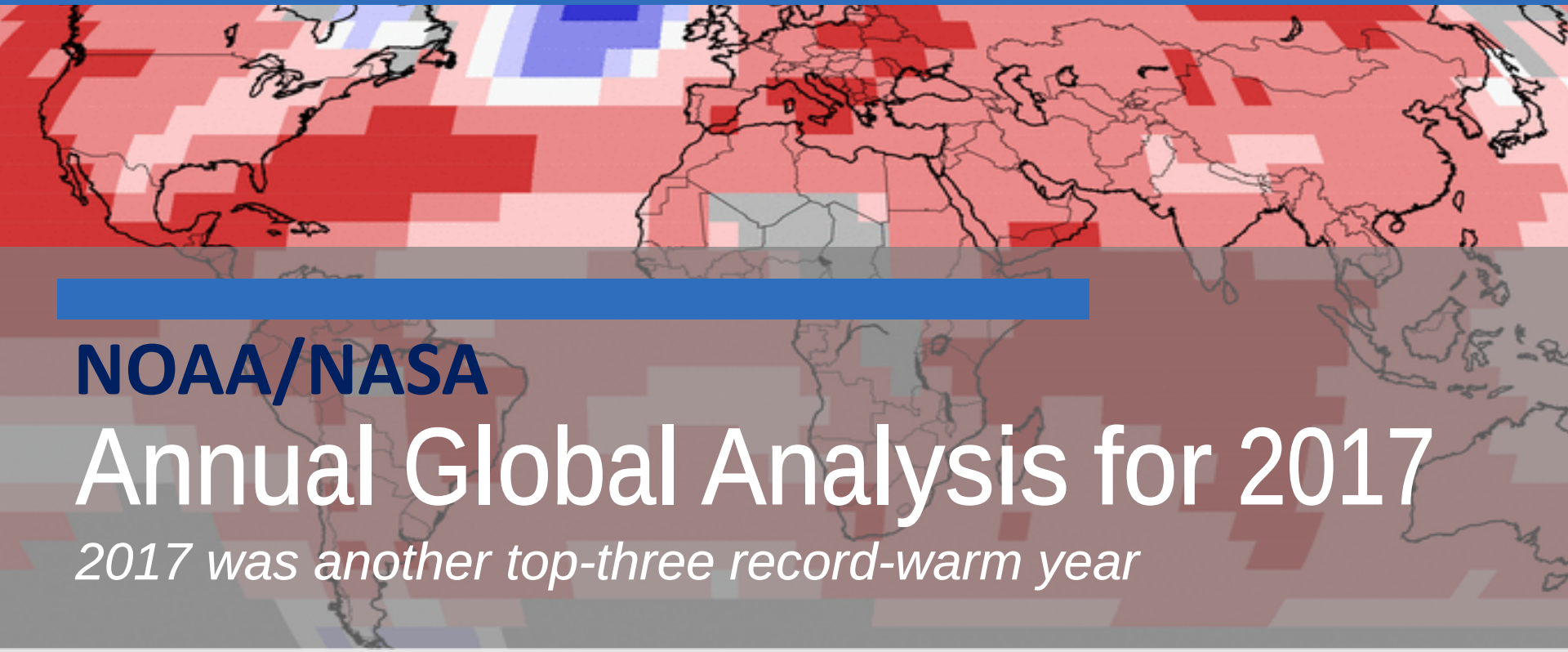


NOAA/NASA
Annual Global Analysis for 2017

2017 was another top-three record-warm year

Gavin A. Schmidt
Director, NASA's Goddard Institute for Space Studies

Derek Arndt
Chief, Monitoring Branch, NOAA's National Centers for Environmental Information

January 2018

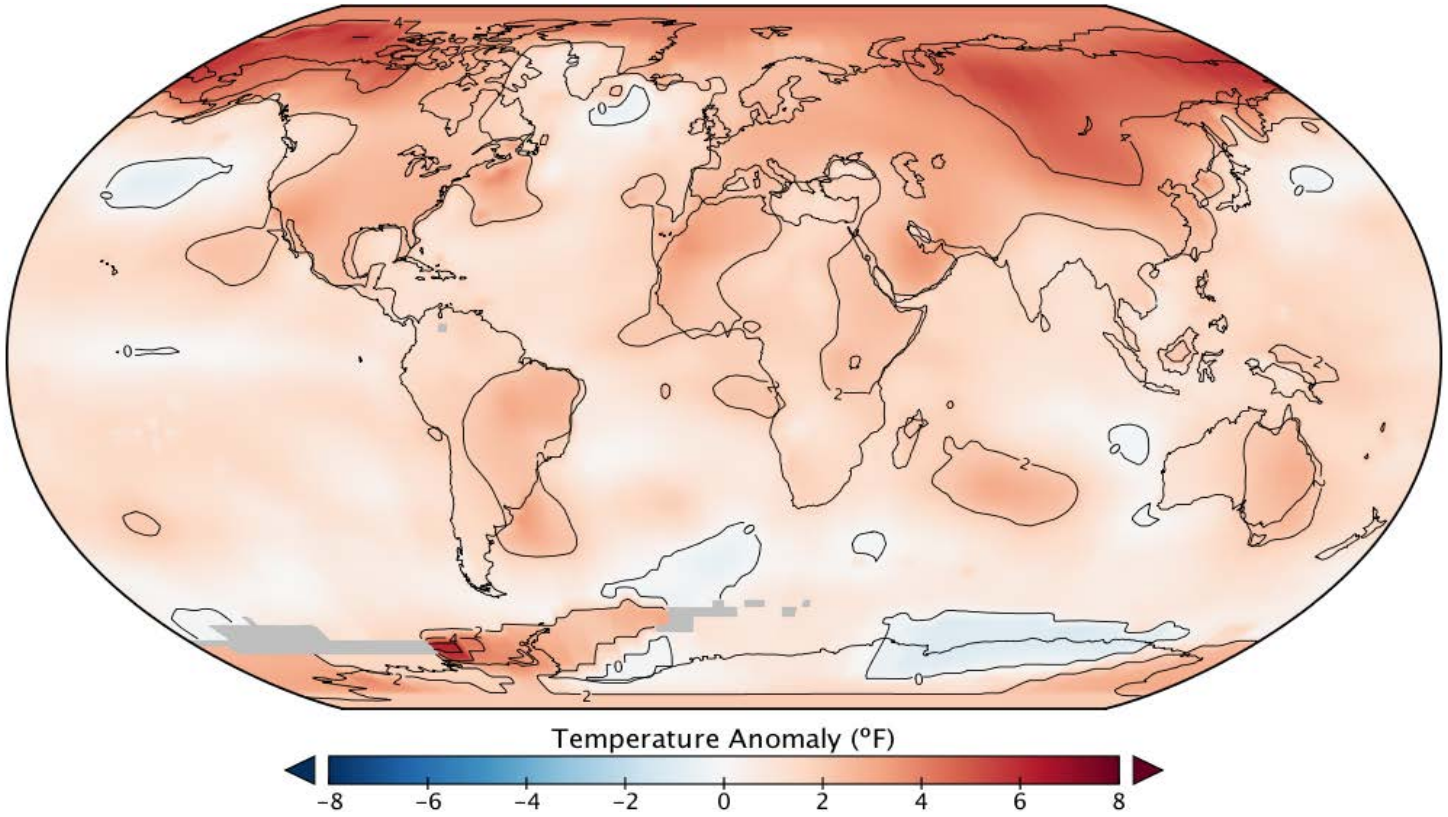
NASA 2017 Global Temperature

2017:

0.9°C / 1.6°F above 1951-80 average

2nd Warmest year of NASA GISTEMP record

GISTEMP Annual Mean 2017
Baseline 1951-1980



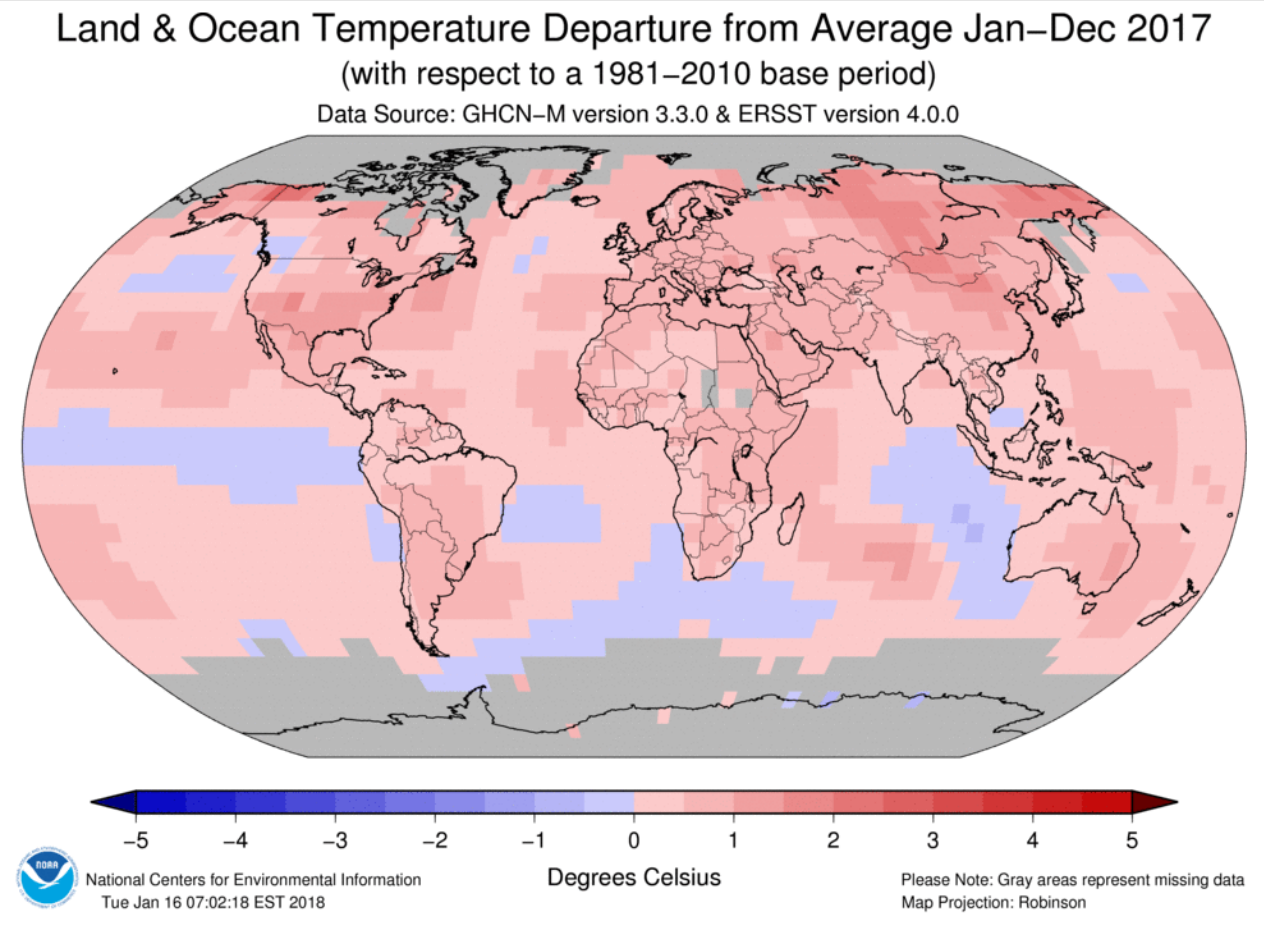
NOAA 2017 Global Temperature

0.84ºC / 1.51ºF above 1901-2000 average; 3rd warmest year of record

USA - CONUS
3rd warmest year
Wetter than average

ENSO
Neutral to La Nina conditions prevailed most of the year

Argentina
110°F on 27 Jan at Puerto Madryn was highest temperature recorded this far south



Continental Temperatures
records begin 1910

S. America
2nd warmest year

Asia
3rd warmest year

Africa
4th warmest year

Europe
5th warmest year

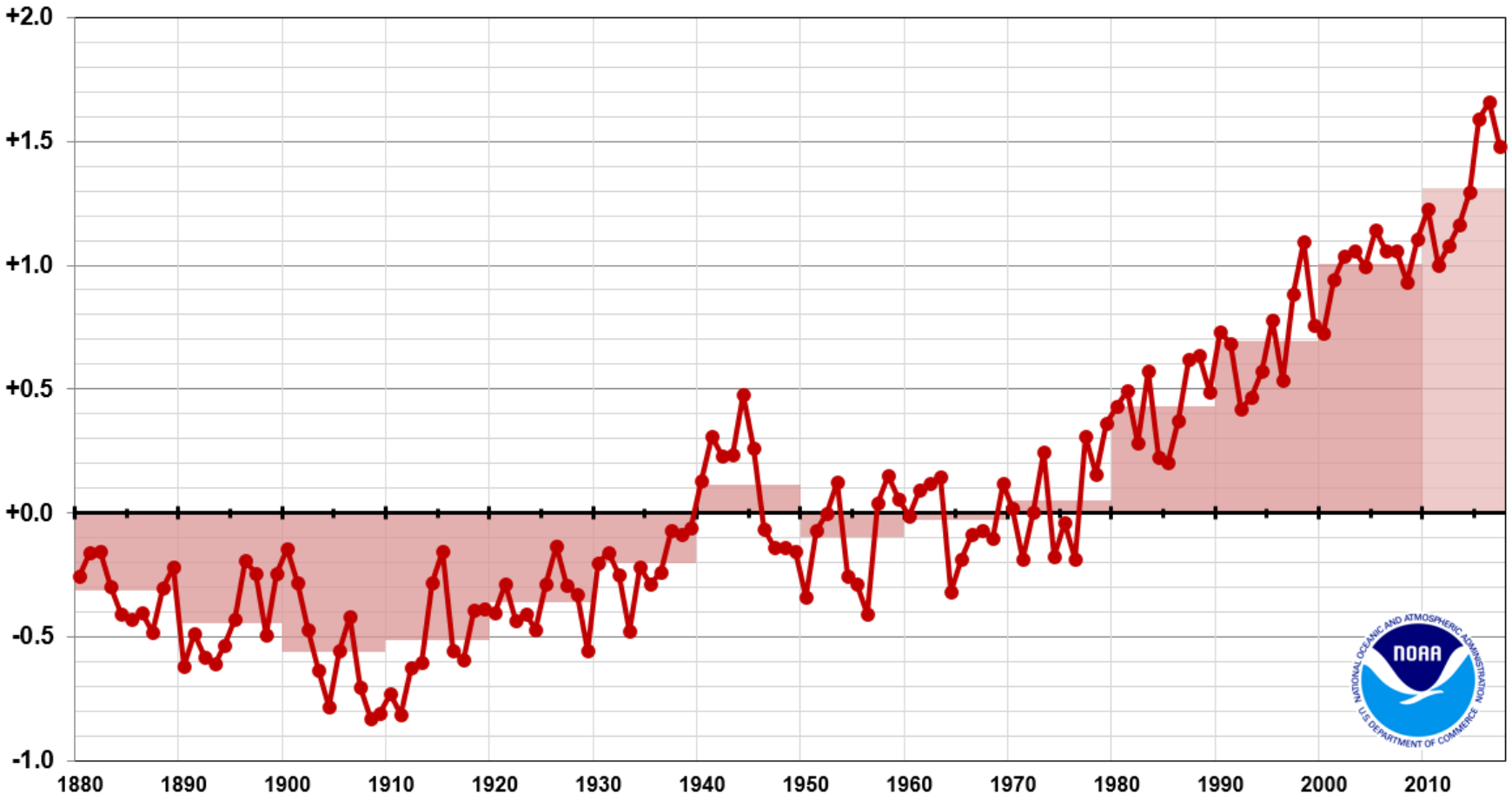
N. America, Oceania
6th warmest year

South of 20°S latitude:
Warmest year of record

Global Temperature Time Series

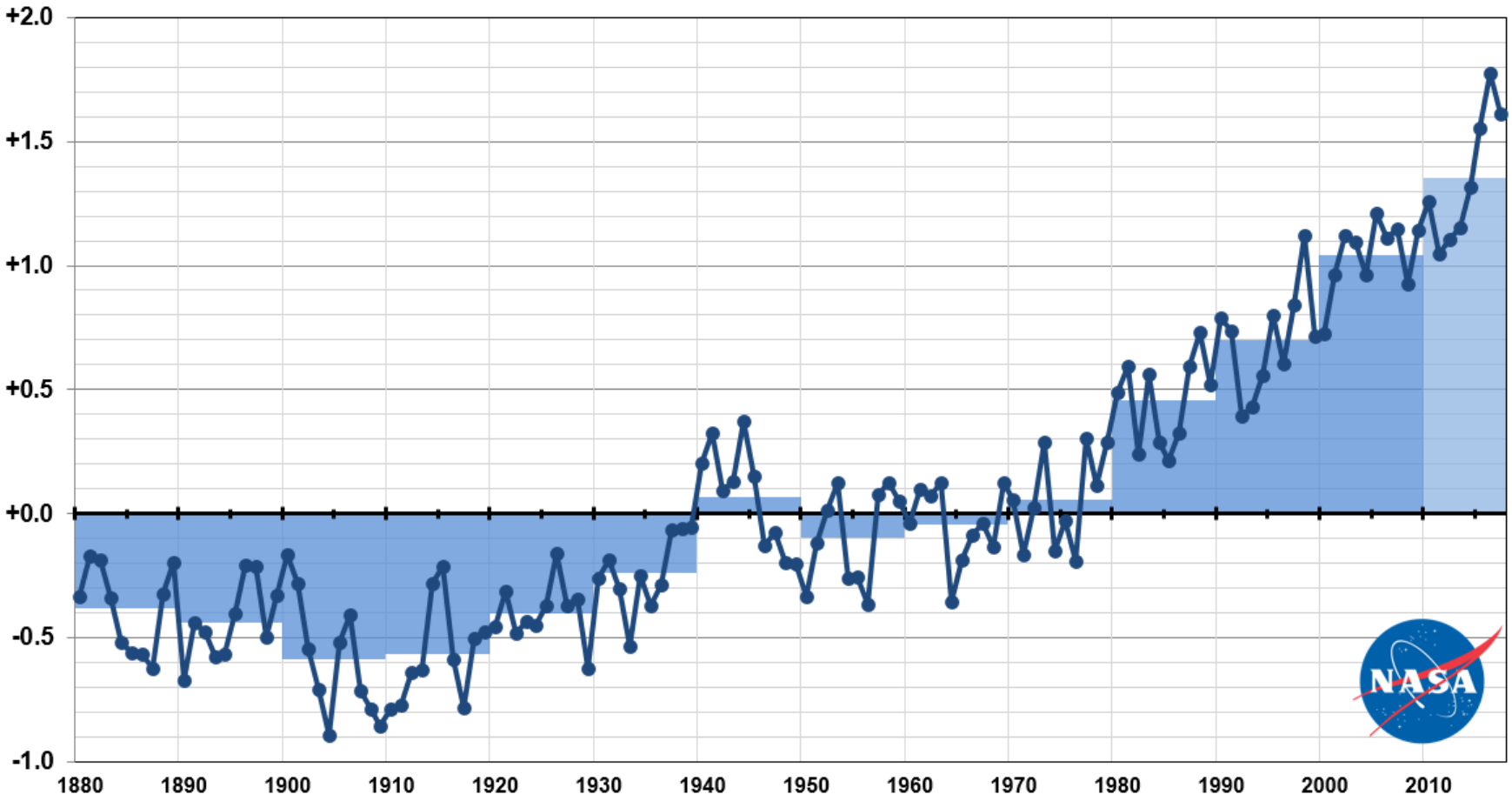
NOAA GlobalTemp

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

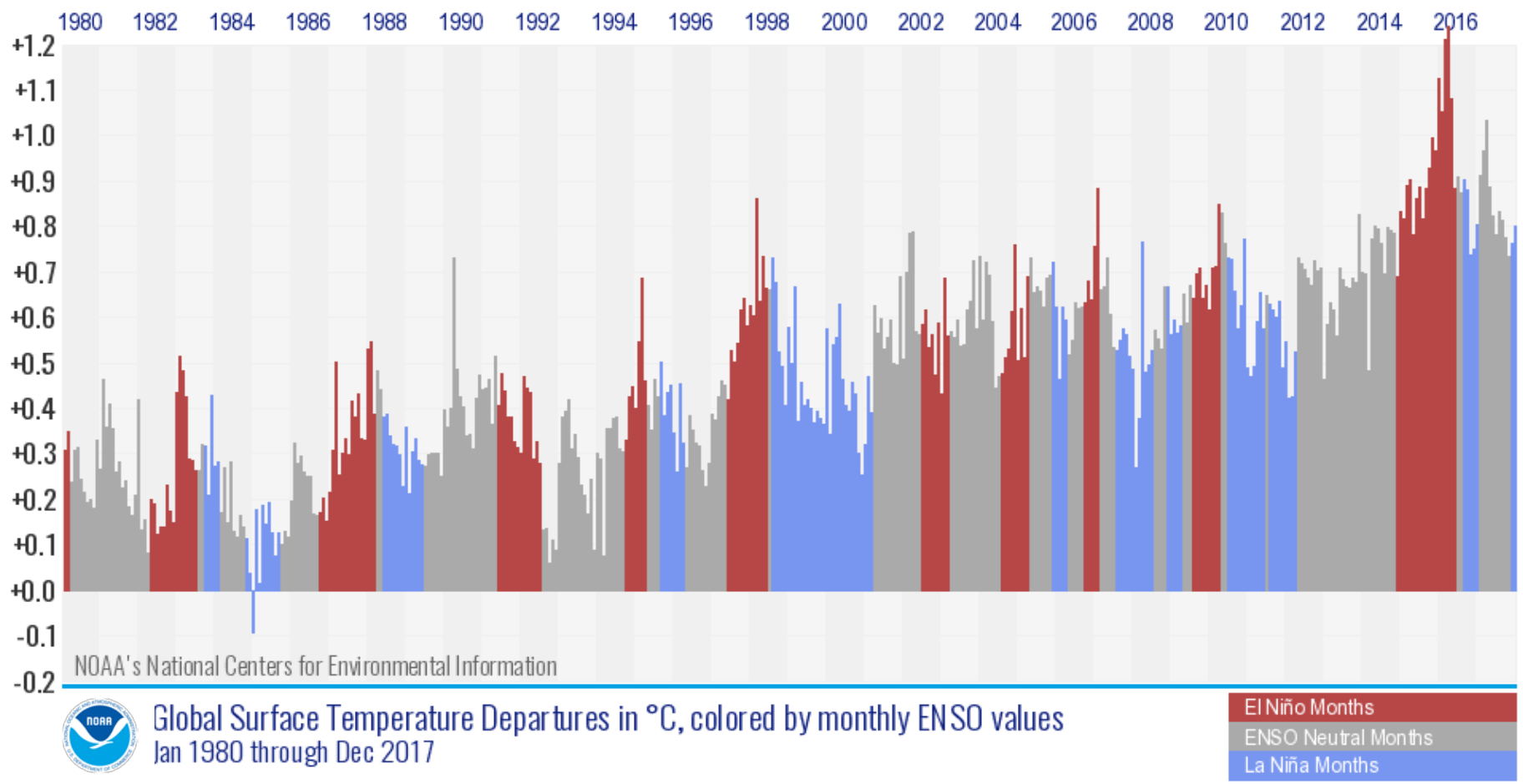


Global Temperature Time Series
NASA GISTEMP

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



El Niño / La Niña & Global Temperature

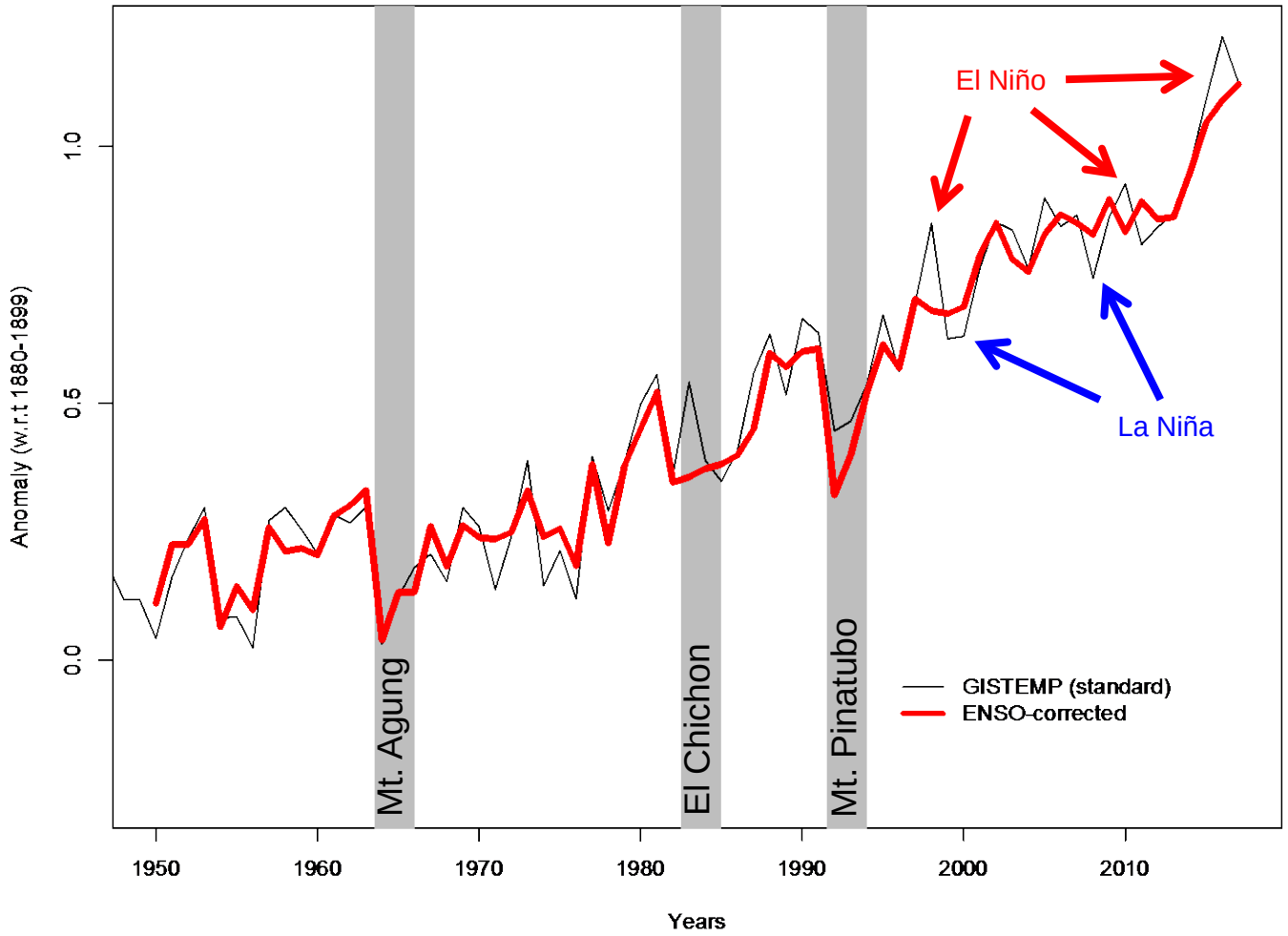


Months with La Niña conditions in blue
Months with El Niño conditions in red

Impact of ENSO on NASA analysis

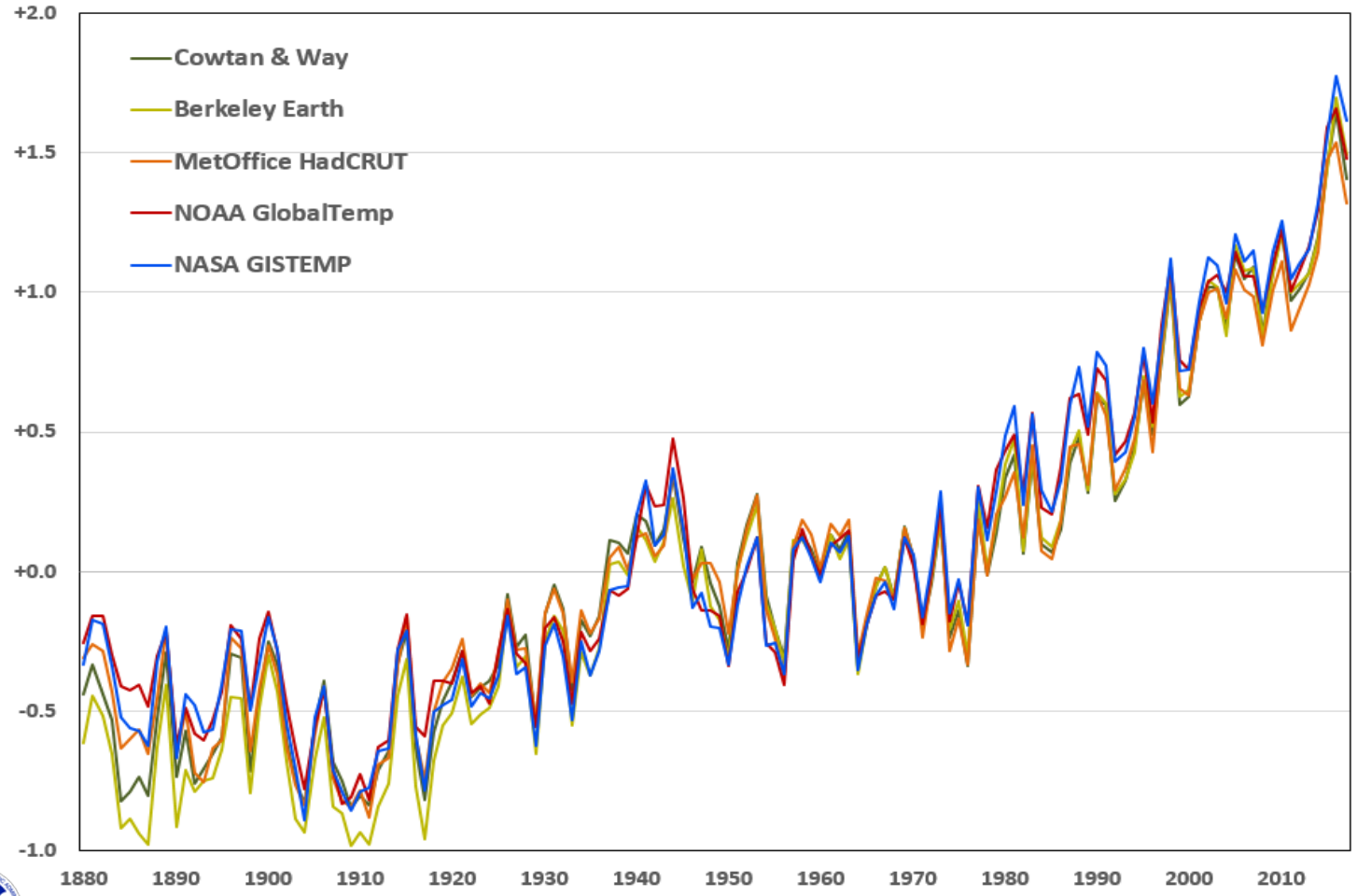
Maximum correlation to annual mean is Feb-Mar ENSO index

ENSO contribution to specific years:
2015: 0.04ºC
2016: 0.12ºC
2017: 0.00ºC



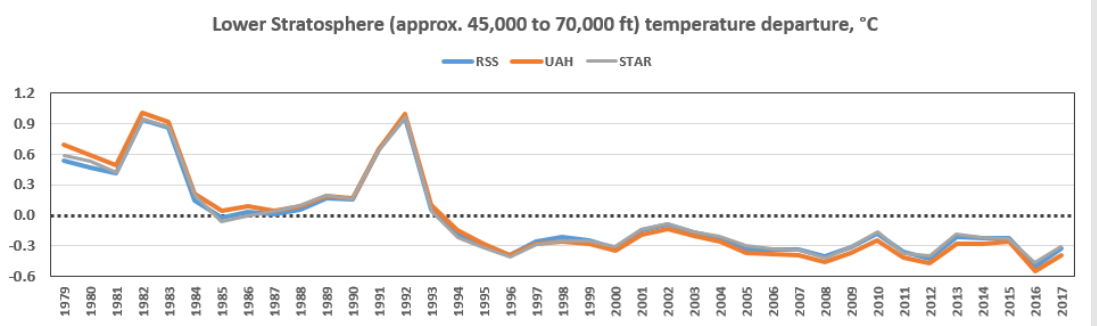
Global Analyses Side by Side

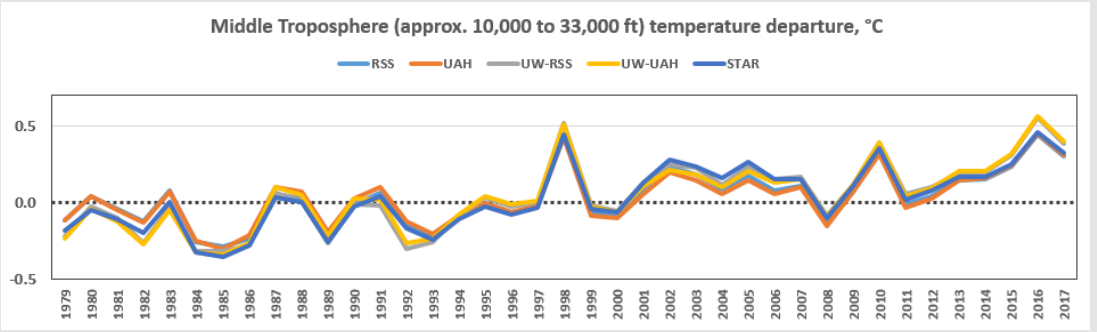
Several major datasets: relative to a common 1951-1980 base period

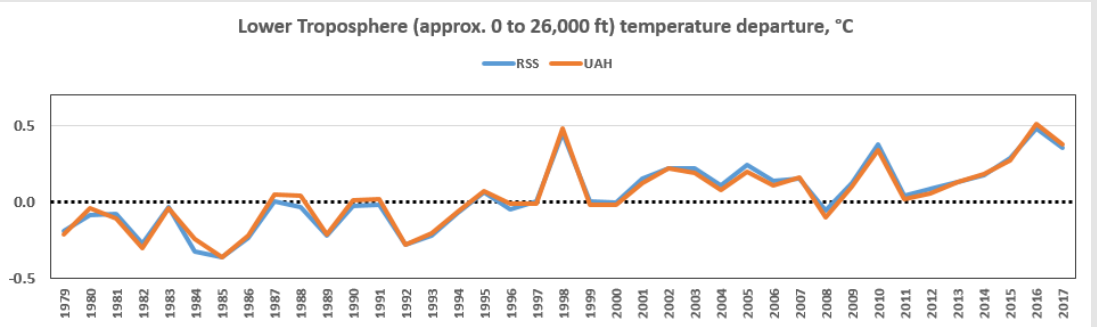


Looking at the Atmosphere

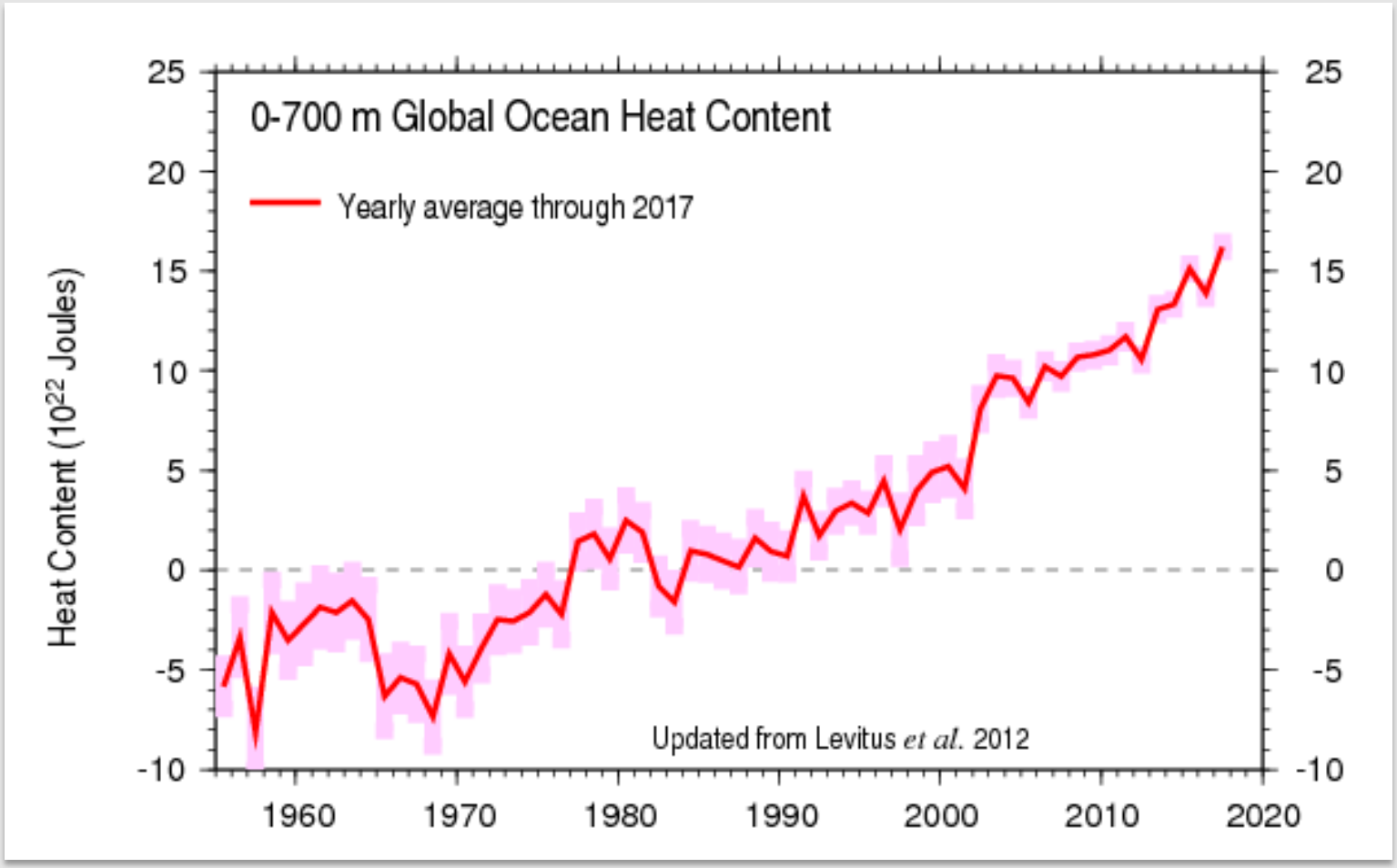
- **Lower Stratosphere (38 yr record)**
  - RSS, NESDIS: 9th coolest (tie)
  - UAH: 5th coolest (tie)
- **Middle Troposphere (38 yr record)**
  - UAH, RSS, UW-RSS, NESDIS: 4th warmest
  - UW-UAH: 3rd warmest
- **Lower Troposphere (38 yr record)**
  - RSS: 4th warmest
  - UAH: 3rd warmest
- **Radiosonde / balloon data (59 yr record, not shown)**
  - ~5,000 ft (850mb): 2nd warmest
  - ~10,000 ft (700mb): 2nd warmest
  - ~18,000 ft (500mb): 2nd warmest
  - ~30,000 ft (300mb): 2nd warmest
  - ~40,000 ft (200mb): 16th warmest







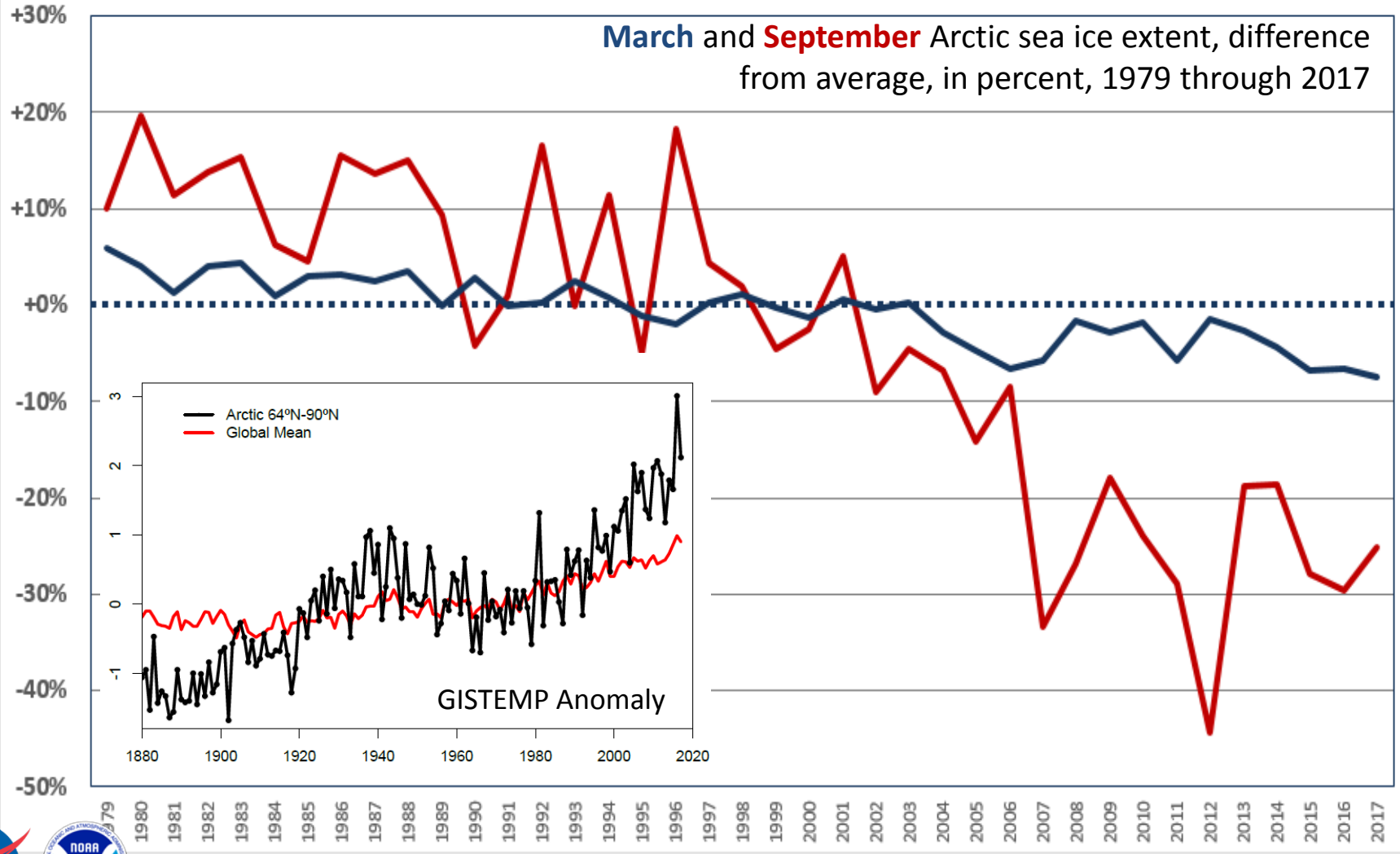
Upper Ocean Heat Content



Source: NOAA/NCEI Center for Coast, Oceans & Geophysics

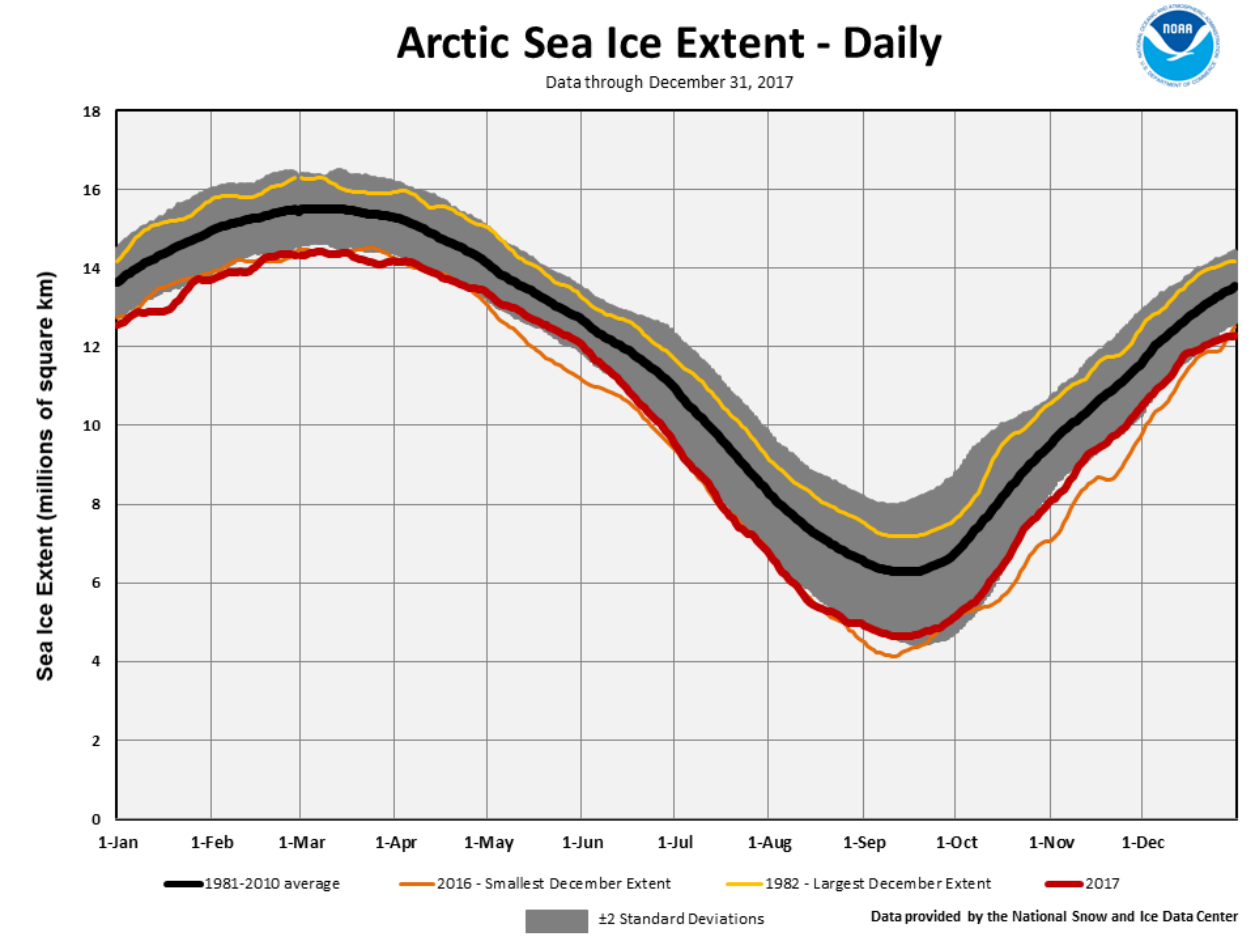
Arctic Sea Ice Extent Since 1979

(inset: Arctic temperature change vs. Global average)



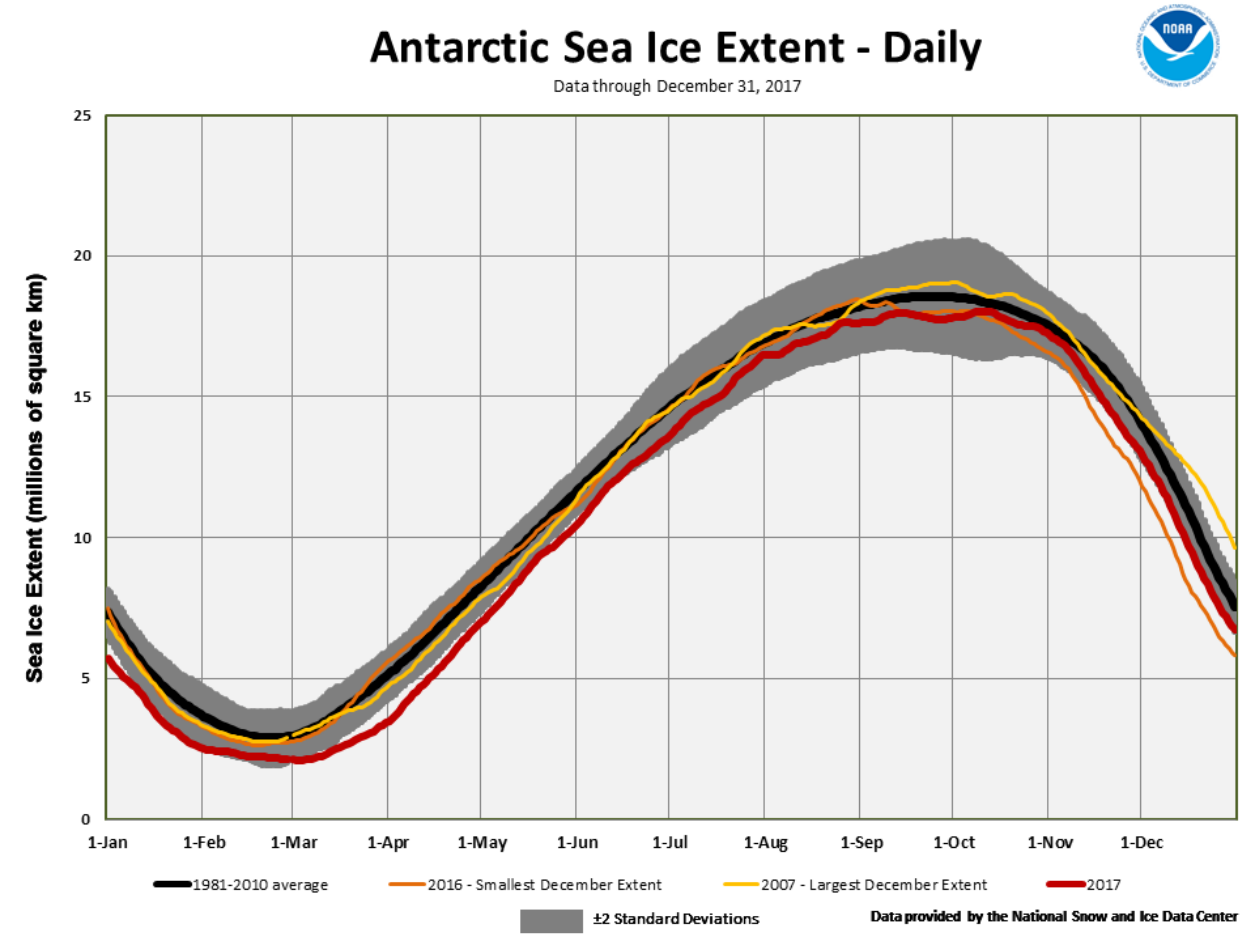
Arctic Sea Ice: Day-by-Day in 2017

Mon	% vs avg	Rank (of 38)
Jan	-8.67%	Smallest
Feb	-7.78%	Smallest
Mar	-7.52%	Smallest
Apr	-6.33%	2nd smallest
May	-5.04%	5th smallest
Jun	-8.92%	4th smallest
Jul	-16.58%	4th smallest
Aug	-24.03%	4th smallest
Sep	-25.12%	7th smallest
Oct	-19.64%	5th smallest
Nov	-11.59%	3rd smallest
Dec	-8.45%	2nd smallest



Antarctic Sea Ice: Day-by-Day in 2017

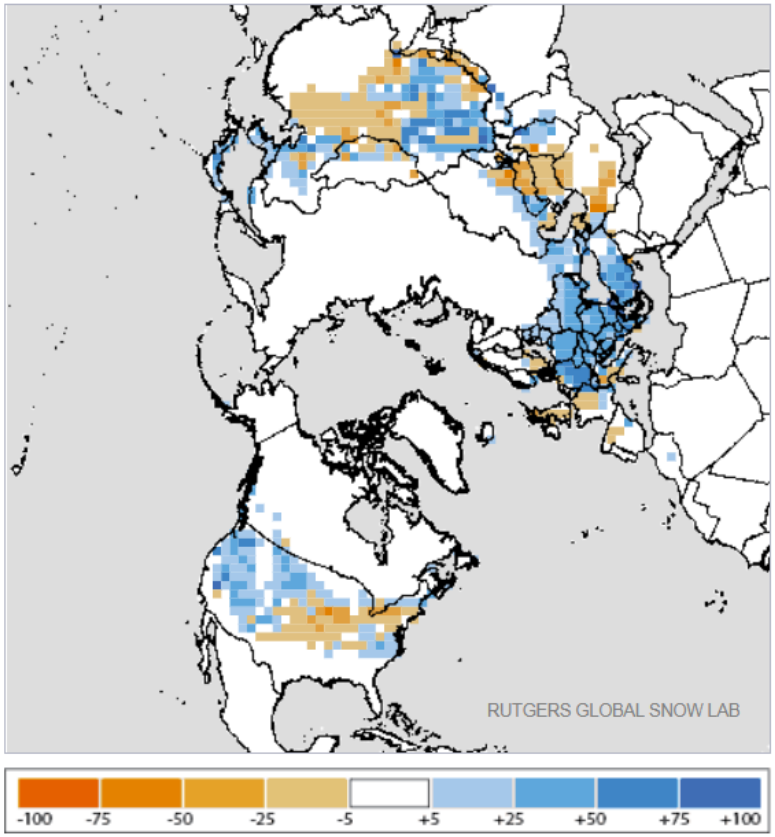
Mon	% vs avg	Rank (of 38)
Jan	-25.20%	Smallest
Feb	-26.06%	Smallest
Mar	-33.25%	Smallest
Apr	-20.73%	2nd smallest
May	-11.42%	2nd smallest
Jun	-7.34%	Smallest
Jul	-4.51%	Smallest
Aug	-3.27%	3rd smallest
Sep	-3.57%	2nd smallest
Oct	-2.21%	5th smallest
Nov	-5.66%	2nd smallest
Dec	-10.28%	4th smallest



Northern Hemisphere Snow Cover Extent

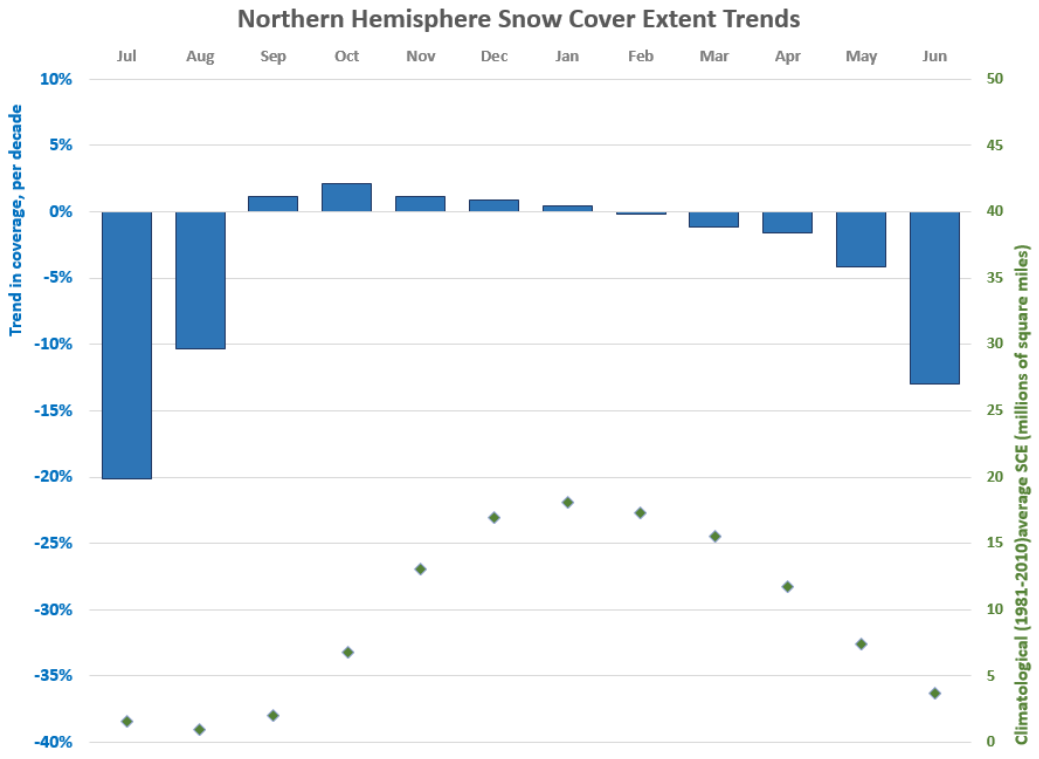
Period of record: 1967-2017 (50 years)

Departure from Normal – January 2017



Data provided by the Rutgers Global Snow Lab
http://climate.rutgers.edu/snowcover/

Northern Hemisphere Snow Cover Trends (1967-2017)



Questions?

Gavin A. Schmidt
Director, NASA's Goddard Institute for Space Studies

Deke Arndt
Chief, Monitoring Branch, NOAA's National Centers for Environmental Information