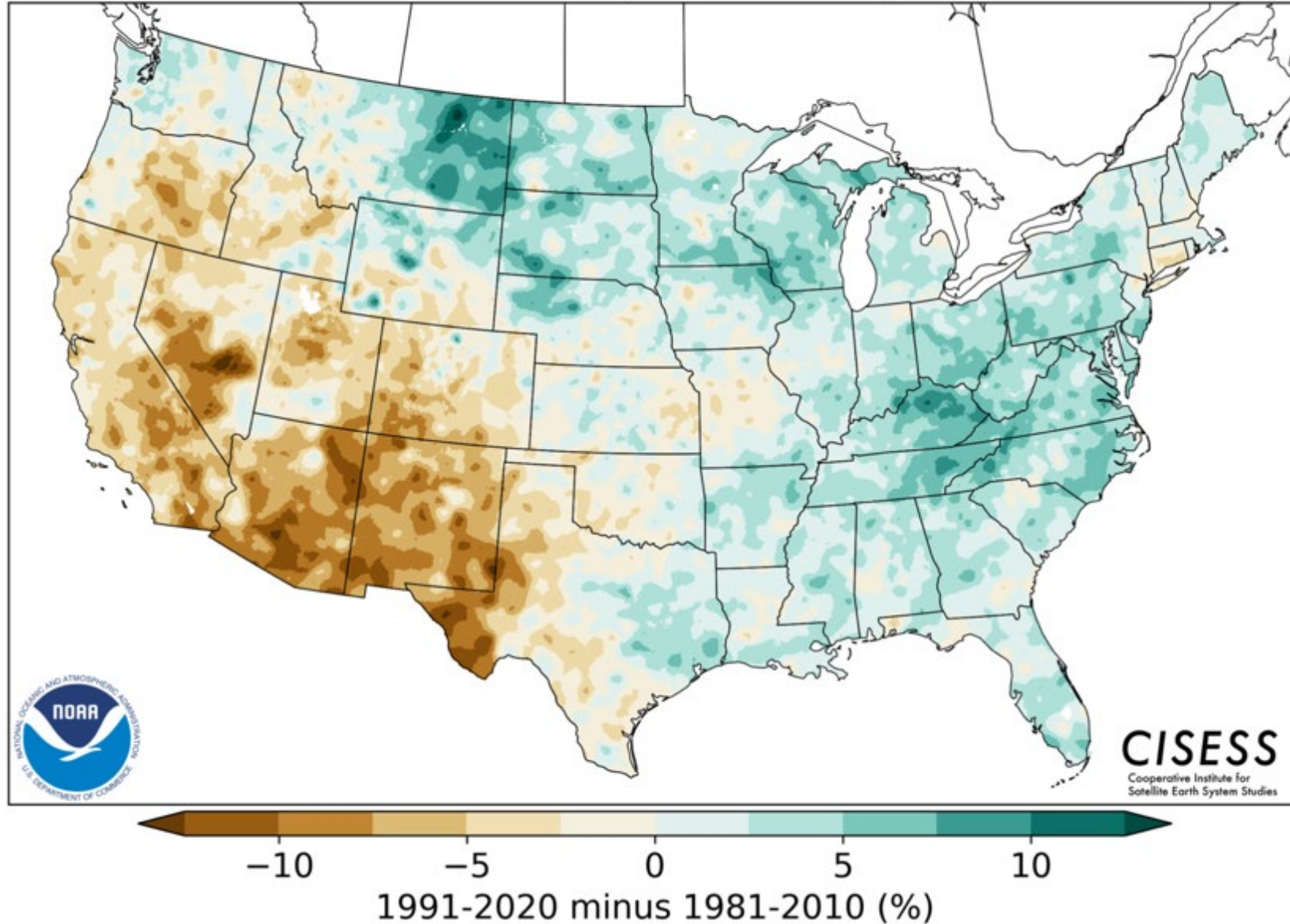


Unique Aspects of Hurricane Ian

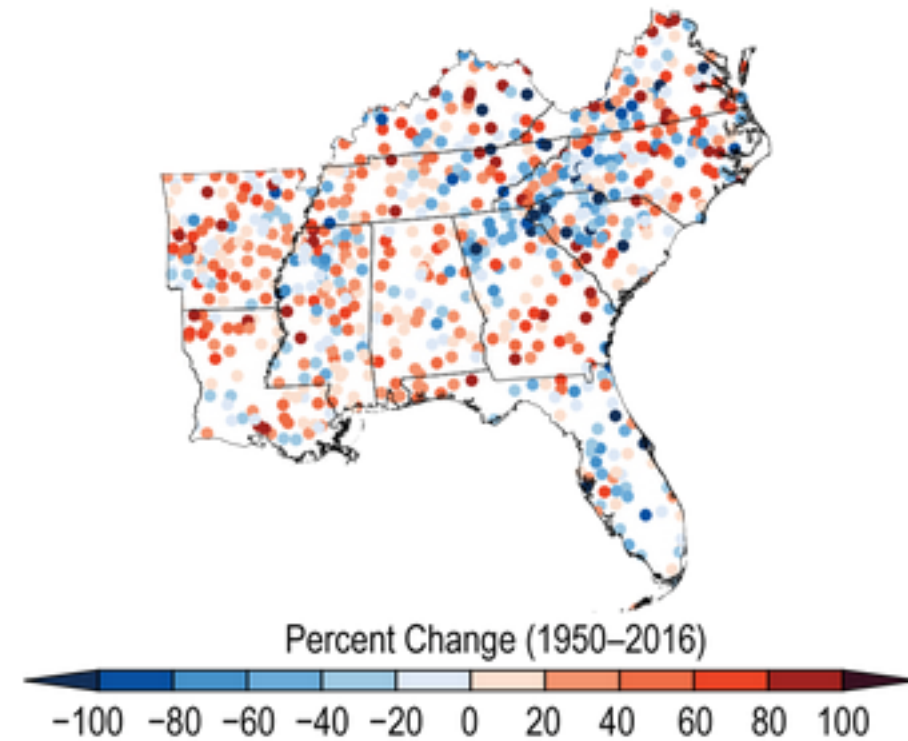
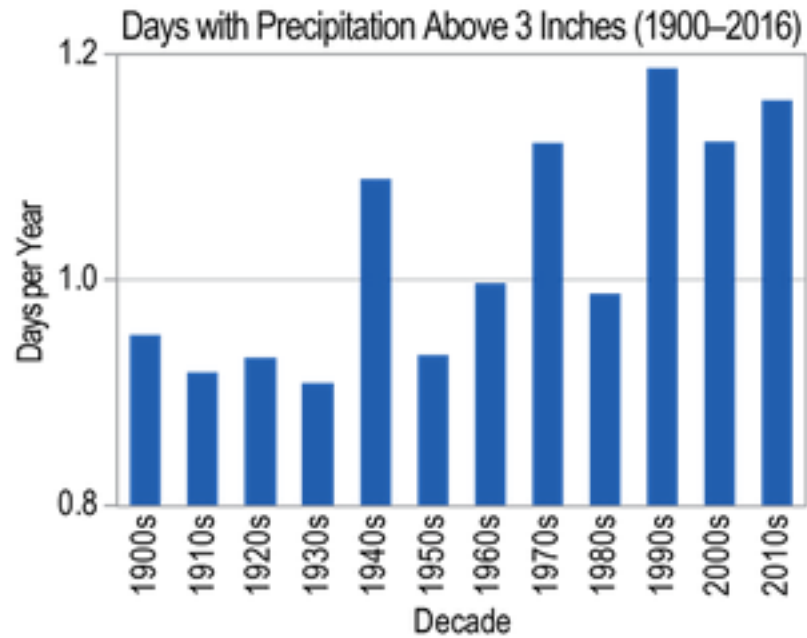


U.S. Precipitation Normals

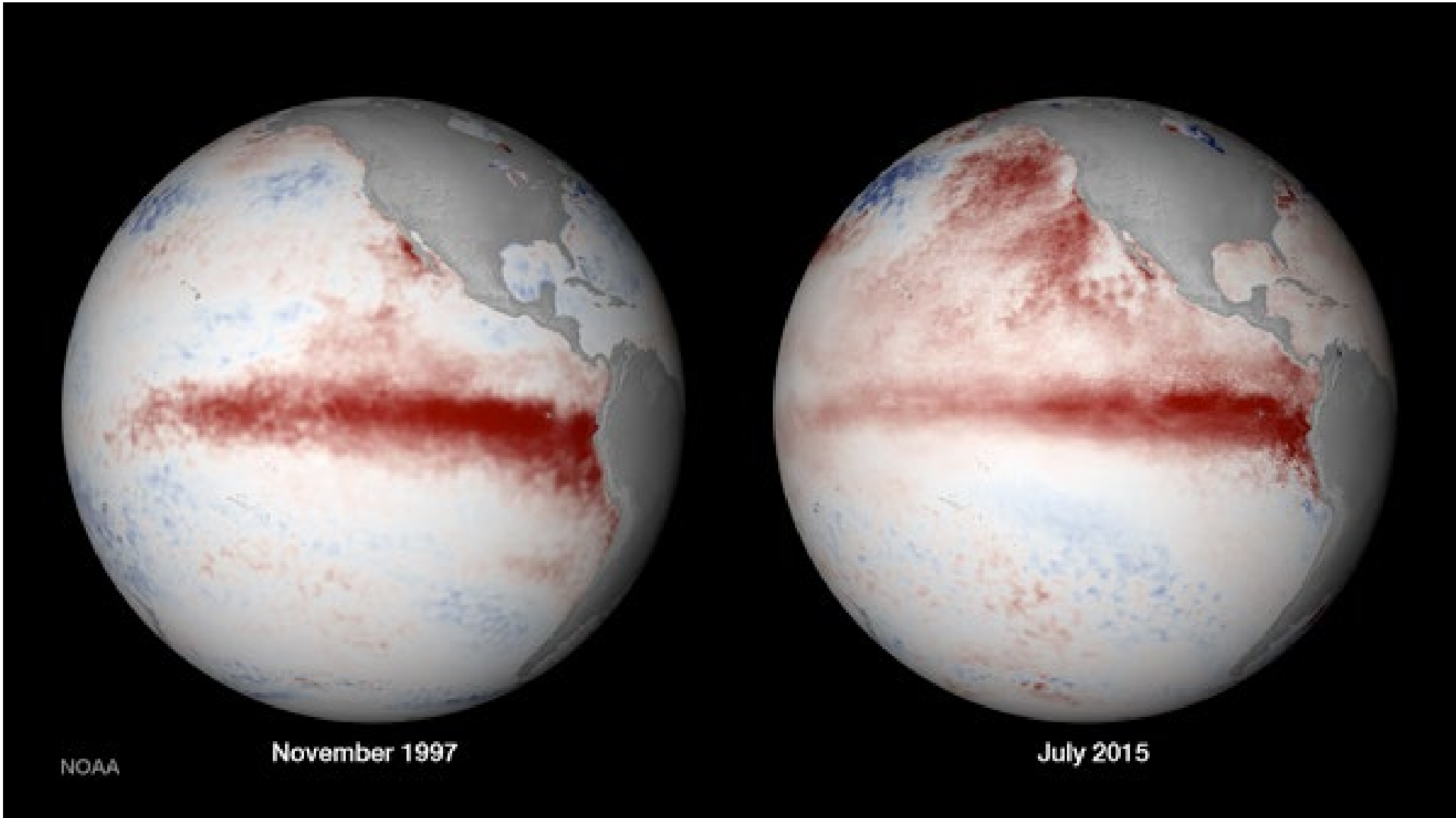
Annual Precipitation Change



Heavy Precipitation



El Nino/La Nina Cycle

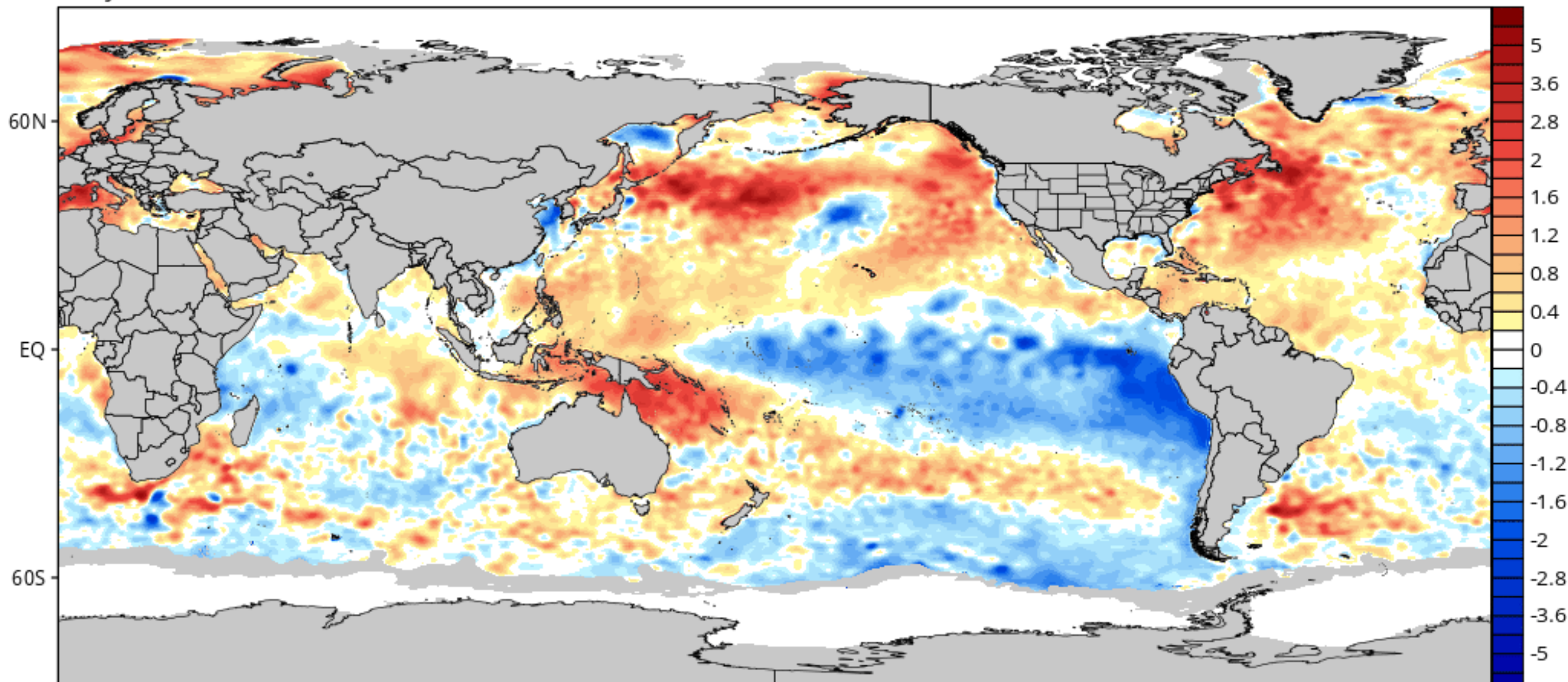


Current Sea Surface Temperatures

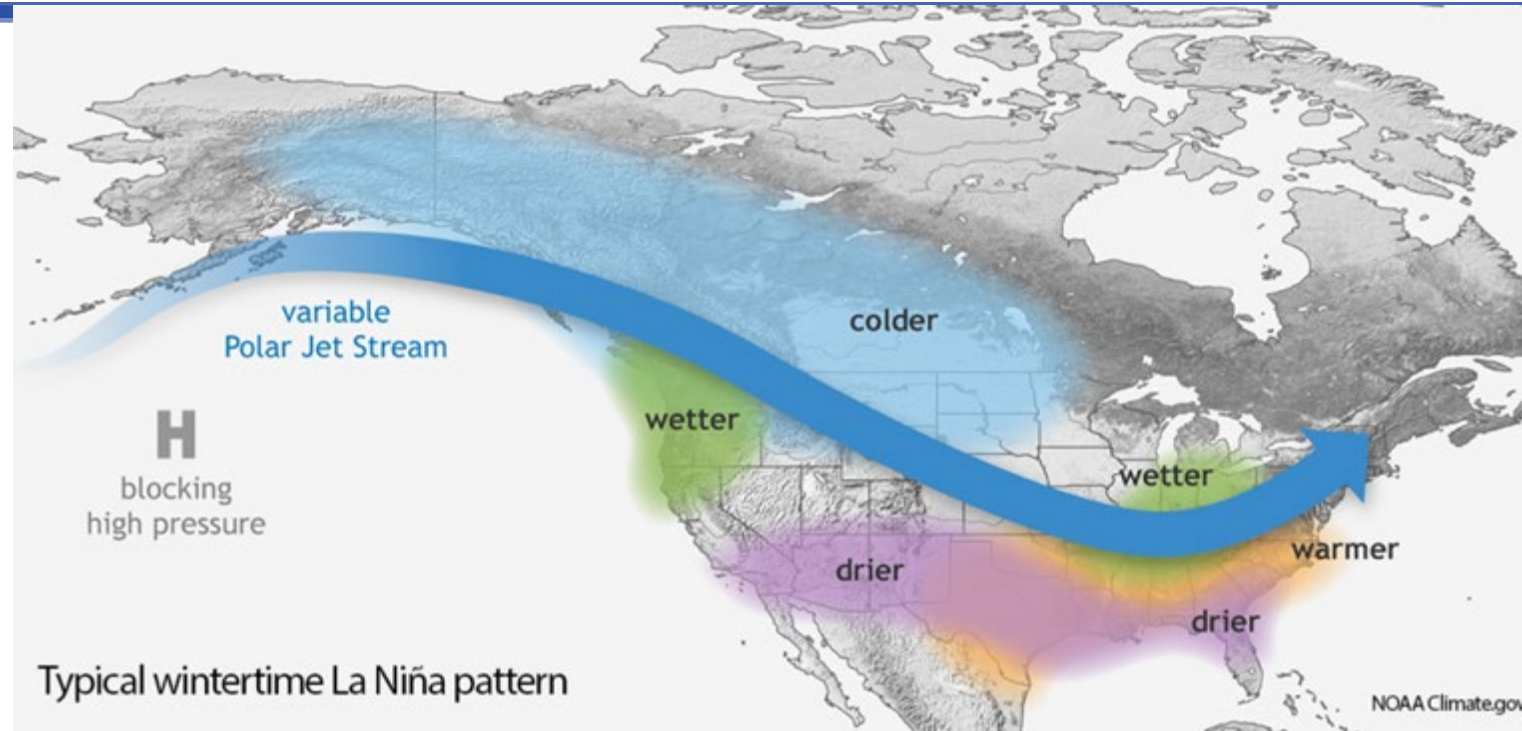
CDAS Sea Surface Temperature Anomaly ($^{\circ}\text{C}$) (based on CFSR 1981-2010 Climatology)

Analysis Time: 06z Oct 27 2022

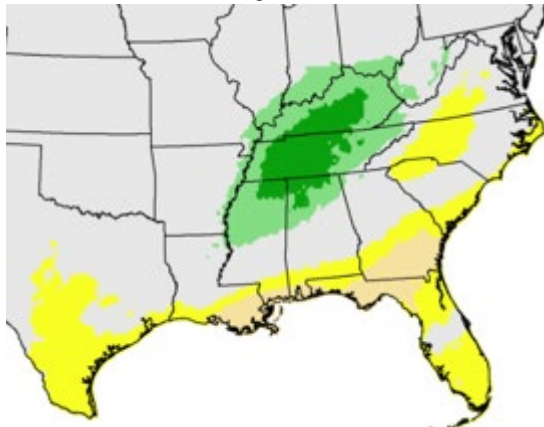
TROPICALTIDBITS.COM



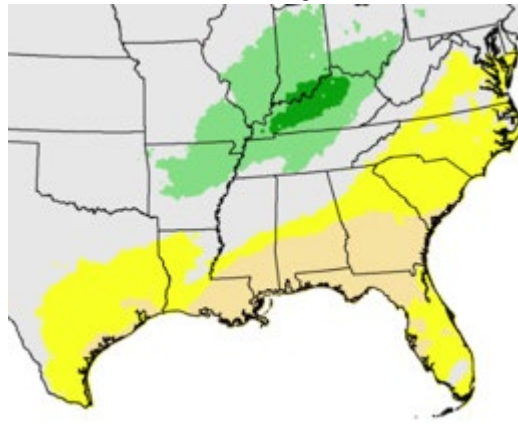
La Nina Impacts



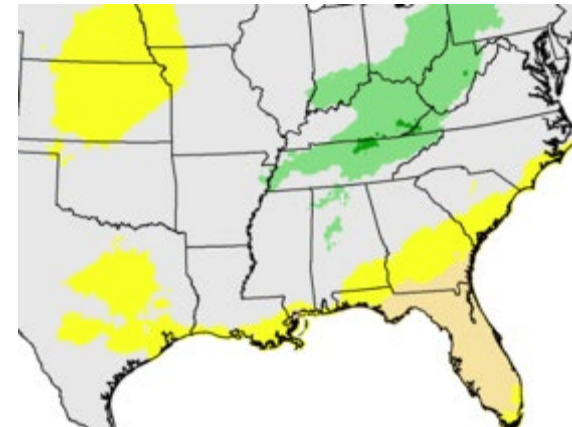
January



February

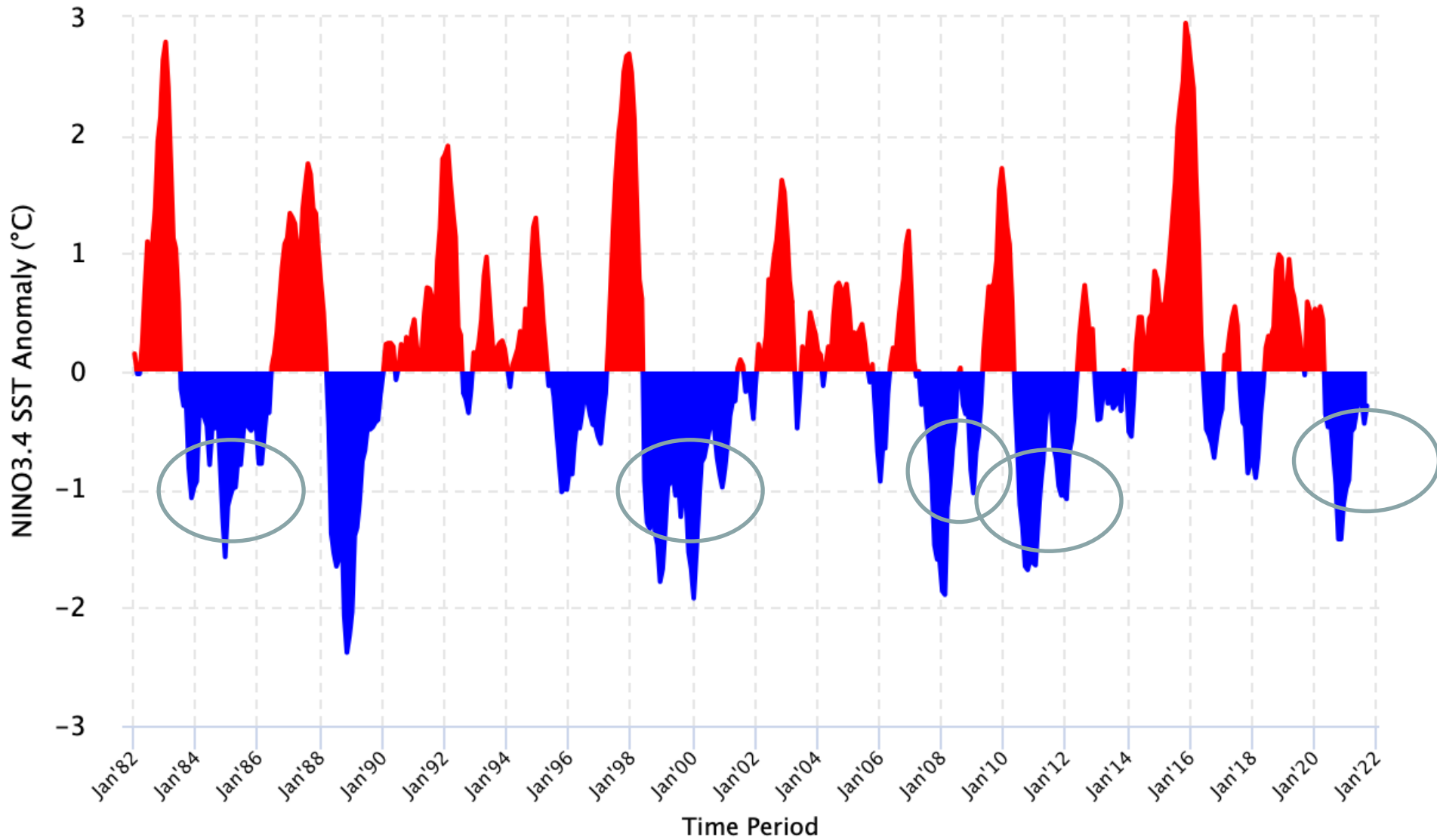


March



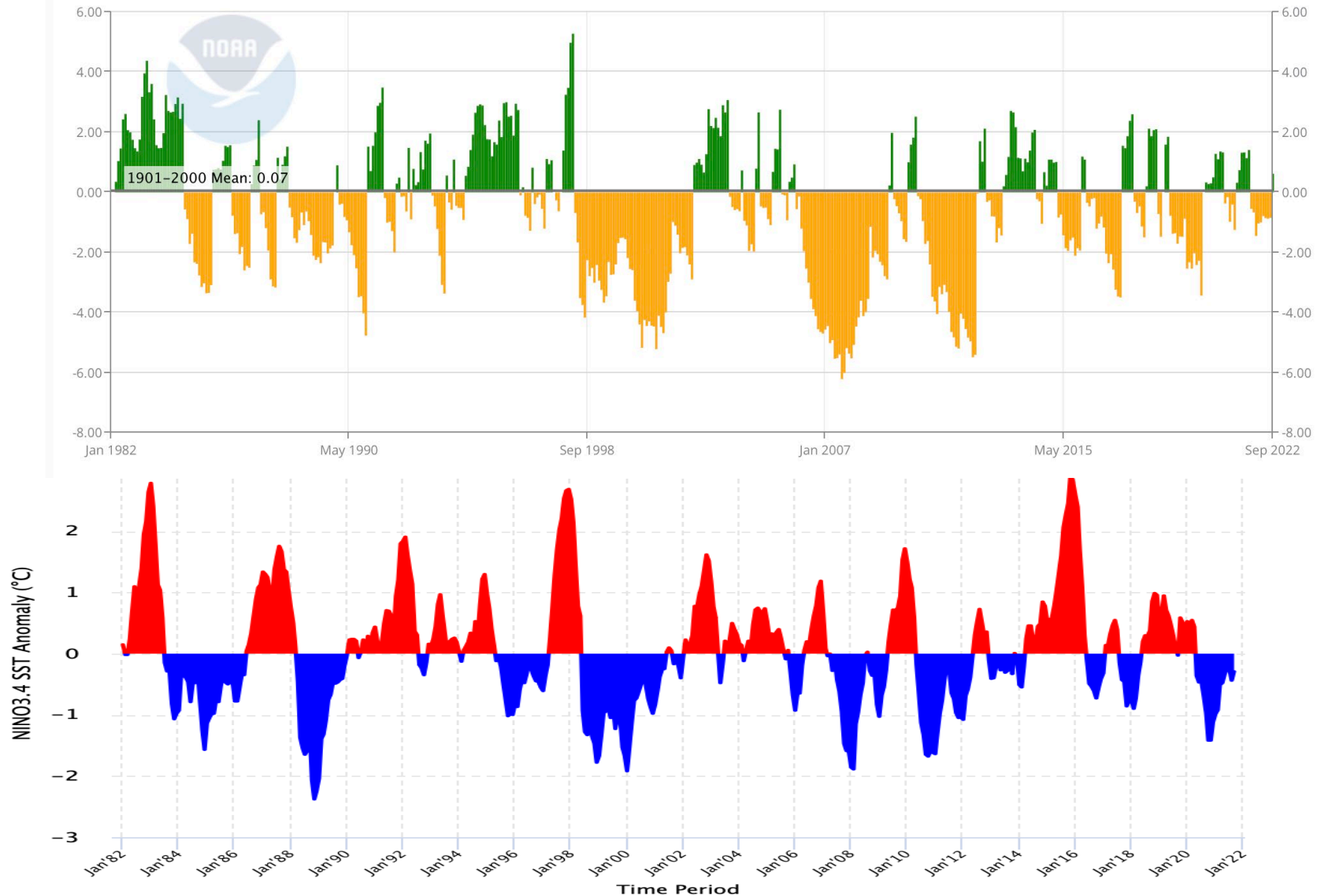
Multi-year La Nina's

Historical Nino 3.4 Sea Surface Temperature Anomaly



Drought and La Nina

Florida Palmer Drought Severity Index (PDSI)



Florida Drought Update

For the assessment period ending October 18, 2022

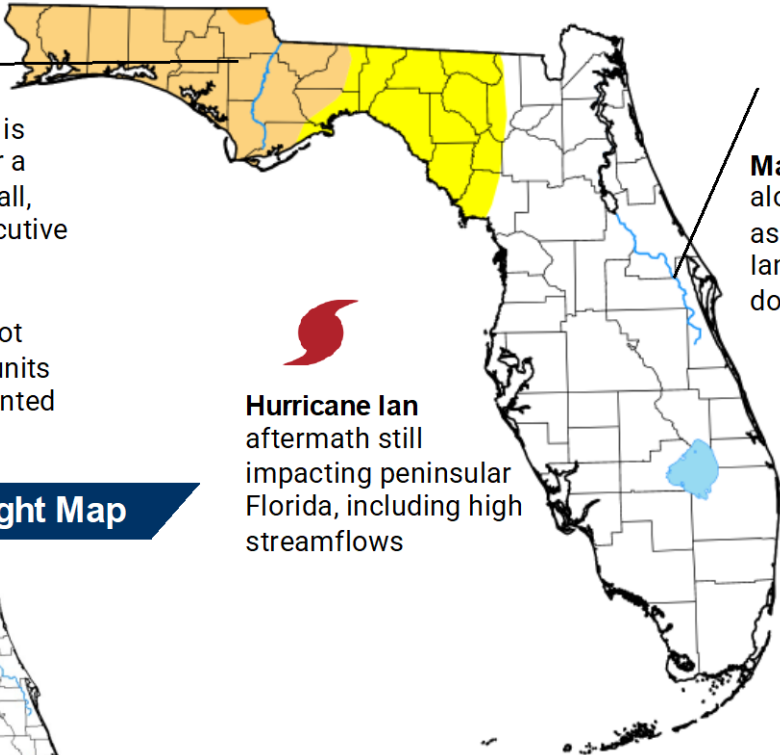
This Week's Drought Monitor of Florida Map

From the US Drought Monitor, authored by **Adam Hartman (NOAA/NWS/NCEP/CPC)**, with input from the Florida Drought Monitoring Group. URL: <https://droughtmonitor.unl.edu/CurrentMap.aspx>



Range and Pasture is struggling with over a month of little rainfall, including 30 consecutive dry days

Colder weather is not providing the heat units needed for later planted crops



Hurricane Ian aftermath still impacting peninsular Florida, including high streamflows

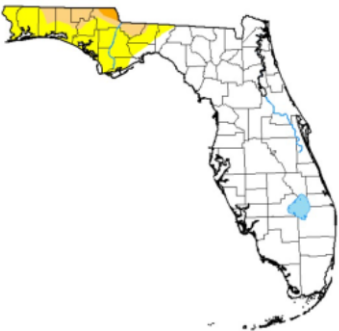


Major flooding continues along the St. John's River as runoff from hurricane Ian slowly makes its way downstream



Lake Okeechobee rebounded by over 2 feet since hurricane Ian, in good shape heading into the dry season

Last Week's Drought Map



Statewide Condition Summary

What's Changed? **Frontal passage** last week brought rainfall from mostly less than an inch to 1.59 inches in Jackson County. Otherwise, very dry conditions persist and moderate drought (D1) and abnormally dry (D0) spread across the Panhandle.

Current Pattern – Coldest temperatures of the year and dry conditions in place over most of the State. No rainfall in the forecast for at least the next week.

What's Next? A warming trend forecast for the next week or more, but no major rainfall events. Tropics look to remain quiet. **A third year of La Nina** favors continued drier than normal conditions through the fall and winter. Drought anticipated to worsen and spread eastward across north Florida.

Statewide Coverage By Category

Category	Coverage This Week	Last Week
D0: Abnormally Dry	30.23%	19.02%
D1: Moderate Drought	18.19%	4.90%
D2: Severe Drought	0.34%	0.57%
D3: Extreme Drought	0.00%	0.00%
D4: Exceptional Drought	0.00%	0.00%





Take Home Messages

- The number of hurricanes and tropical storms may not change, but many risk factors from tropical cyclones are worsening
- Hurricane Ian illustrated the impact of these changes
- Rainfall patterns across North America may be shifting, more rainfall from extreme events
- Drought in Florida largely driven by the El Nino/La Nina cycle
- Future changes in seasonal rainfall uncertain, but drought likely to become more frequent/severe with rising temperature

