

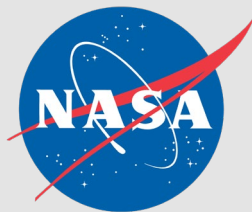


NOAA/NASA

Annual Global Analysis for 2022

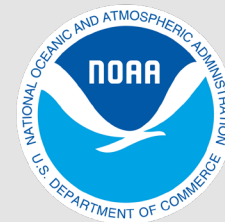
Gavin A. Schmidt

*Director, NASA Goddard Institute
for Space Studies*



Russell S. Vose

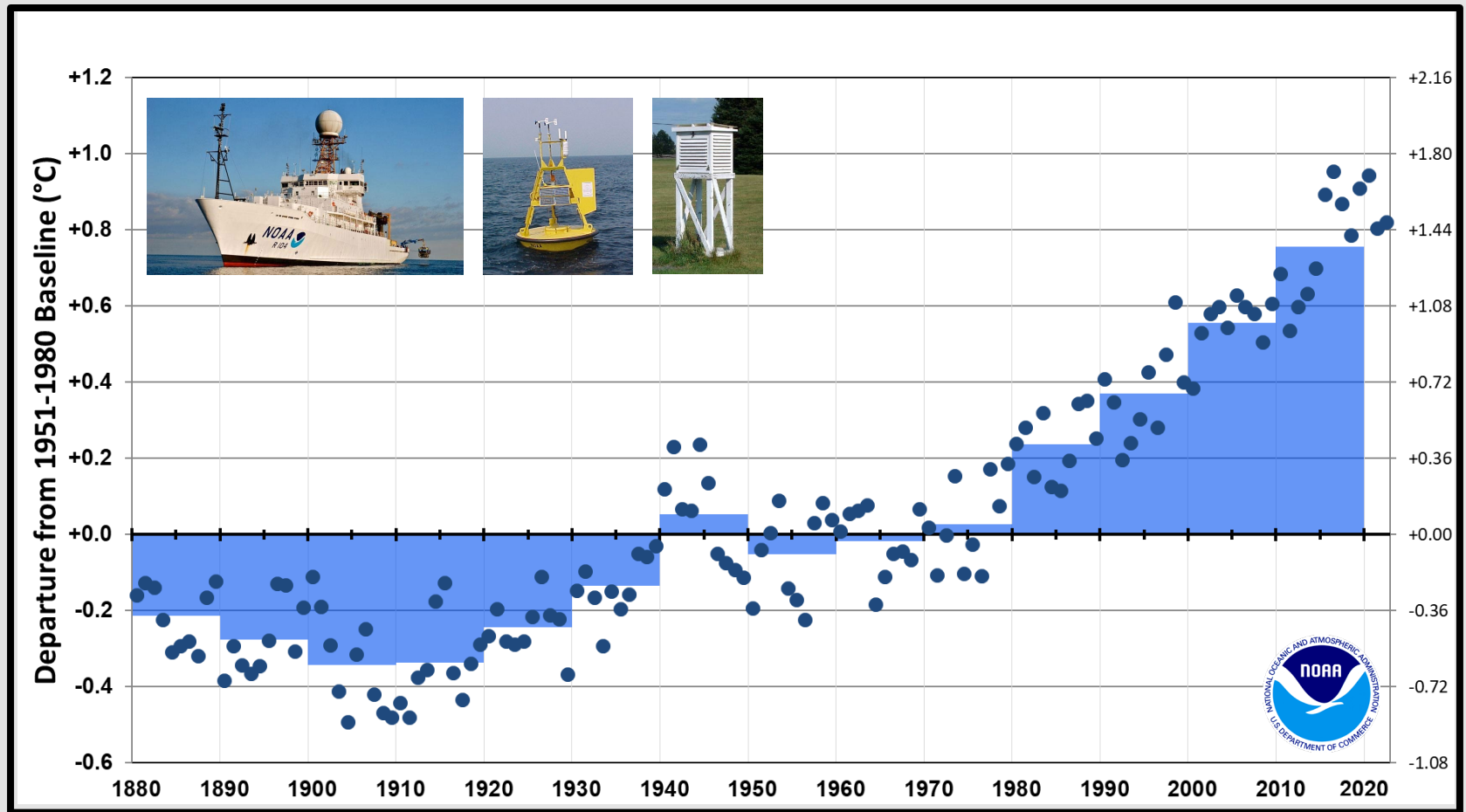
*Chief, Analysis and Synthesis Branch, NOAA's
National Centers for Environmental Information*



January 2023

NOAA: 2022 Ranked 6th Warmest

0.86°C (1.55°F) above 1901-2000 baseline*, 0.02°C warmer than 2021



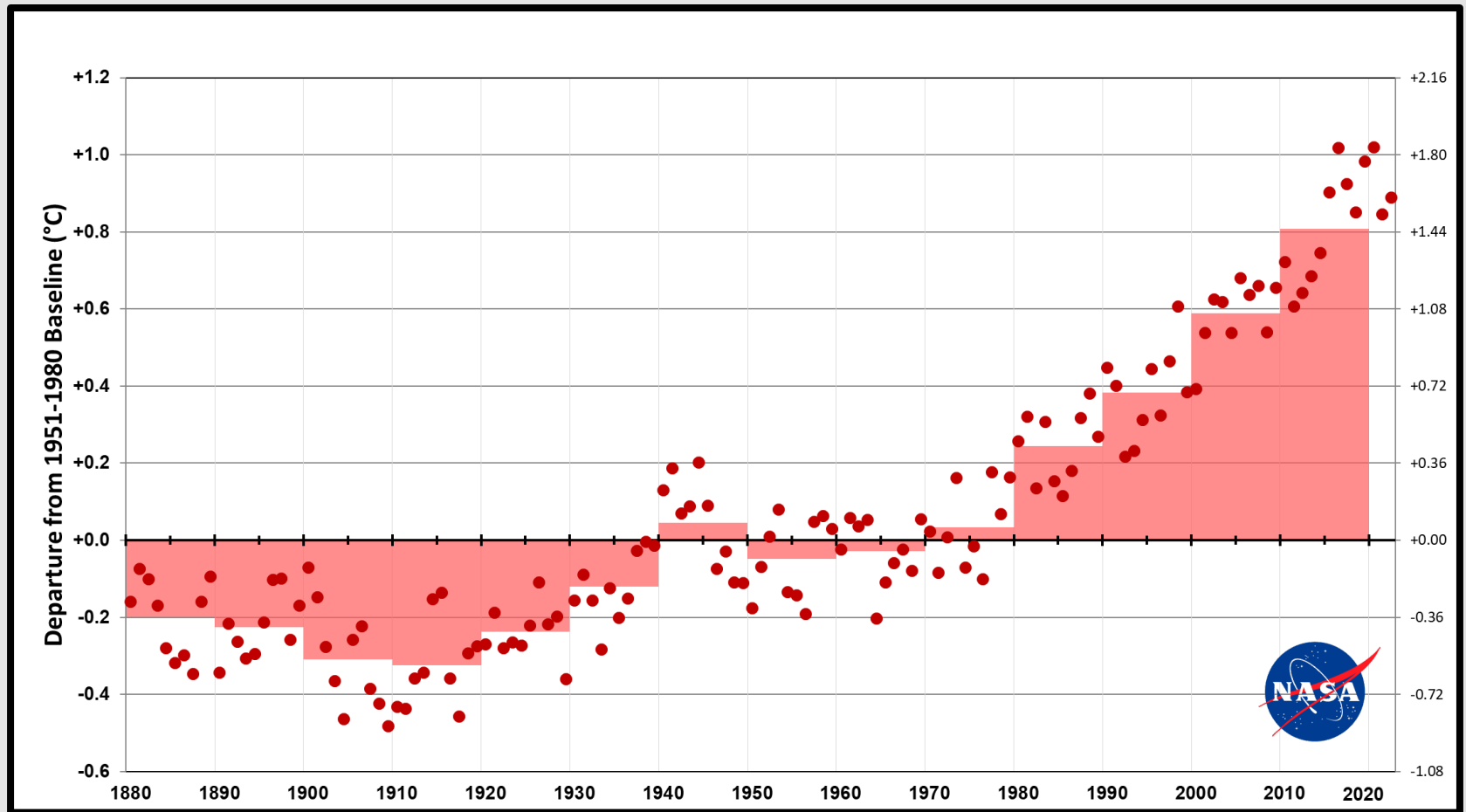
*NOAA uses 1901-2000 as the baseline in its monthly reports.

For reference purposes, 2022 was 0.81°C (1.46°F) above the 1951-1980 baseline.



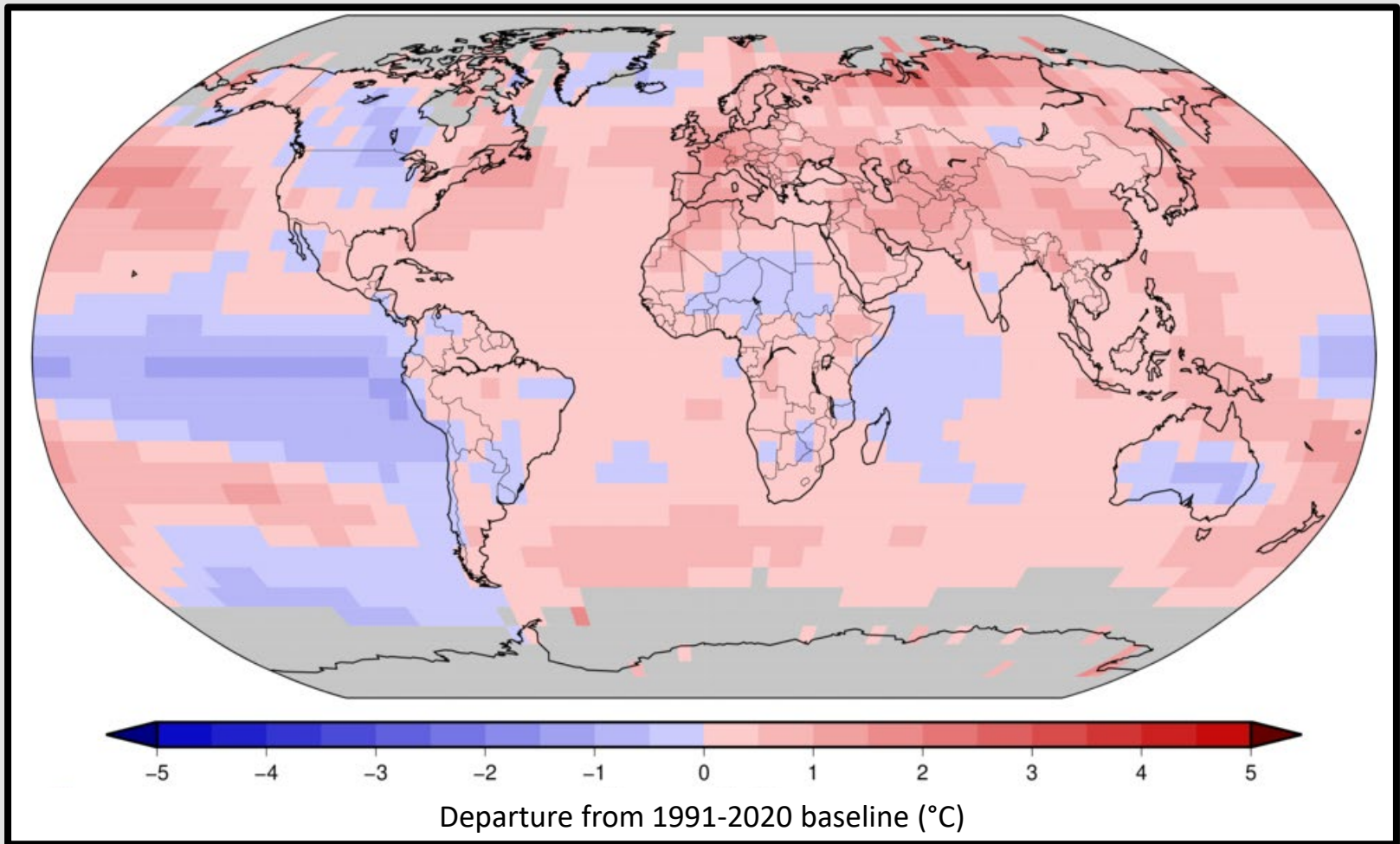
NASA: 2022 Tied for 5th Warmest

0.89°C (1.60°F) above 1951-1980 baseline, statistical tie with 2015



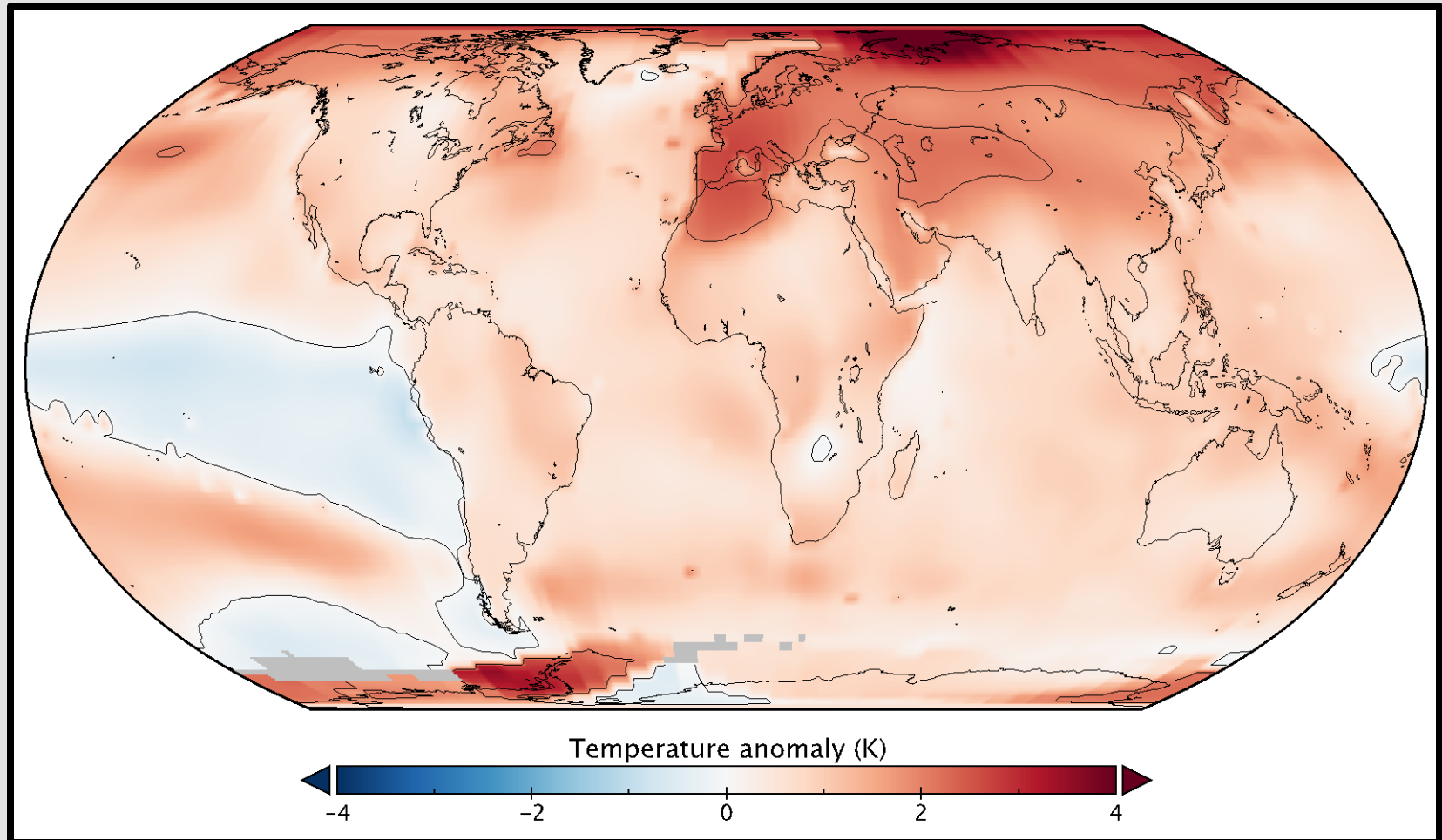
NOAA: Warm over Most of the Globe

La Niña in the eastern Pacific slightly cooled global temperatures



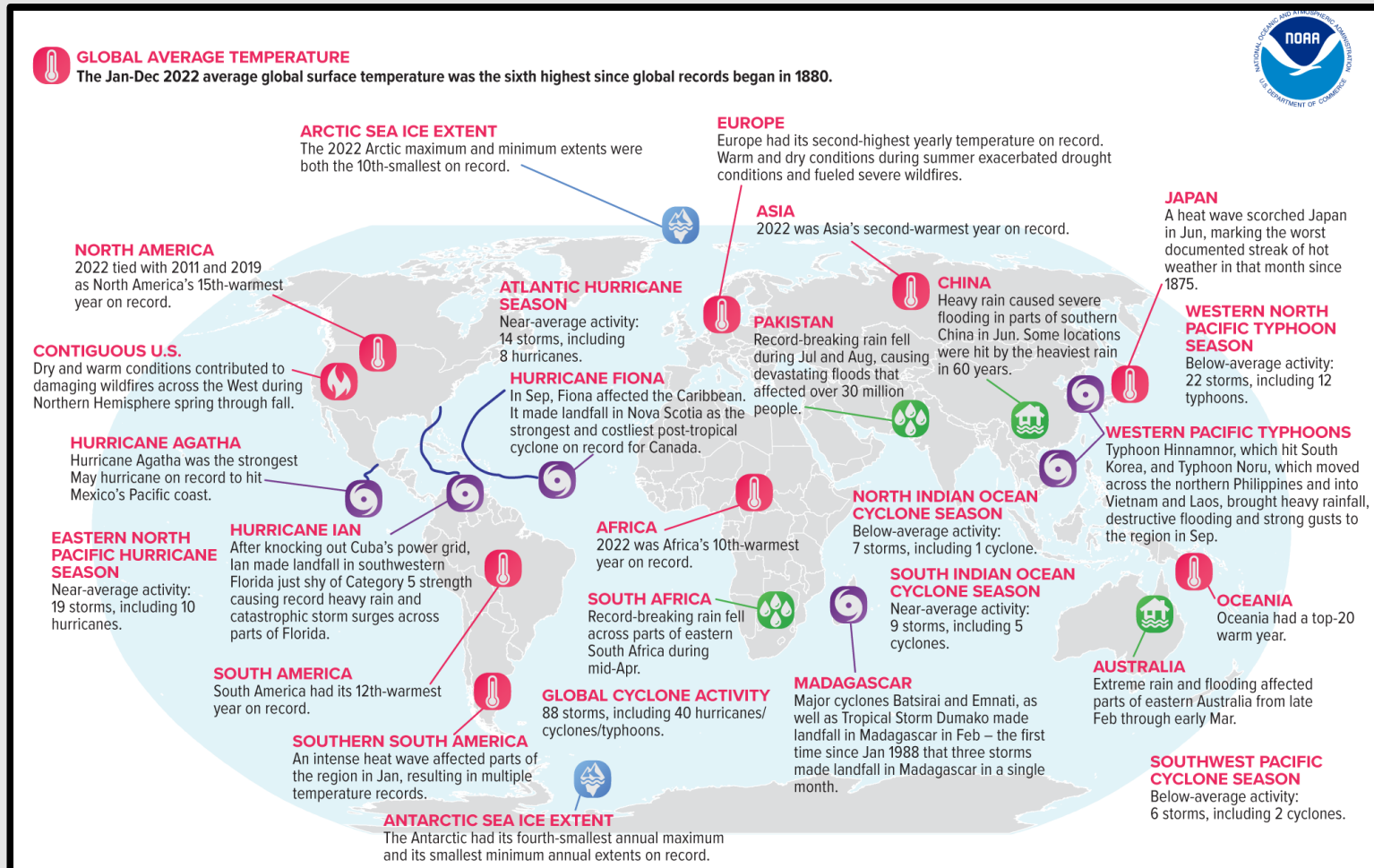
NASA: Warming Despite Continuing La Niña

Greatest warming in Northern Hemisphere, on land, and in the Arctic



NOAA: Select Significant Events of 2022

Once again there was no shortage of material for this map



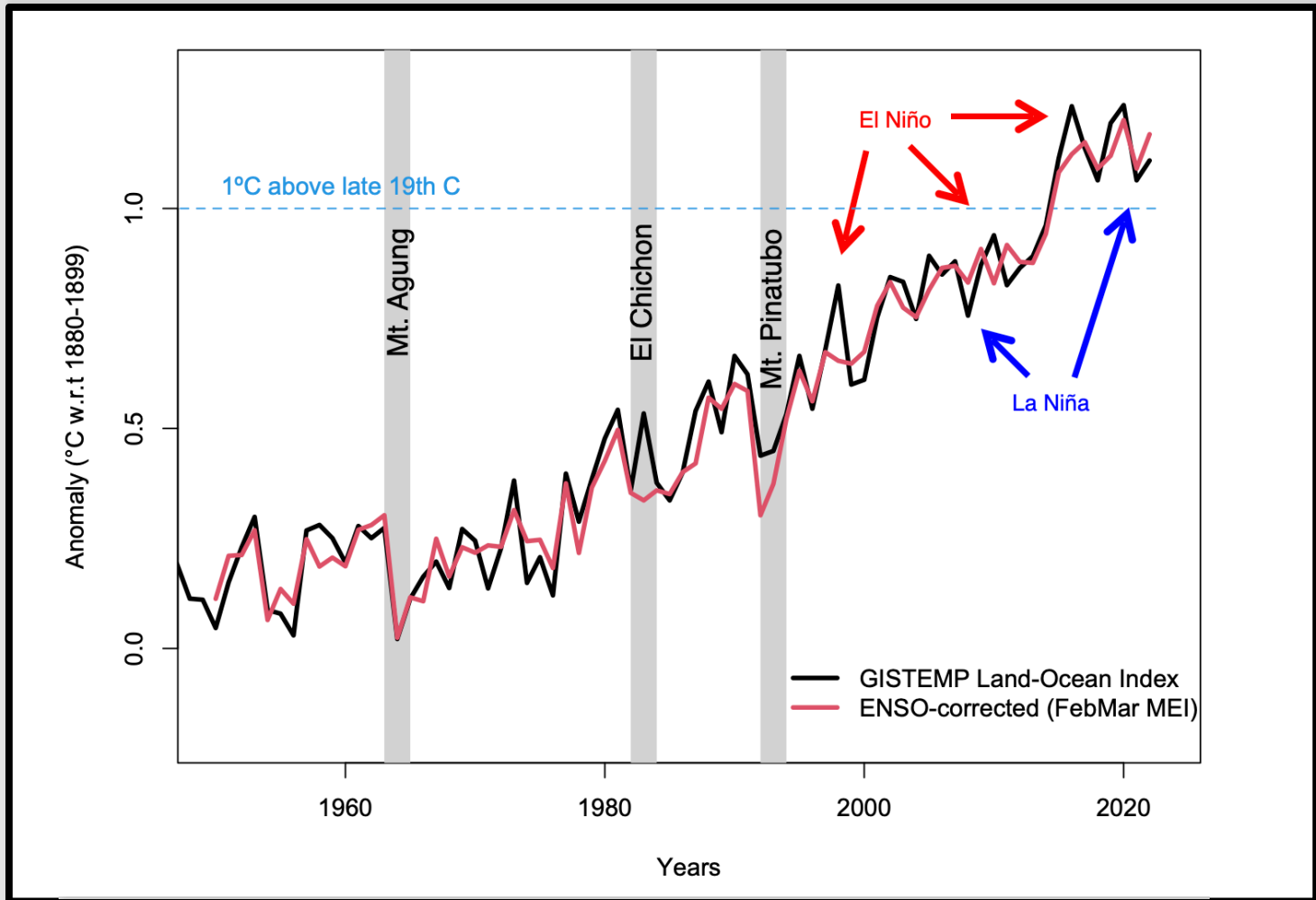
NASA: ENSO Impact on Global Temperature

Substantial cooling influence from La Niña in the eastern Pacific

ENSO impact in specific years:

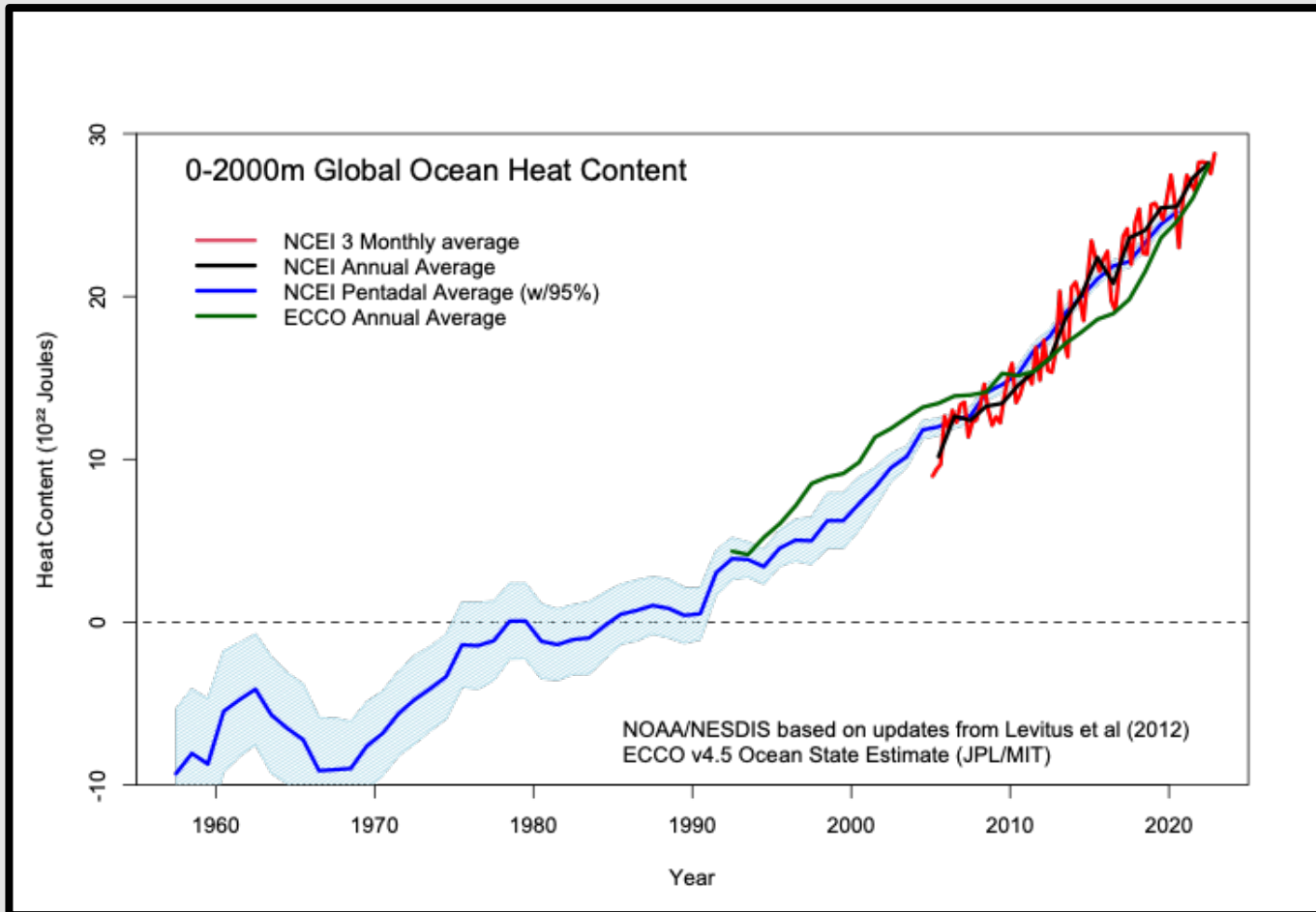
- 2016: 0.11°C
- 2017: -0.01°C
- 2018: -0.03°C
- 2019: 0.07°C
- 2020: 0.03°C
- 2021: -0.03°C
- 2022: -0.06°C

(Max. correlation with annual global mean is Feb-Mar ENSO index)



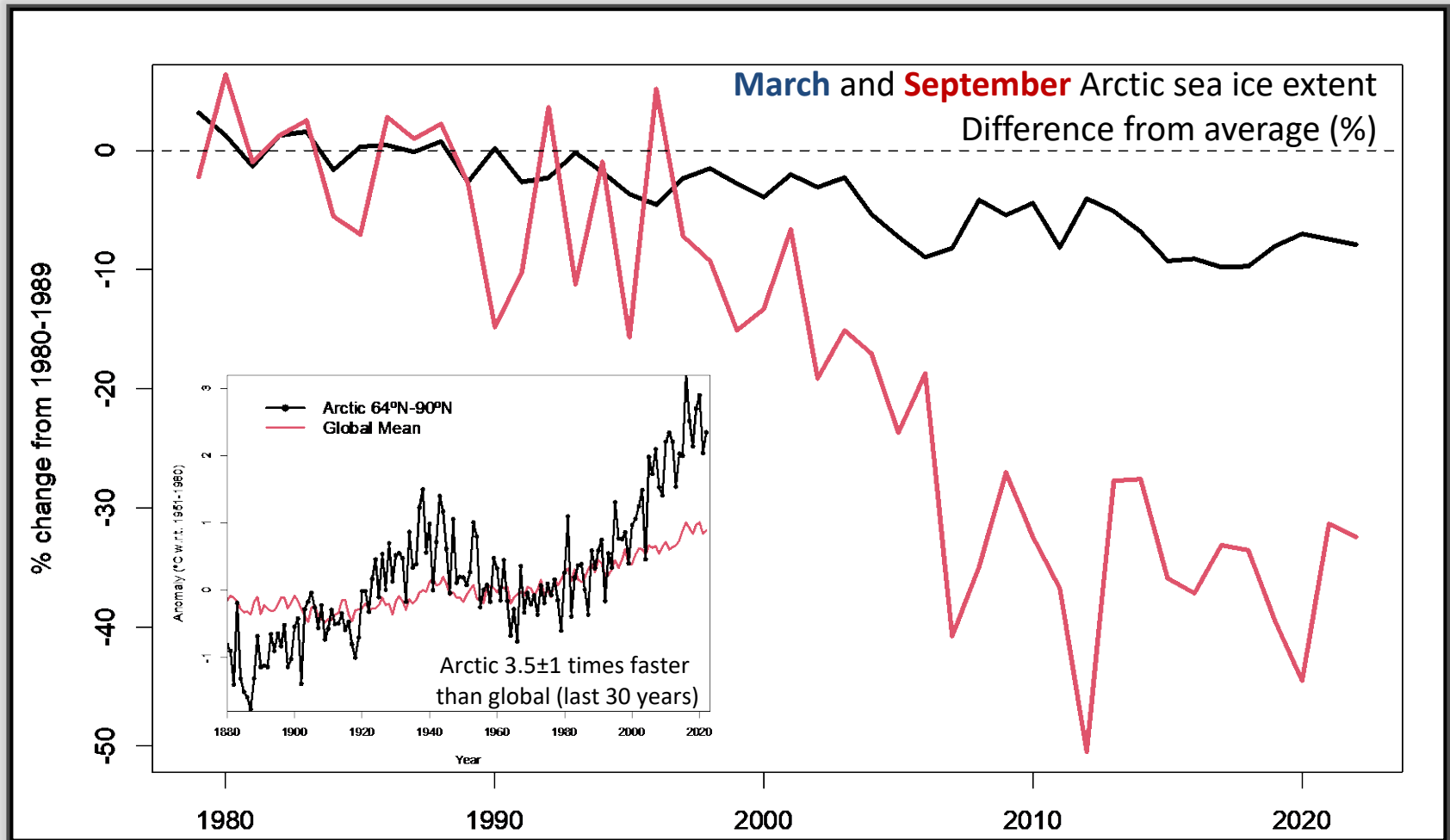
NOAA/NASA: Record Ocean Heat Content

Oceans absorb more than 90% of the excess heat



NASA: Arctic Sea Ice Declines

Arctic warming more than 3x faster than global mean



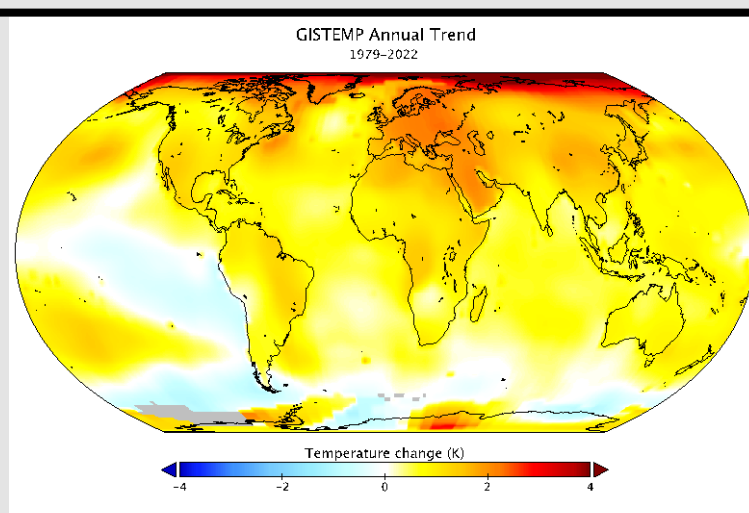
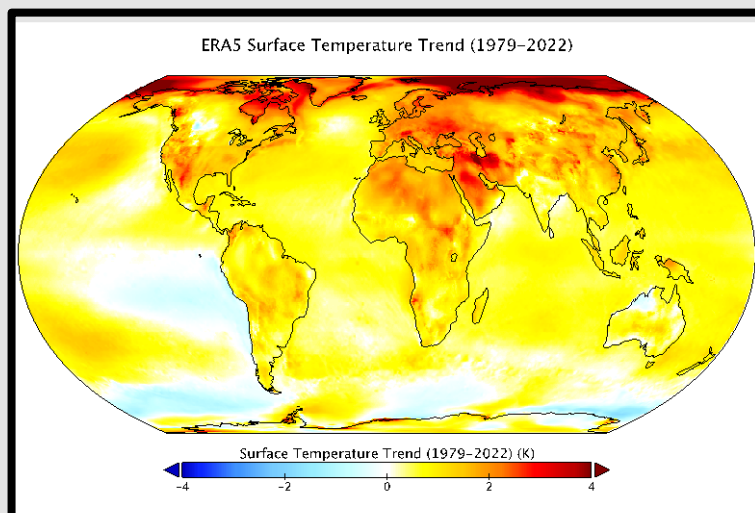
NASA: Evaluation Against Reanalysis / Remote Sensing

Independent data sets validate surface temperature analysis

ERA5 is the latest ECMWF reanalysis.

Trends 1979-2022:

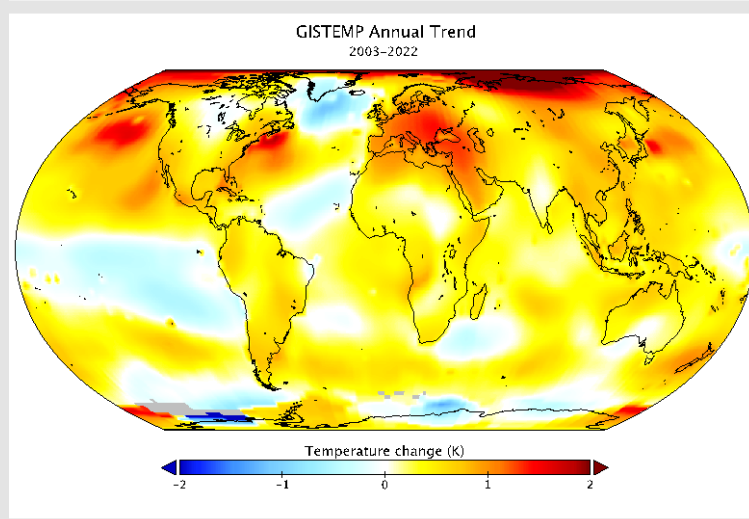
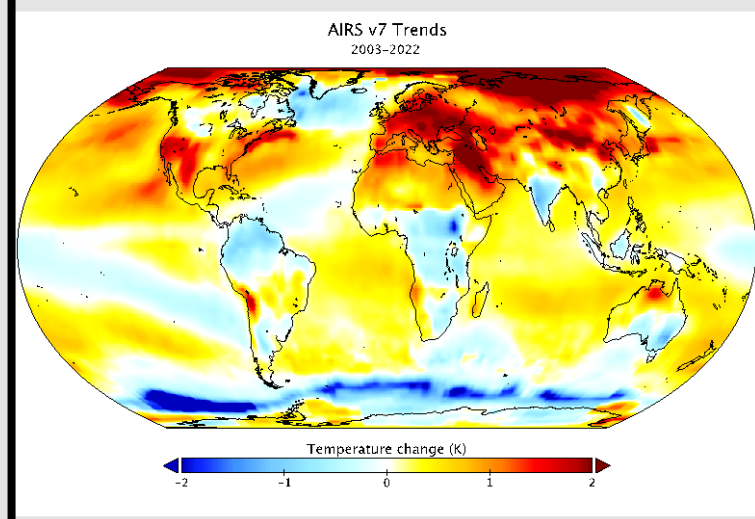
ERA5: 0.82°C
 GISTEMP: 0.80°C
 NOAA: 0.74°C



AIRS is an instrument on Eos Aqua.

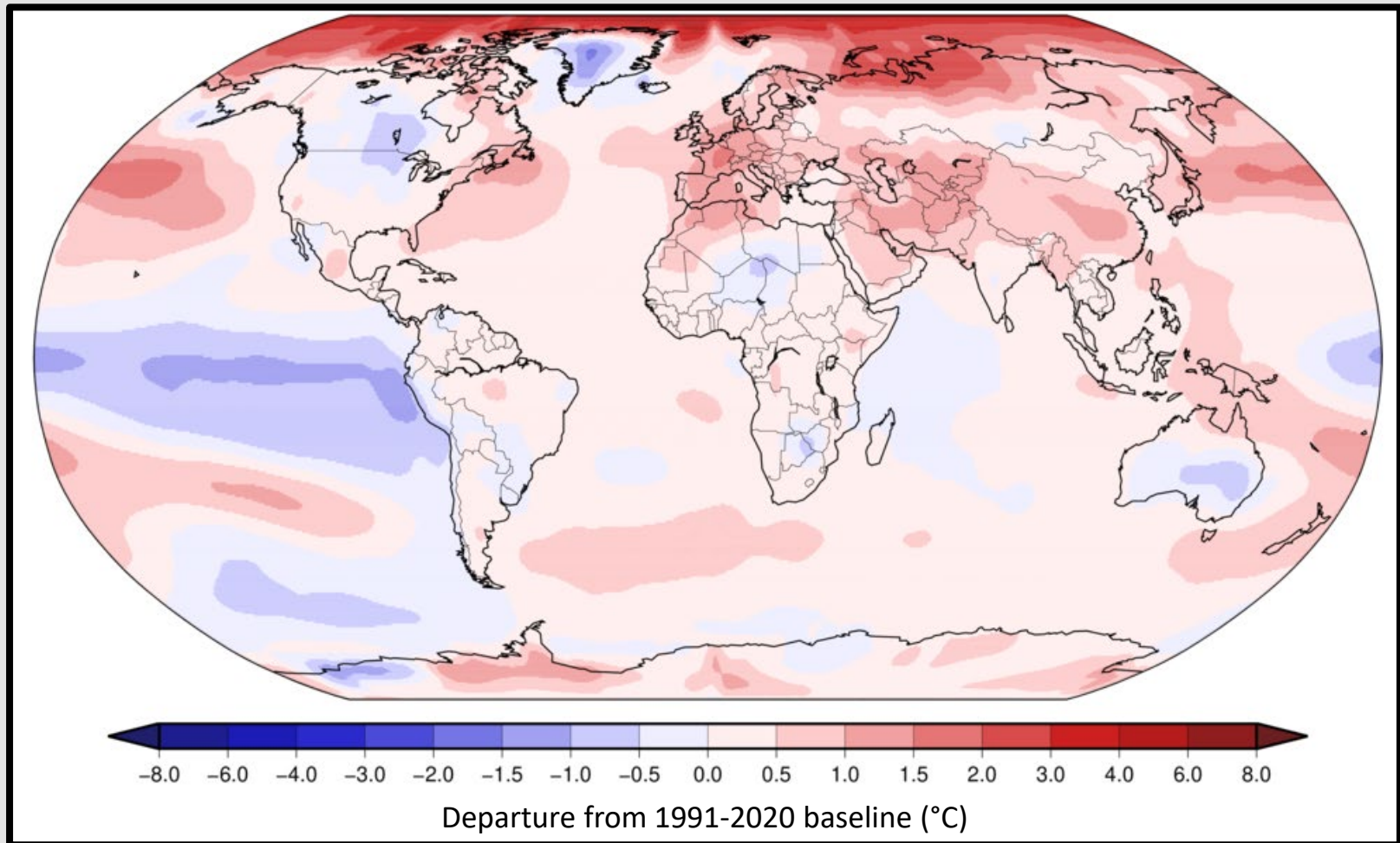
Trends 2003–2022:

AIRSV6: $0.38 \pm 0.18^{\circ}\text{C}$
 AIRSV7: $0.30 \pm 0.16^{\circ}\text{C}$
 GISS: $0.44 \pm 0.14^{\circ}\text{C}$
 NOAA: $0.38 \pm 0.16^{\circ}\text{C}$
 ERA5: $0.48 \pm 0.16^{\circ}\text{C}$



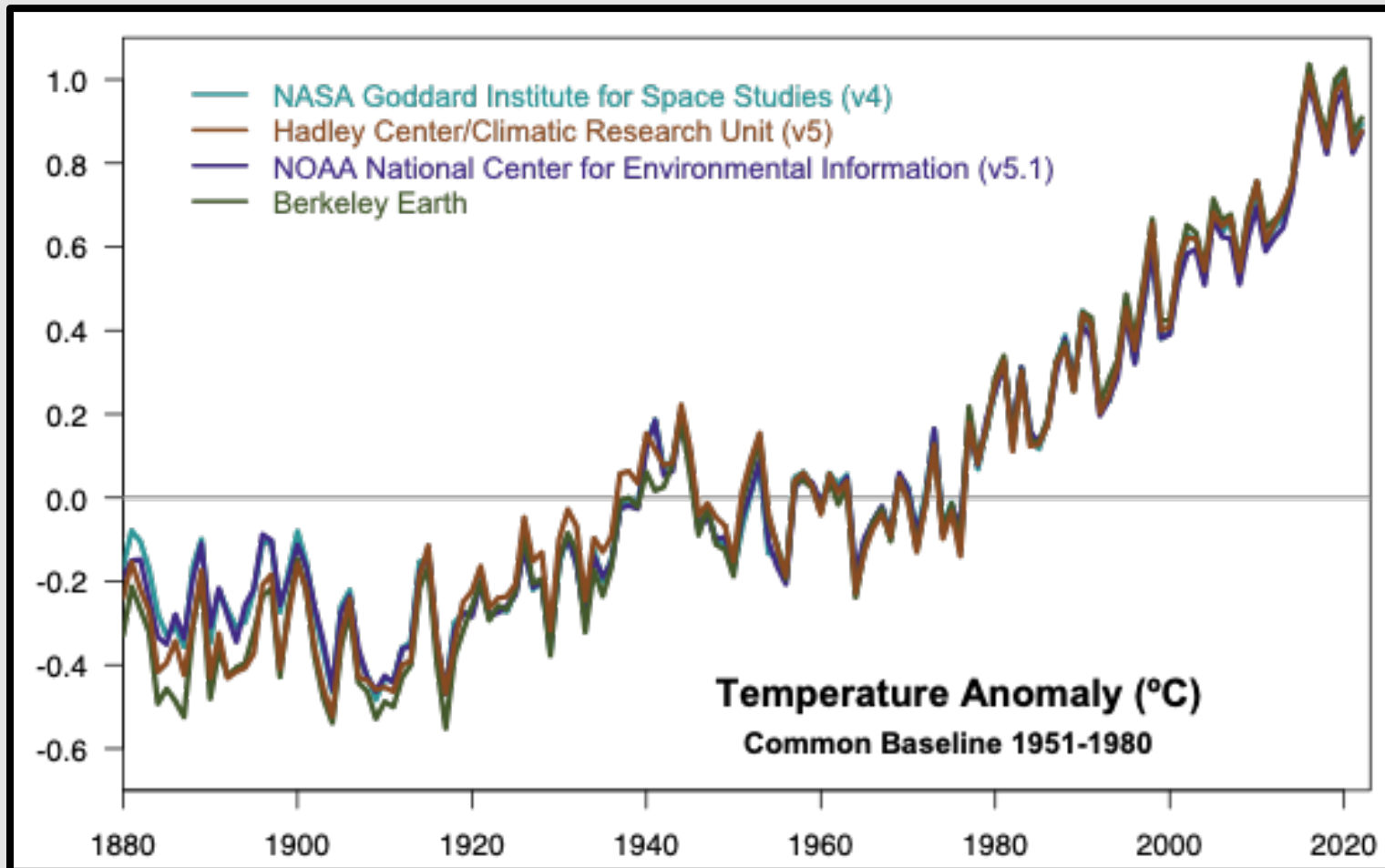
NOAA: New Global Analysis (v5.1)

Complete spatial coverage dating back to 1850



NOAA: Analyses Track One Another

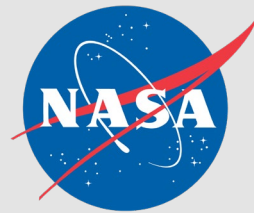
Despite Differences in Methodology



Questions?

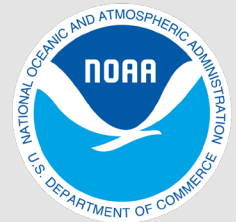
Gavin A. Schmidt

Director, NASA's Goddard Institute for Space Studies



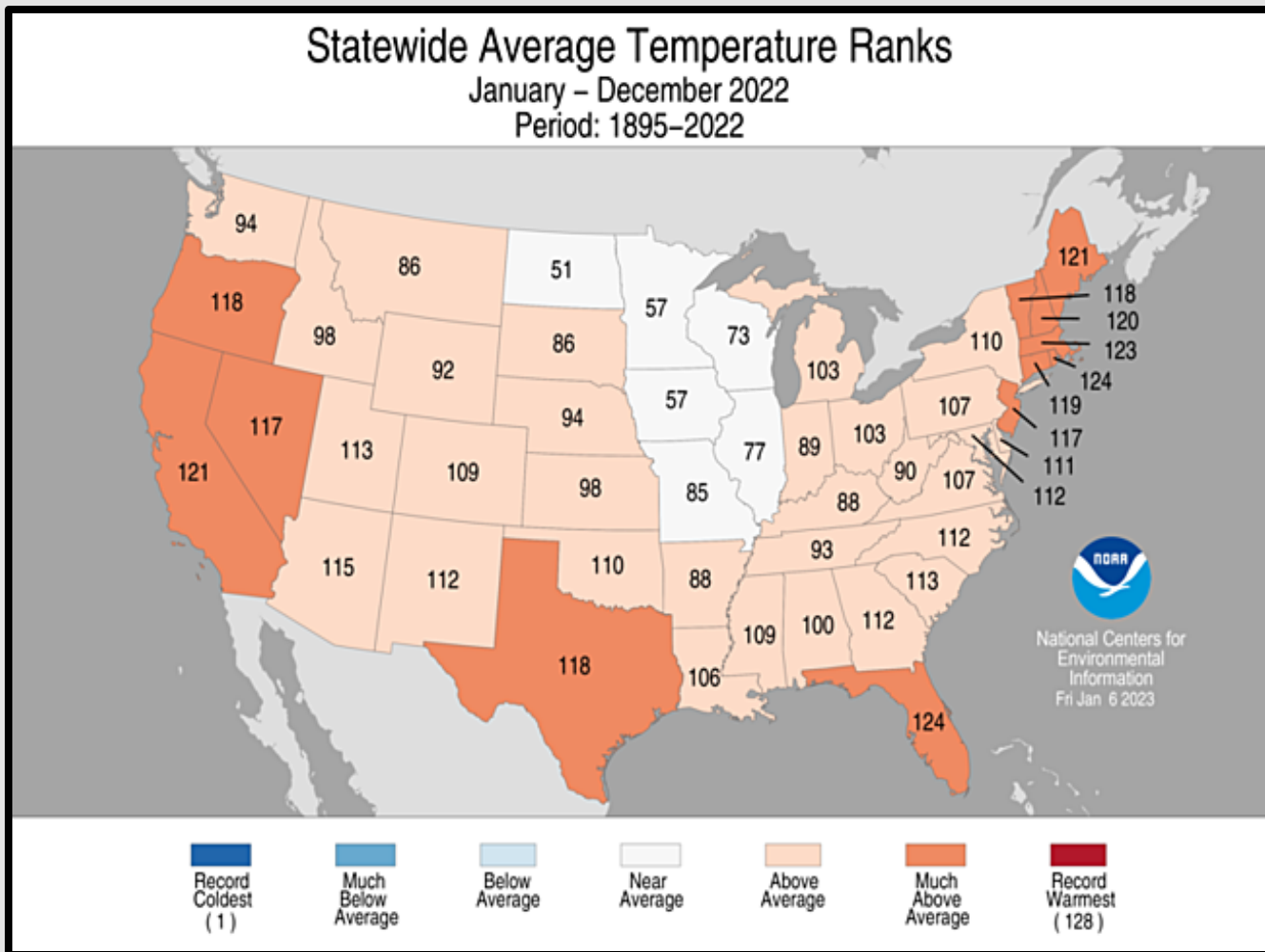
Russell S. Vose

Chief, Analysis and Synthesis Branch, NOAA's National Centers for Environmental Information



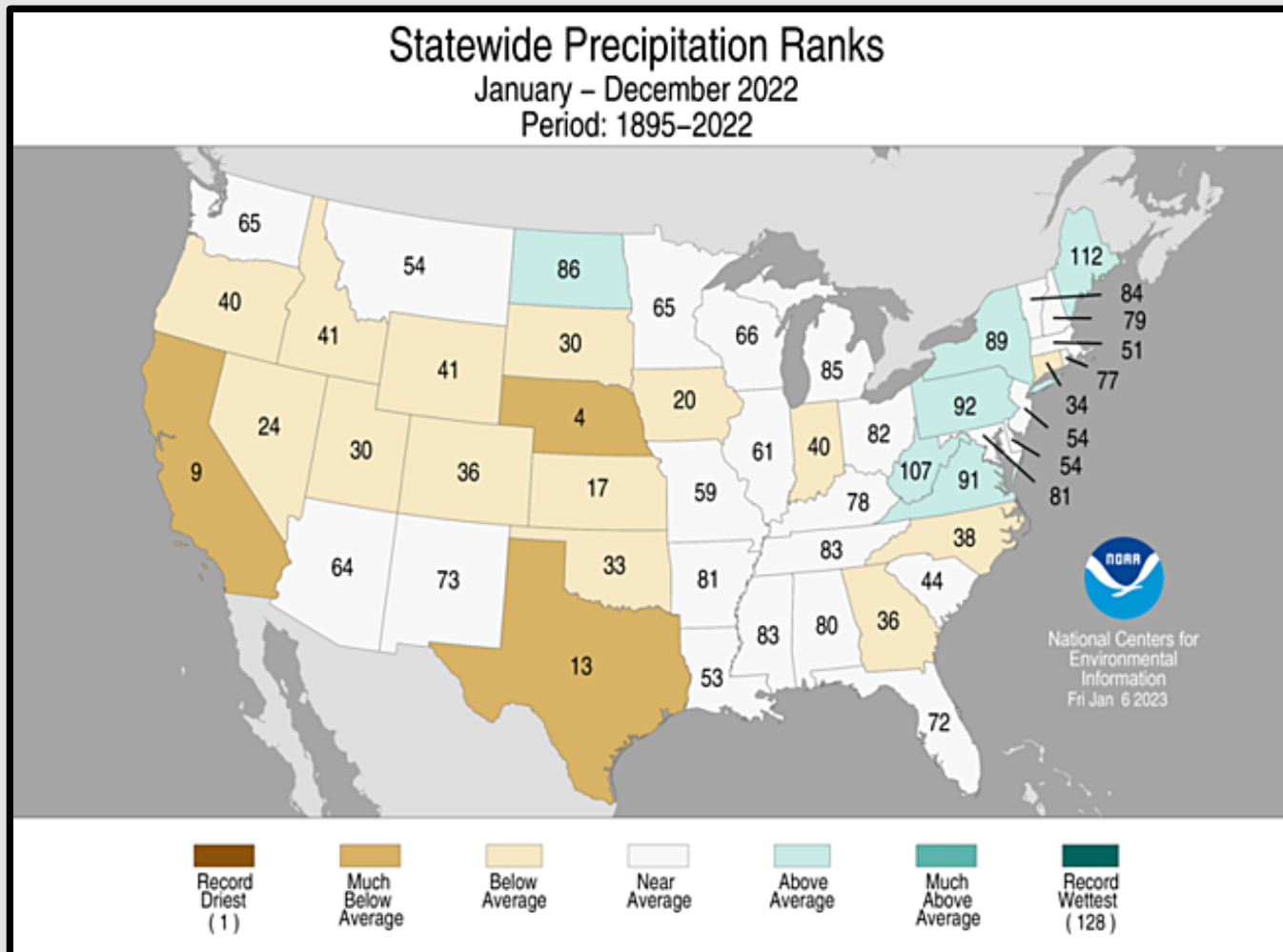
18th Warmest Year Since 1895

National average: 53.4°F (1.4°F above 20th century baseline)



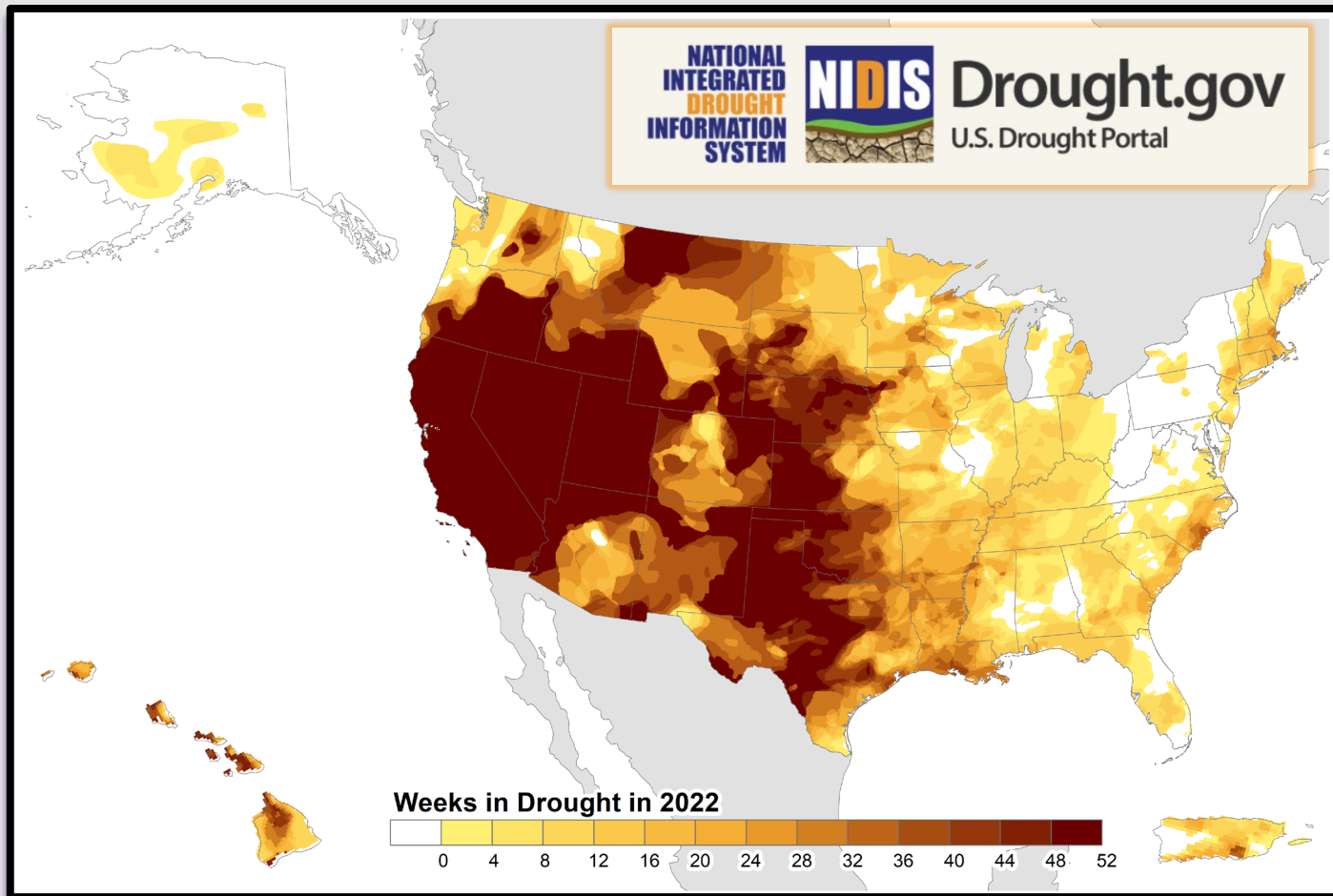
27th Driest Year Since 1895

National average: 28.35 inches (1.59 inches below 20th century baseline)



Drought Impacted the West

About 63% of U.S. was in drought by late October



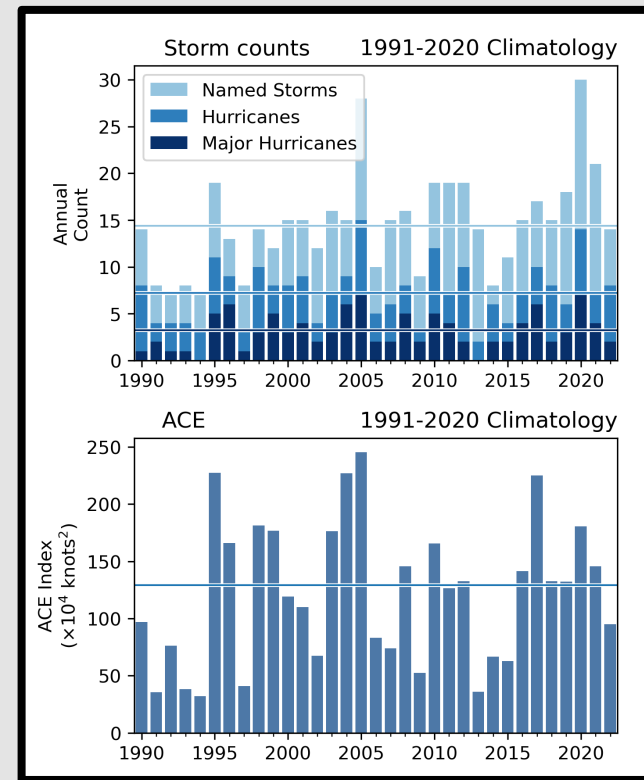
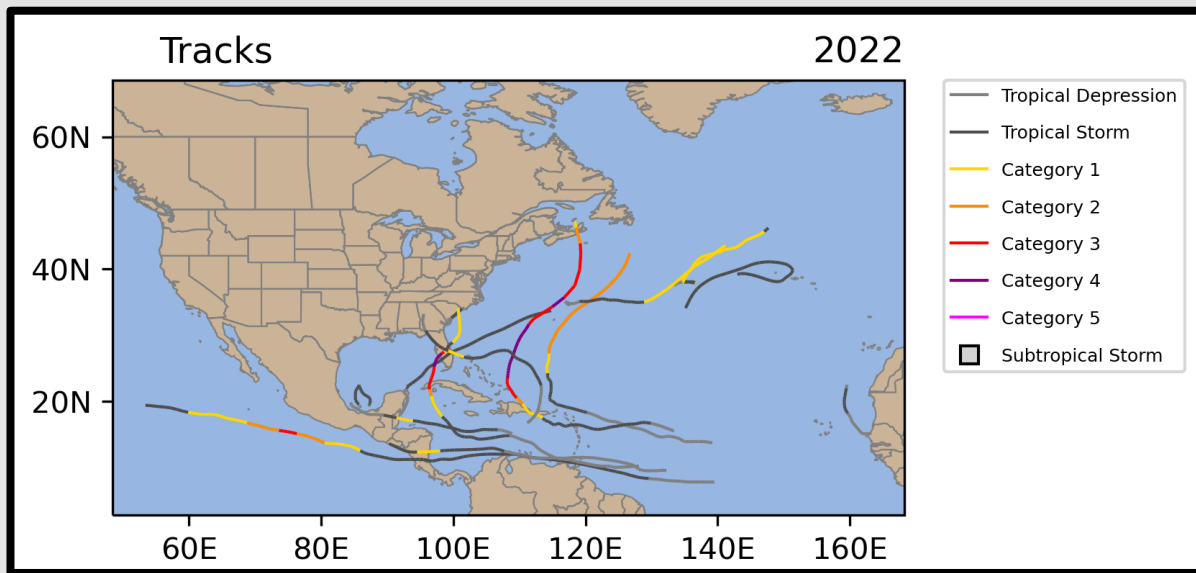
Active Atlantic Hurricane Season

Ian was the 3rd most costly storm on record

14 named storms – near average

ACE value – about 80% of average

Fiona & Ian – September Cat 4 storms



Another Year of Billion-Dollar Disasters

18 events in 2022 (3rd highest), \$165 billion in losses (3rd highest)

