



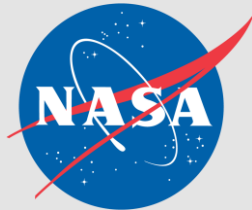
NOAA/NASA

Annual Global Analysis for 2018

2018 was 4th warmest for globe, 3rd wettest for US

Gavin A. Schmidt

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Derek Arndt

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Centers for Environmental Information*



February 2019

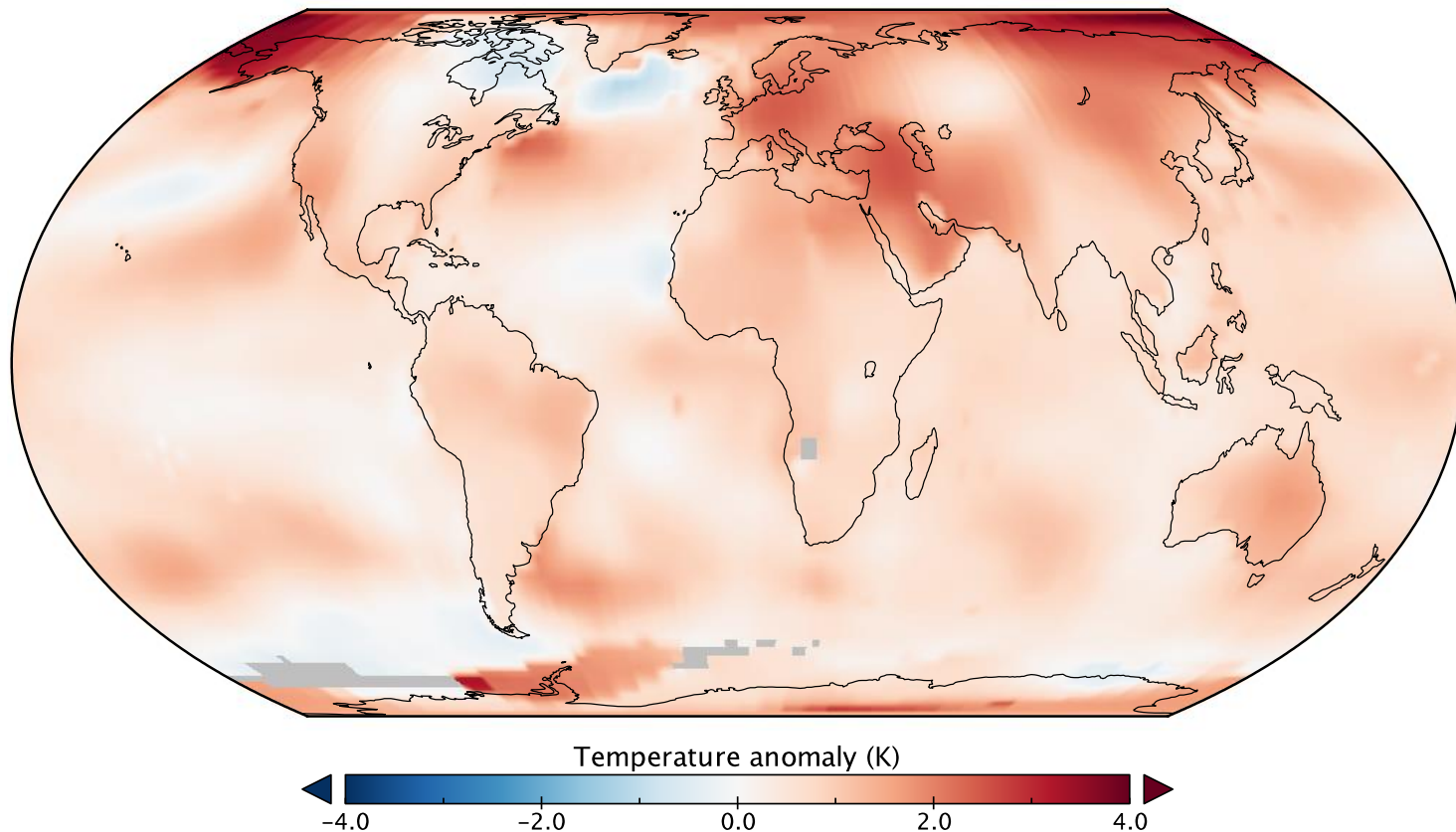
NASA 2018 Global Temperature

2018:

0.83°C / 1.49°F
above 1951-80
average

4th Warmest
year of NASA
GISTEMP record

GISTEMP Annual Mean 2018
Baseline 1950-1981



NOAA 2018 Global Temperature

0.79°C / 1.42°F above 1901-2000 average; 4th warmest year of record

Record warmth

Much of: Europe, the Mediterranean, the Middle East, New Zealand and nearby ocean, and parts of the Atlantic and western Pacific

ENSO

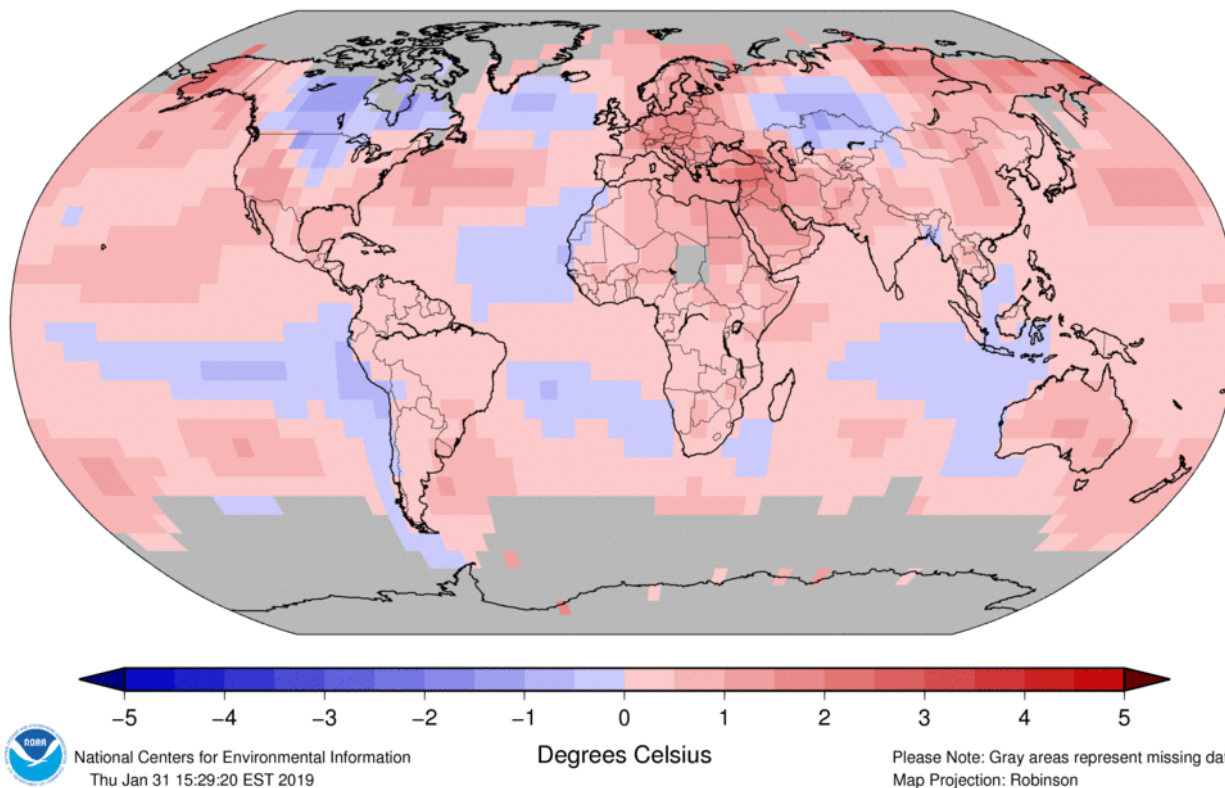
Neutral conditions prevailed most of the year

South of 20°S latitude:

Warmest year of record for 2nd consecutive year

Land & Ocean Temperature Departure from Average Jan–Dec 2018 (with respect to a 1981–2010 base period)

Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0



Continental Temperatures

records begin 1910

Europe

warmest year on record, nominally

France, Germany, Switzerland

Warmest year on record

Africa; Oceania

among 5 warmest years

Asia; S. America

among 10 warmest years

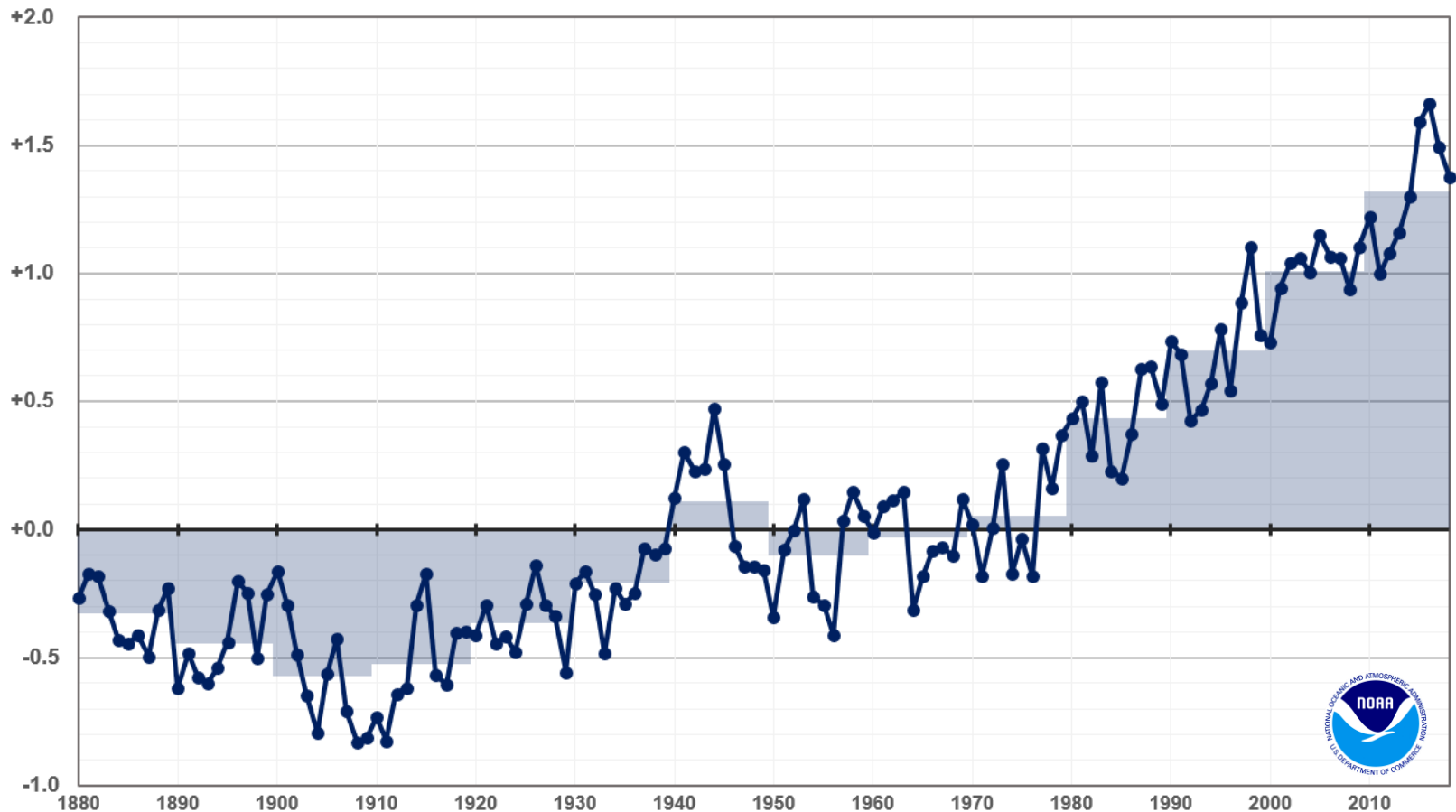
N. America

among 20 warmest years

Global Temperature Time Series

NOAA GlobalTemp

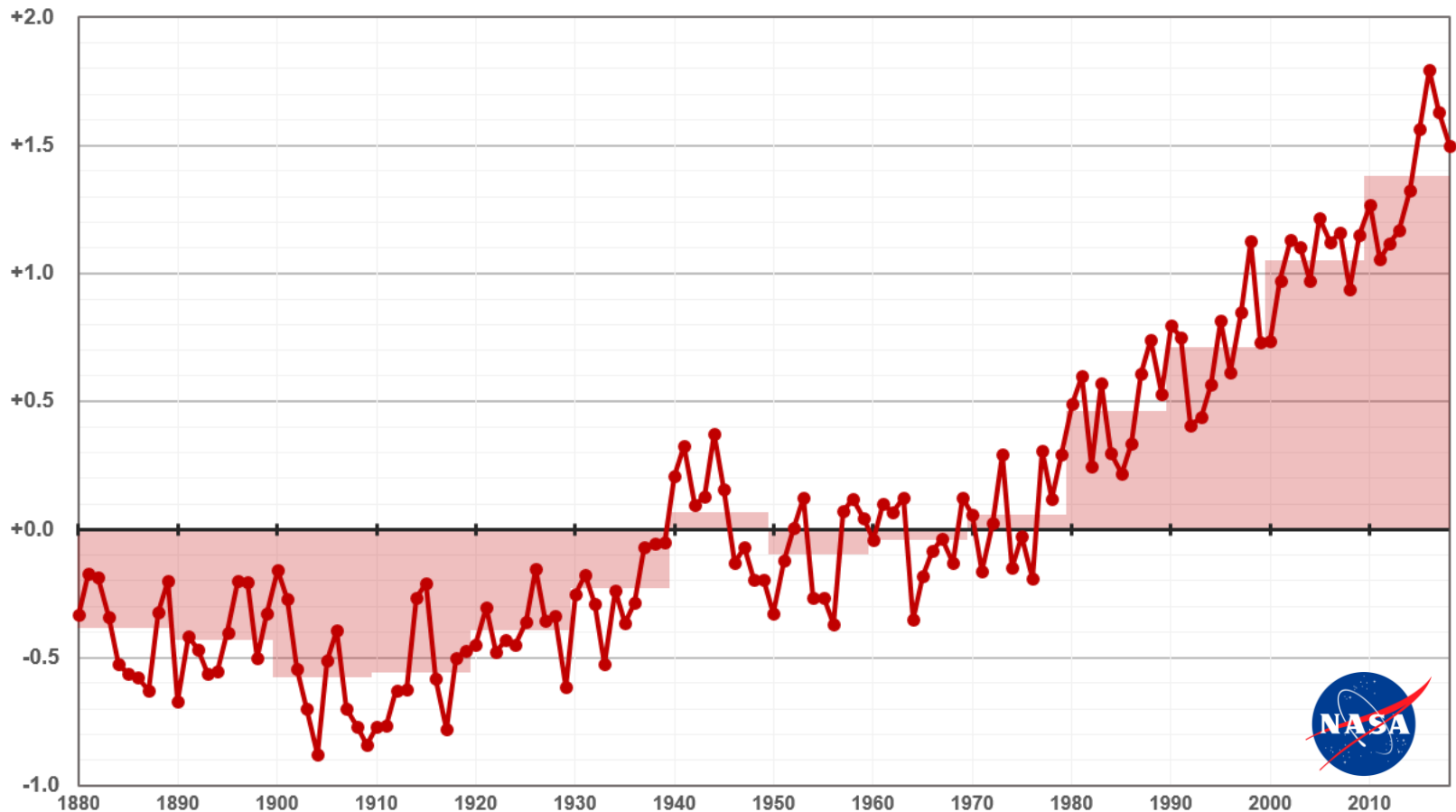
Annual Global Temperature: Difference From 1951-80 Average, in °F



Global Temperature Time Series

NASA GISTEMP

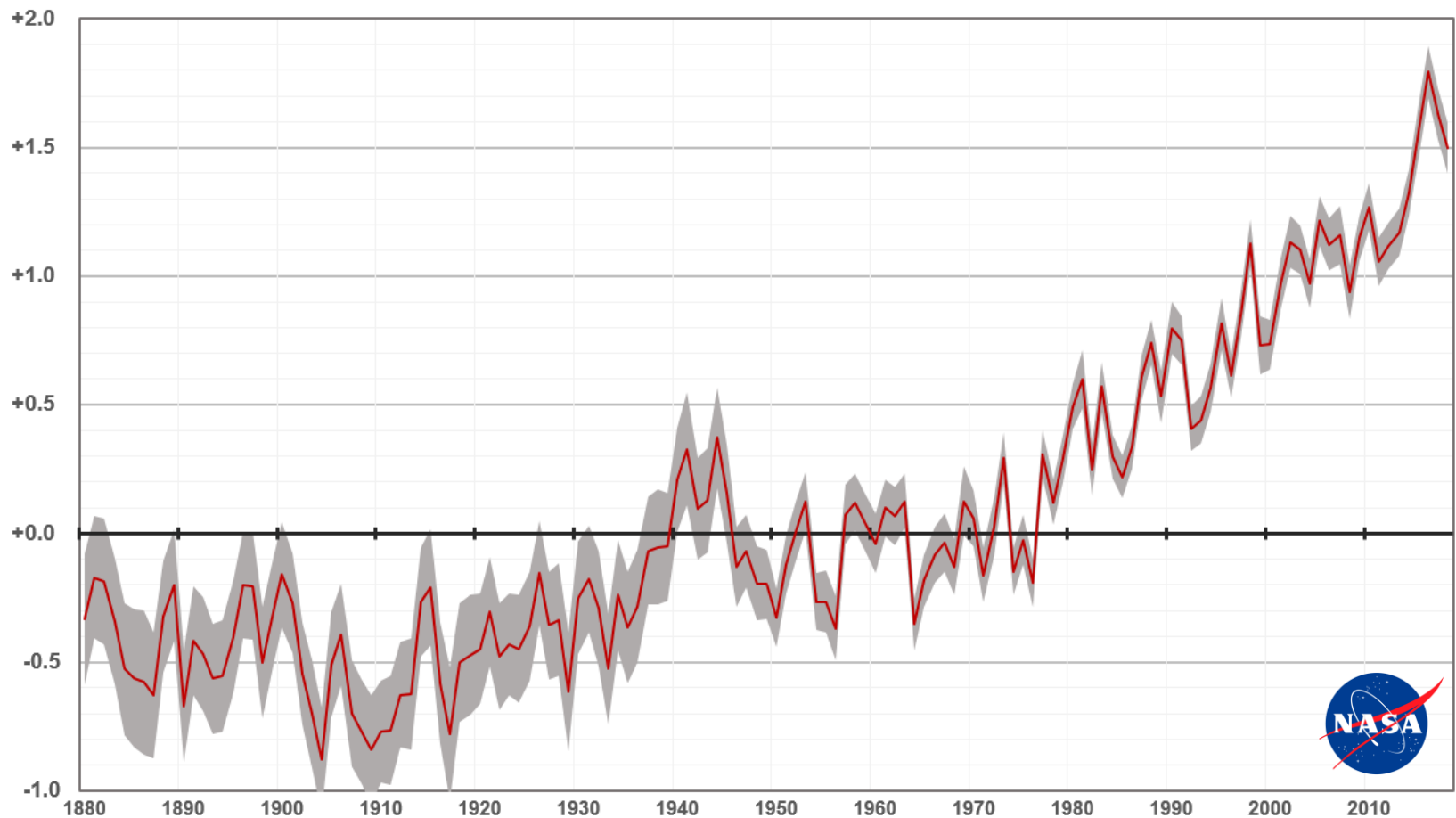
Annual Global Temperature: Difference From 1951-80 Average, in °F



Global Temperature Time Series

NASA GISTEMP

Annual Global Temperature: Difference From 1951-80 Average, in °F

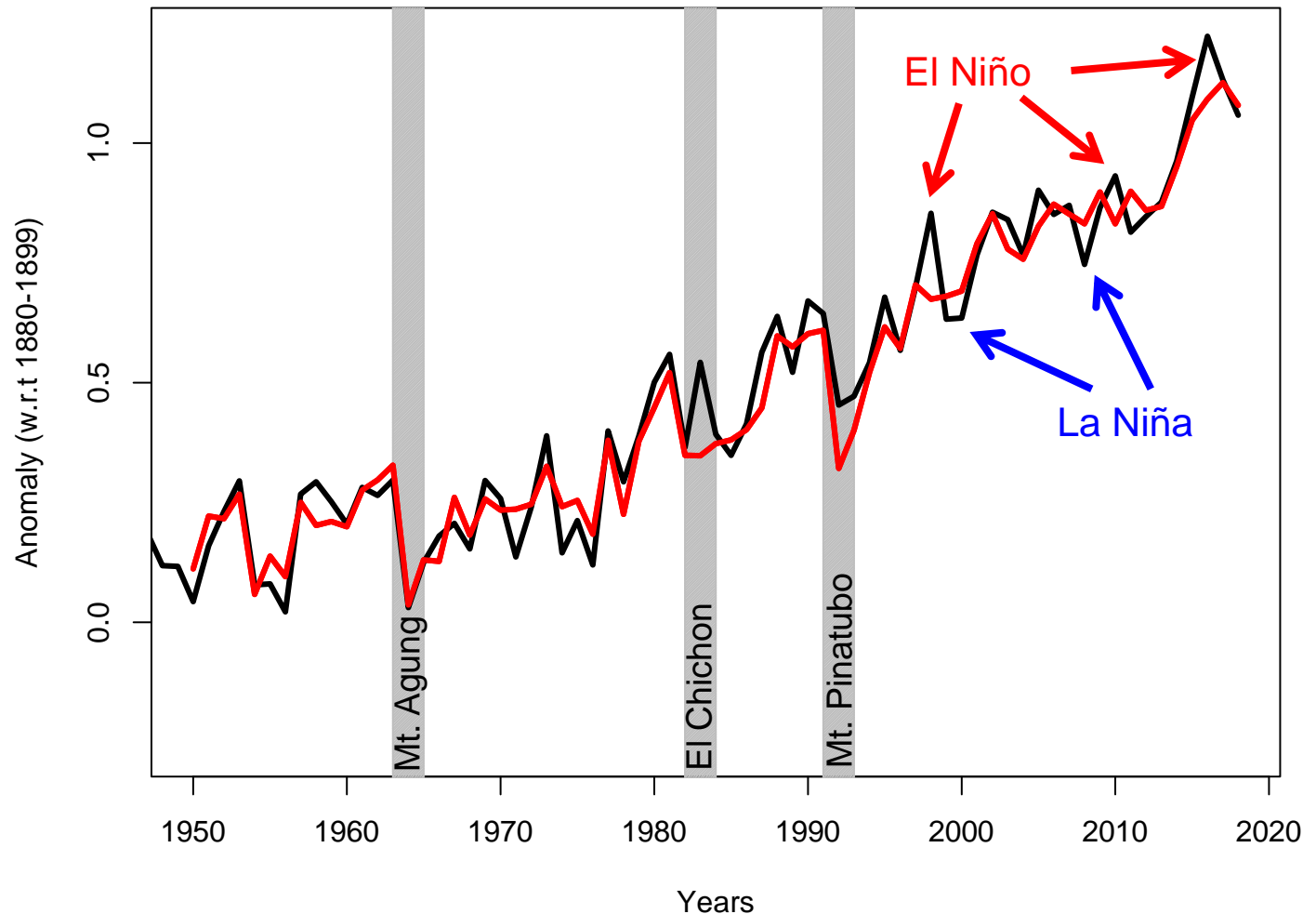


Impact of ENSO on NASA analysis

Maximum correlation to annual mean is Feb-Mar ENSO index

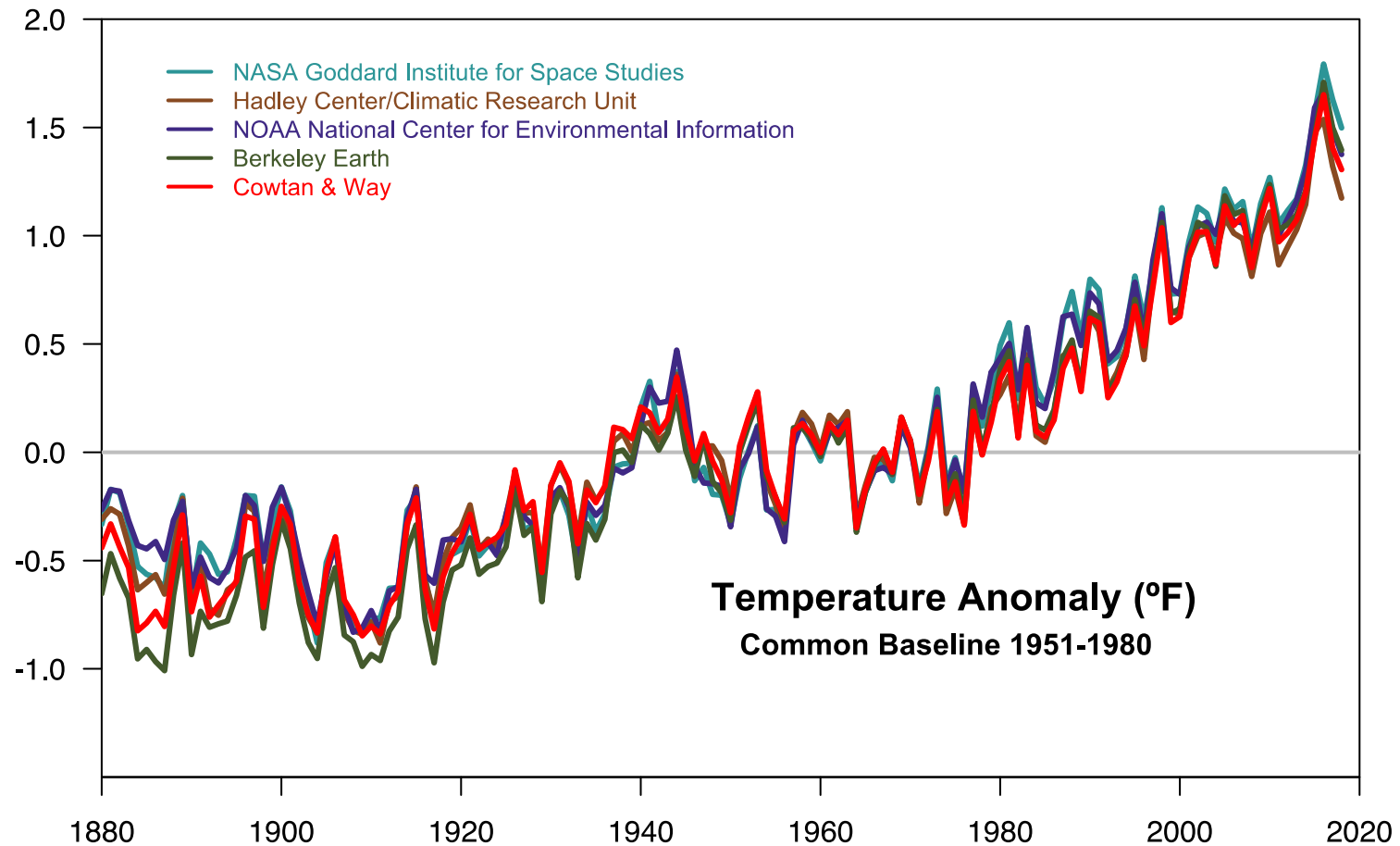
ENSO contribution to specific years:

2015: 0.05°C
2016: 0.13°C
2017: 0.00°C
2018: -0.02°C



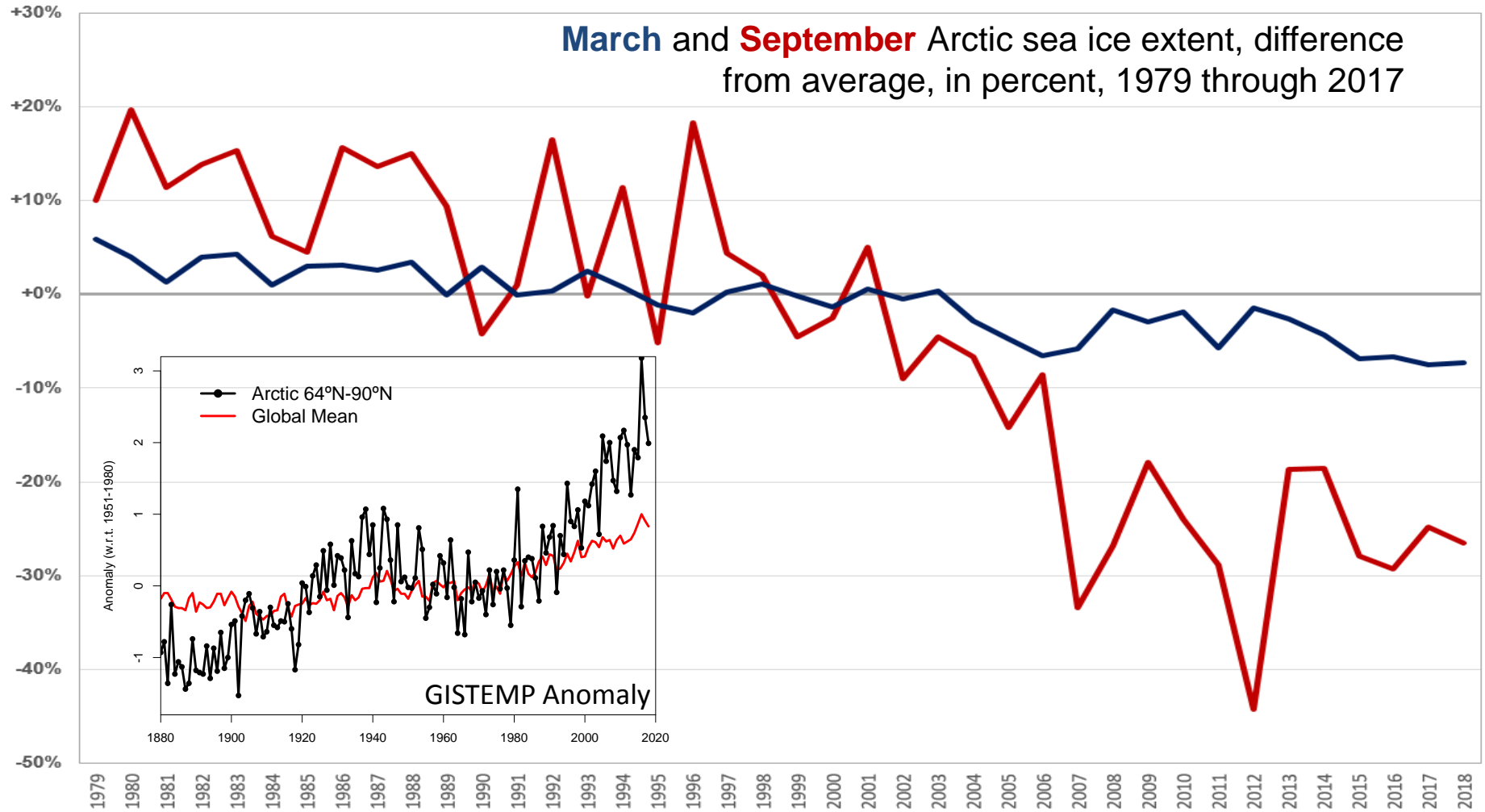
Global Analyses Side by Side

Several major datasets: relative to a common 1951-1980 base period



Arctic Sea Ice Extent Since 1979

(inset: Arctic temperature change vs. Global average)



Evaluation against Reanalyses (ERA5) and Remote Sensing (AIRS)

ERA-5 is the latest reanalysis from ECMWF.

Trends 1979-2018:

ERA5: 0.72°C

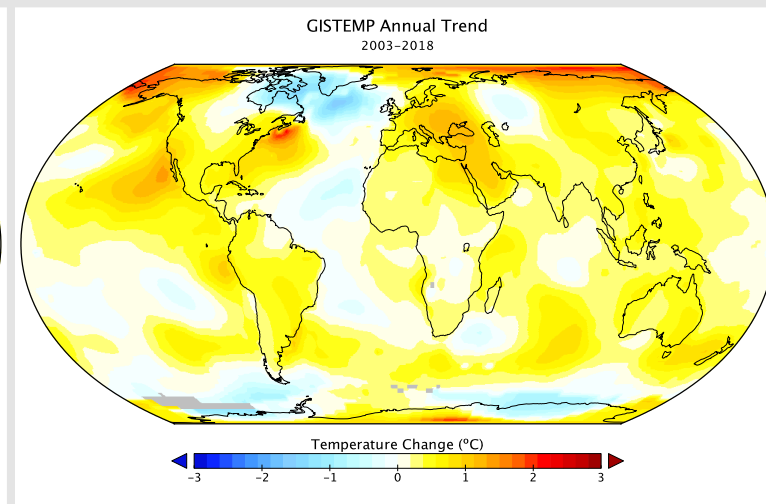
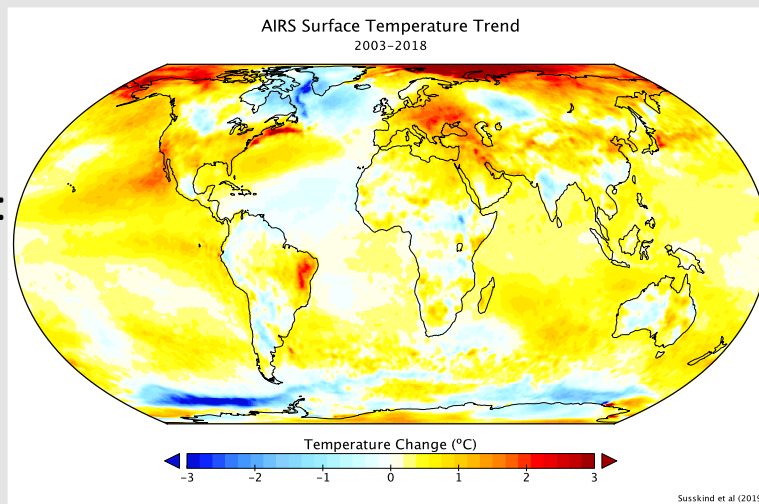
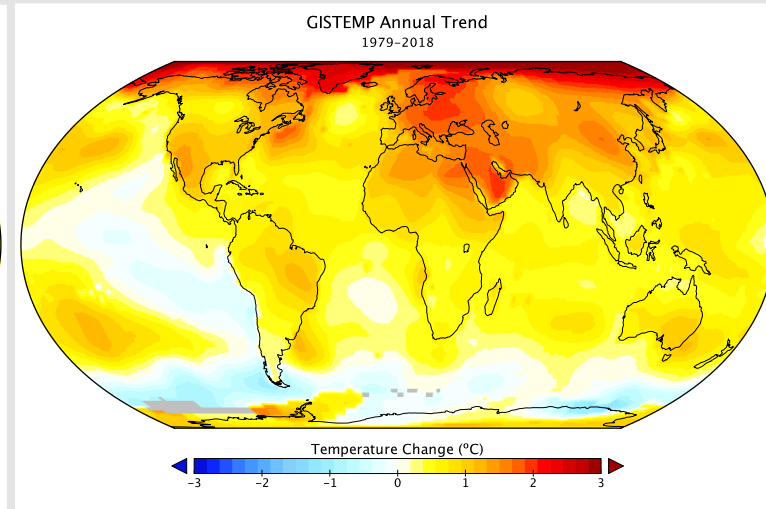
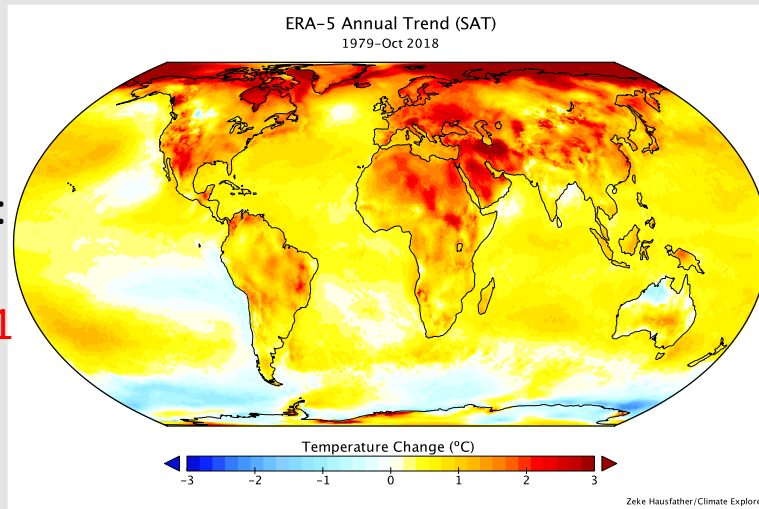
GISTEMP: $0.68 \pm 0.1^{\circ}\text{C}$ (95%CI)

AIRS is an IR instrument on Eos Aqua.

Trends 2003-2018:

AIRS: 0.36°C

GISTEMP: $0.35 \pm 0.17^{\circ}\text{C}$



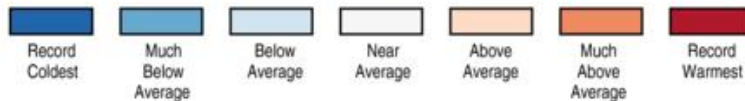
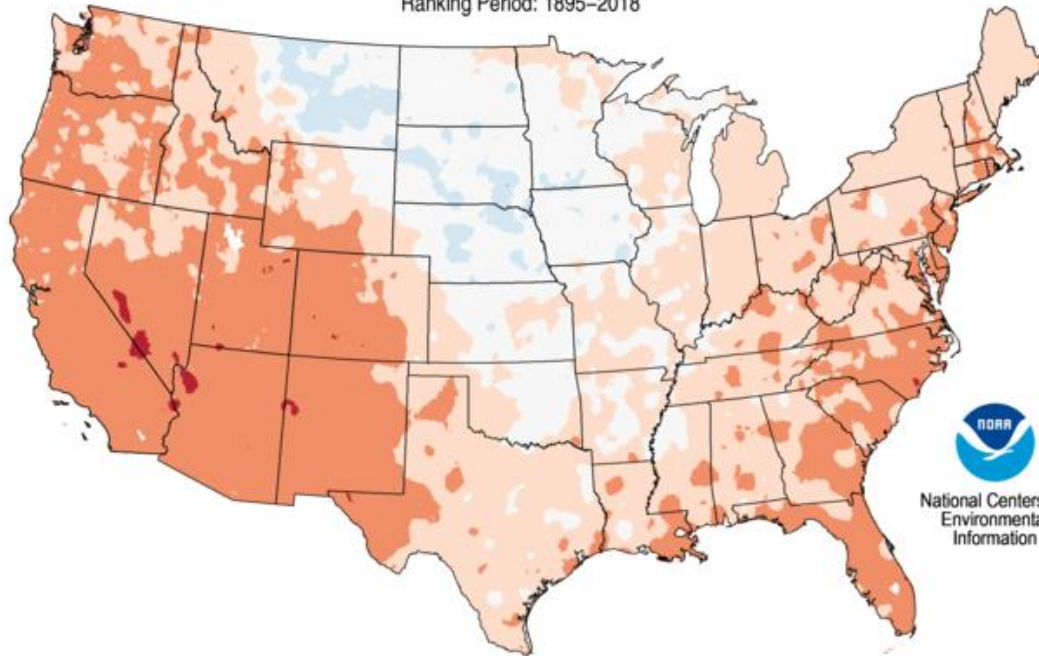
U.S. Climate Conditions: 2018

Temperature: 53.5°F; 1.5°F above 20th century average; 14th warmest

Mean Temperature Percentiles

January–December 2018

Ranking Period: 1895–2018



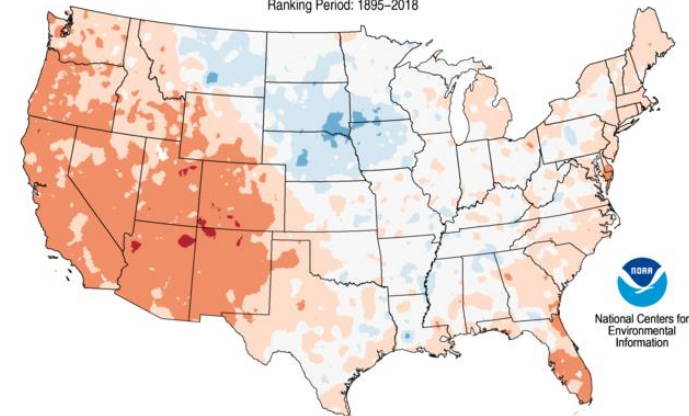
Created: Thu Jan 31 2019

Data Source: 5km Gridded Dataset (nClimGrid)

Maximum Temperature Percentiles

January–December 2018

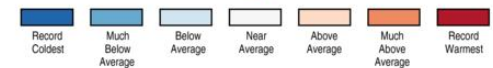
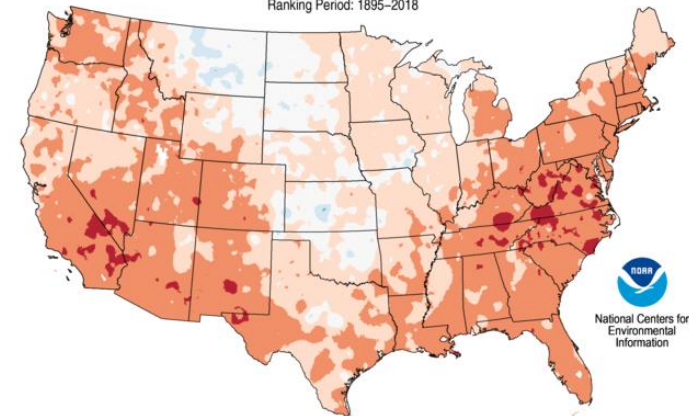
Ranking Period: 1895–2018



Minimum Temperature Percentiles

January–December 2018

Ranking Period: 1895–2018



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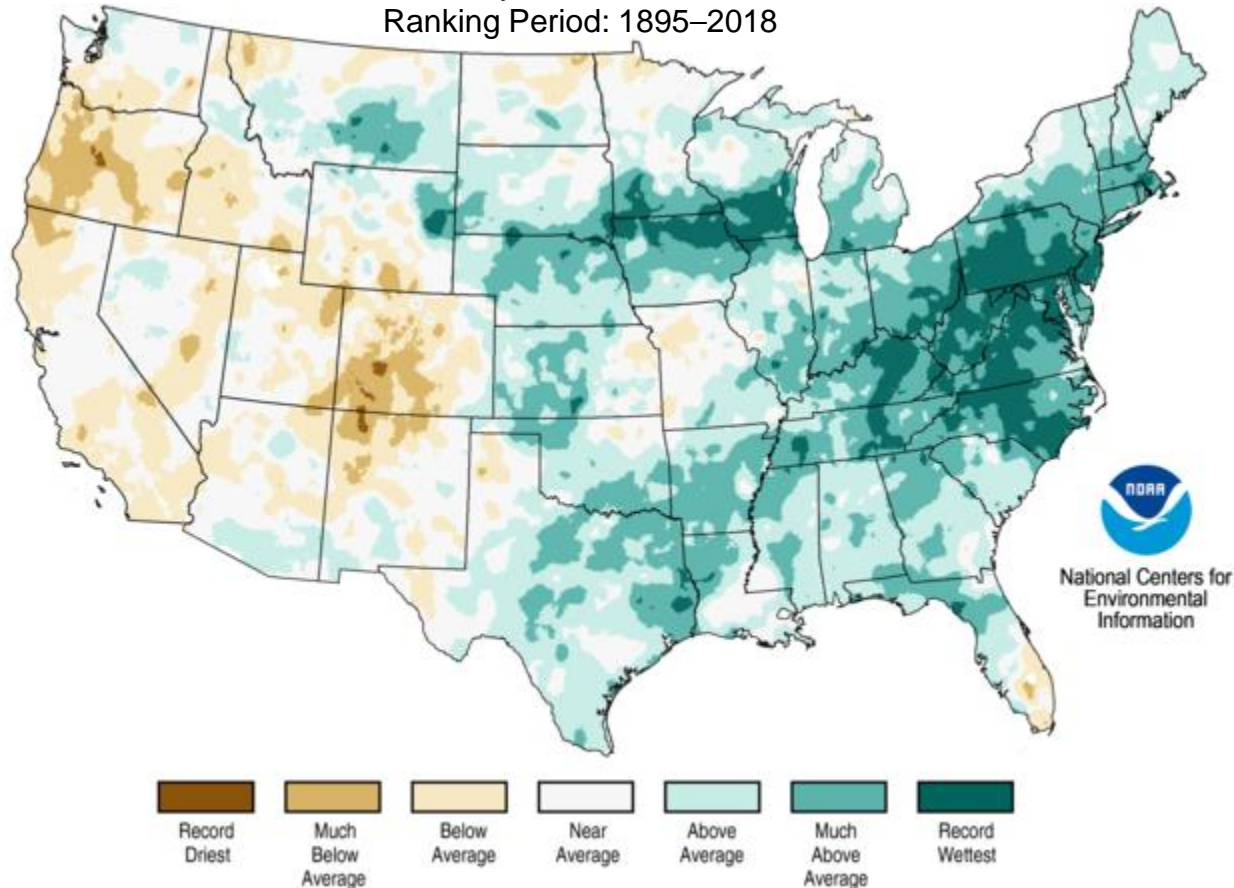
U.S. Climate Conditions: 2018

Precipitation: 34.63 in.; 4.69 in. above 20th century average; 3rd wettest

Total Precipitation Percentiles

January–December 2018

Ranking Period: 1895–2018

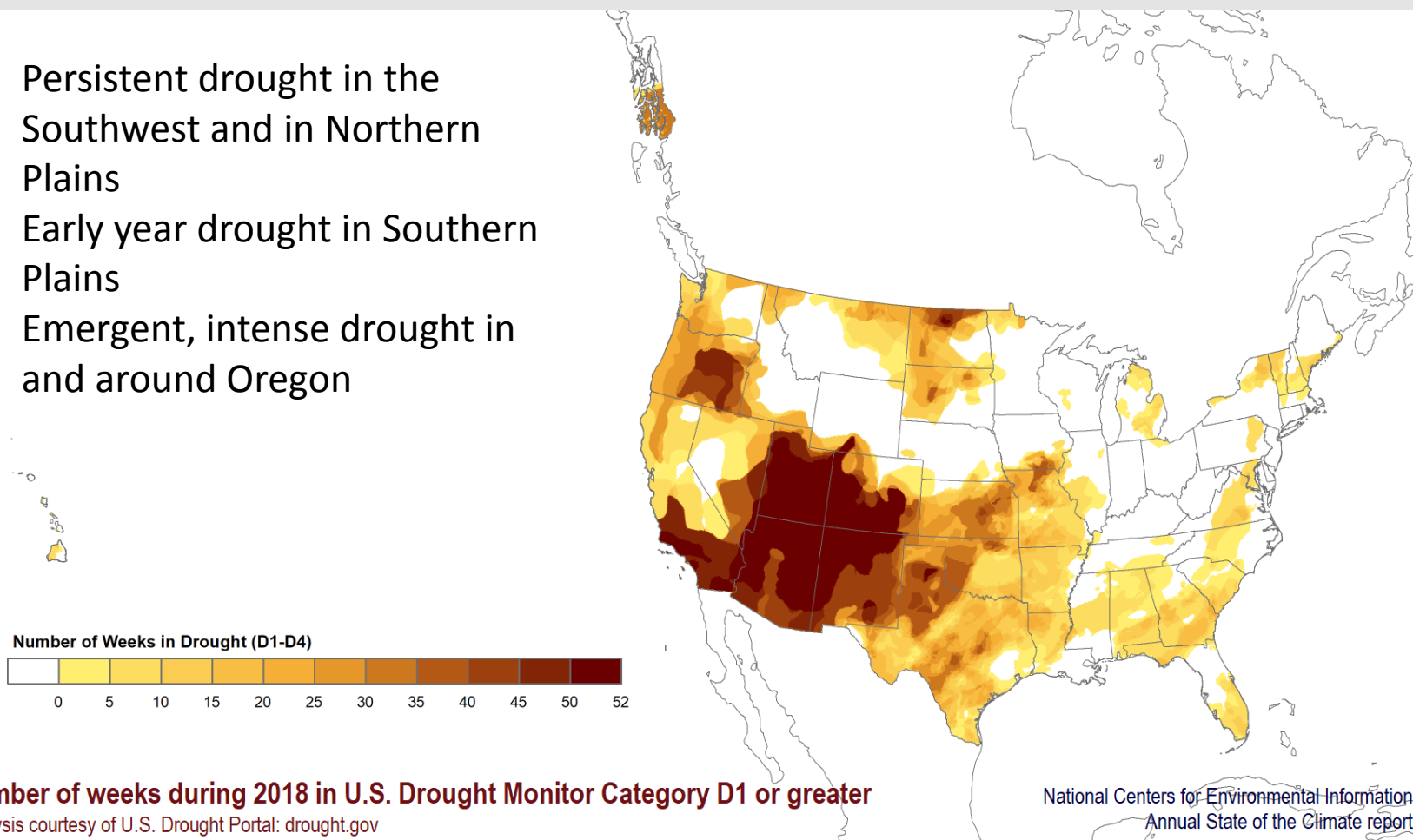


Created: Thu Jan 31 2019

Data Source: 5km Gridded Dataset (nClimGrid)

U.S. Drought Conditions: 2018

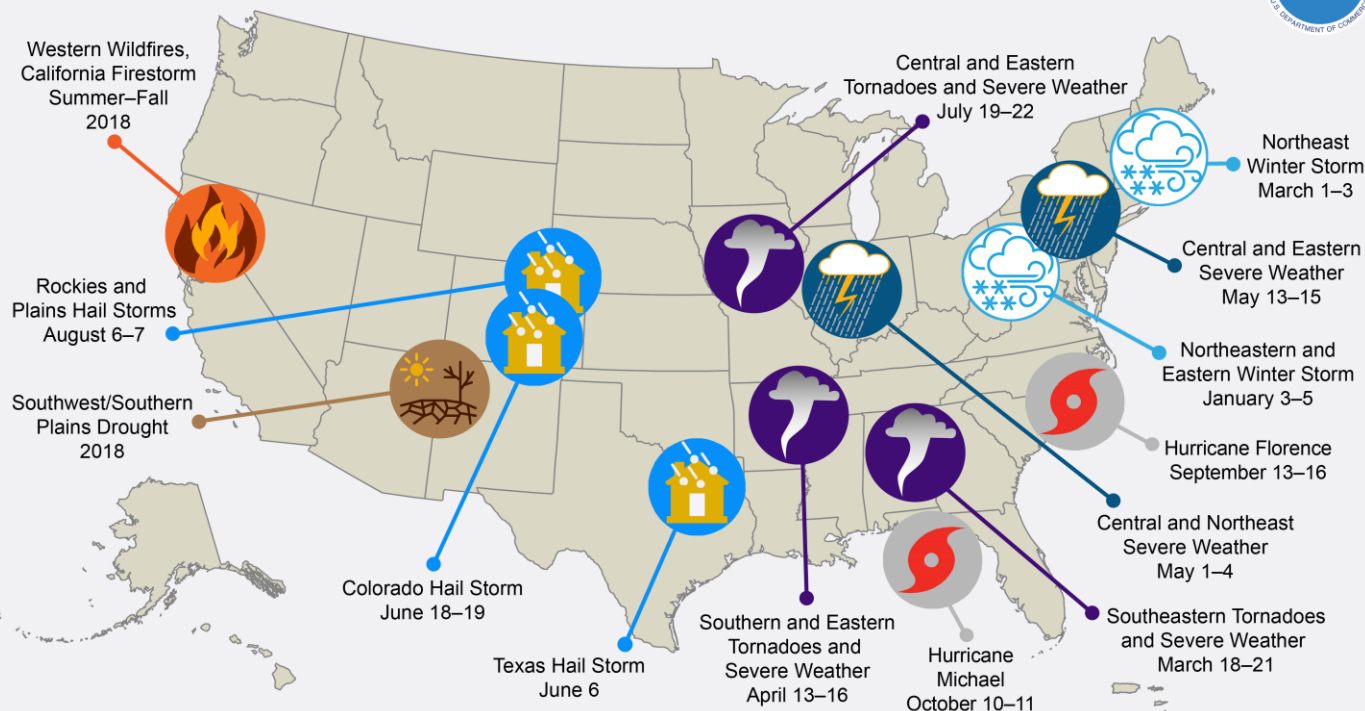
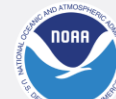
- Persistent drought in the Southwest and in Northern Plains
- Early year drought in Southern Plains
- Emergent, intense drought in and around Oregon



U.S. Billion Dollar Disasters

14 events in 2018

U.S. 2018 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the 14 separate billion-dollar weather and climate disasters that impacted the United States during 2018.

14 Billion Dollar Disasters

4th largest total of the 1980–2018 record

Accounted for \$91B in direct losses
4th largest total on record

Michael: \$25B
Florence: \$24B
Western wildfires: \$24B



Questions?

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