



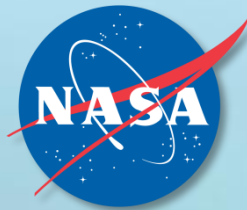
NOAA/NASA

# 2013 Global Temperatures

**Gavin A. Schmidt**

*Deputy Chief*

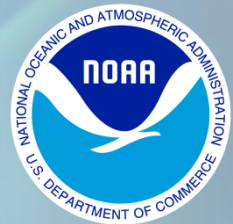
*NASA's Goddard Institute for Space Studies*



**Thomas R. Karl**

*Director*

*NOAA's National Climatic Data Center*

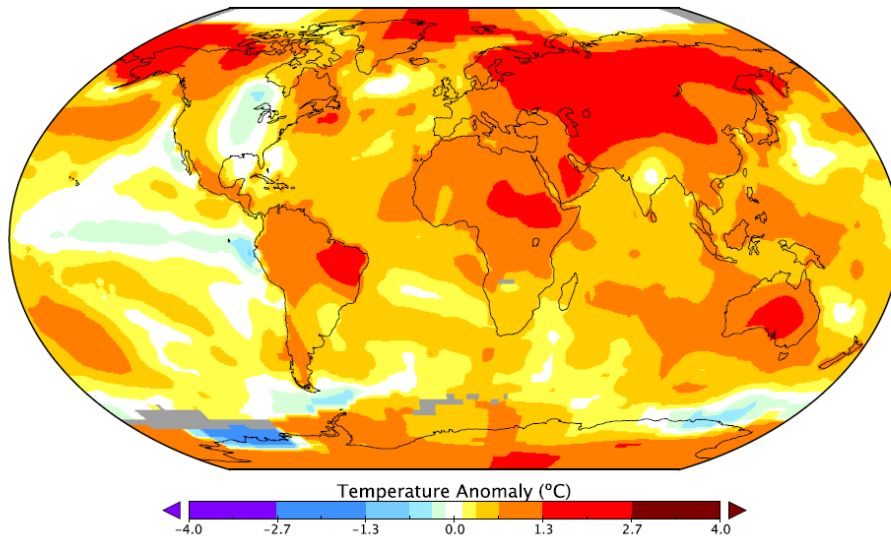


January 21, 2014

# 2013 Annual Temperature

NASA

GISTEMP Land–Ocean Temperature Index  
Annual 2013 (w.r.t. 1951–1980)

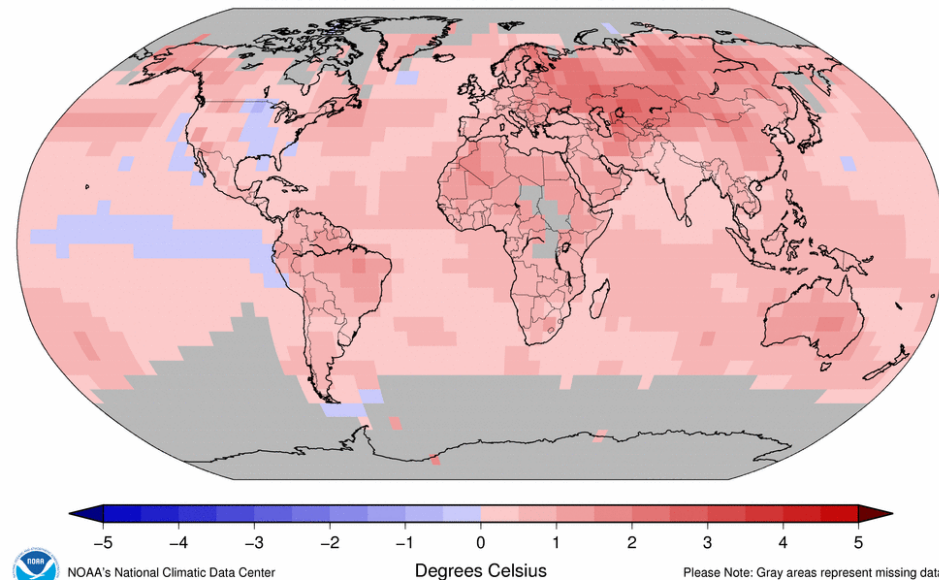


Anomaly (1951–80 base period):  $0.60^{\circ}\text{C}$   
Anomaly (20<sup>th</sup> Century average):  $0.63^{\circ}\text{C}$

NOAA

Land & Ocean Temperature Anomalies Jan–Dec 2013  
(with respect to a 1951–1980 base period)

Data Source: GHCN–M version 3.2.2 & ERSST version 3b

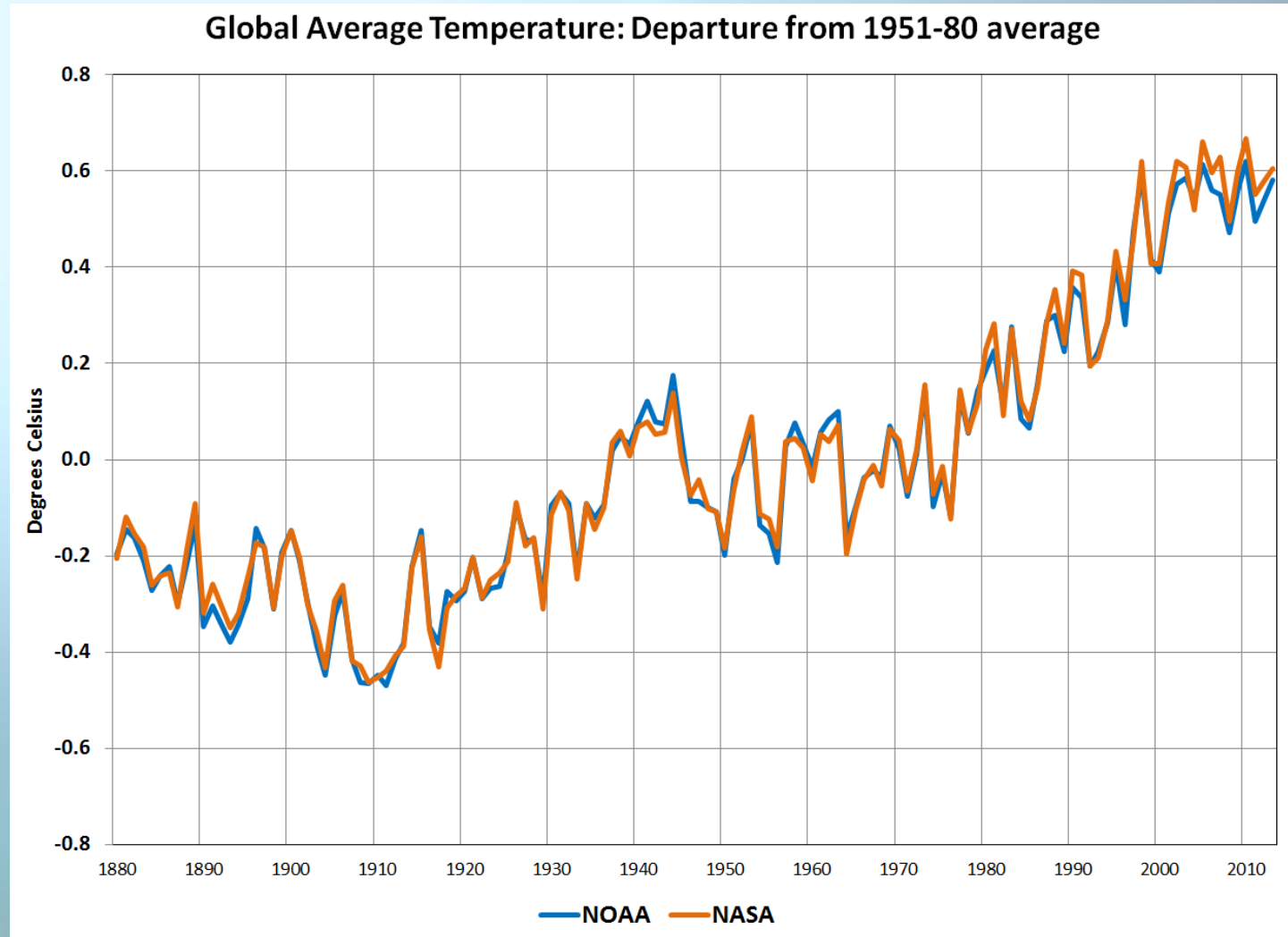


NOAA's National Climatic Data Center  
Tue Jan 14 12:19:59 EST 2014

Please Note: Gray areas represent missing data  
Map Projection: Robinson

Anomaly (1951–80 base period):  $0.58^{\circ}\text{C}$   
Anomaly (20<sup>th</sup> Century average):  $0.62^{\circ}\text{C}$

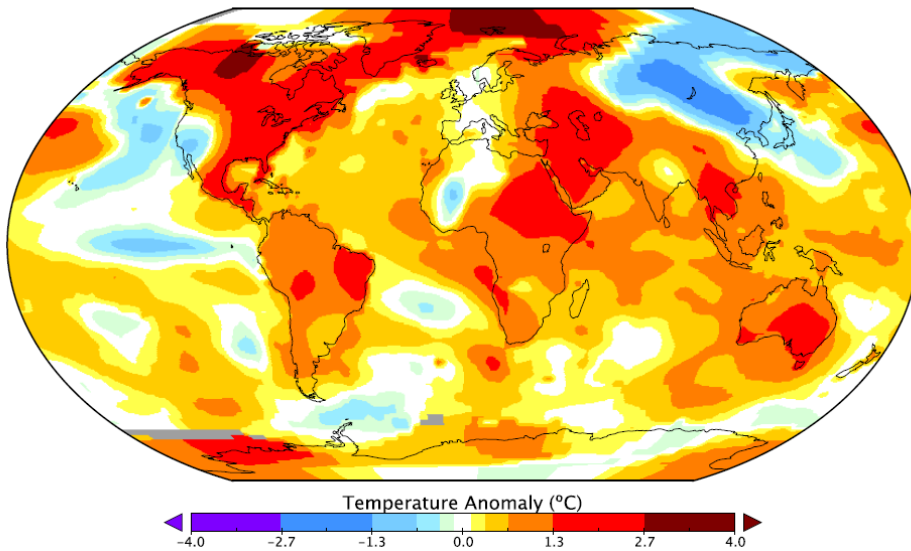
# Temperature Time Series Comparison



# December 2012 – February 2013

## NASA

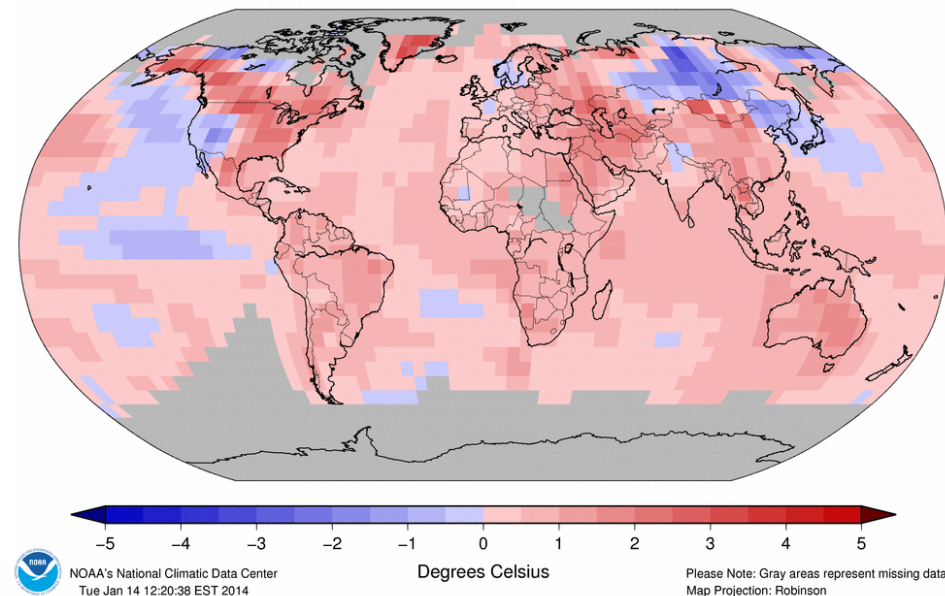
GISTEMP Land–Ocean Temperature Index  
Dec–Jan–Feb 2013 (w.r.t. 1951–1980)



Anomaly (1951–80 base period): 0.55°C  
Anomaly (20<sup>th</sup> Century average): 0.57°C

## NOAA

Land & Ocean Temperature Anomalies Dec 2012–Feb 2013  
(with respect to a 1951–1980 base period)  
Data Source: GHCN–M version 3.2.2 & ERSST version 3b

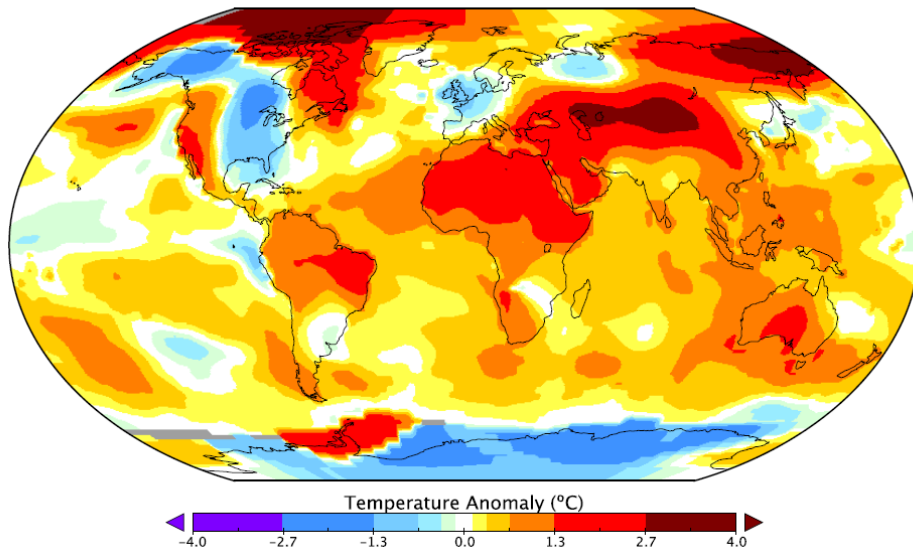


Anomaly (1951–80 base period): 0.49°C  
Anomaly (20<sup>th</sup> Century average): 0.52°C

# March – May 2013

## NASA

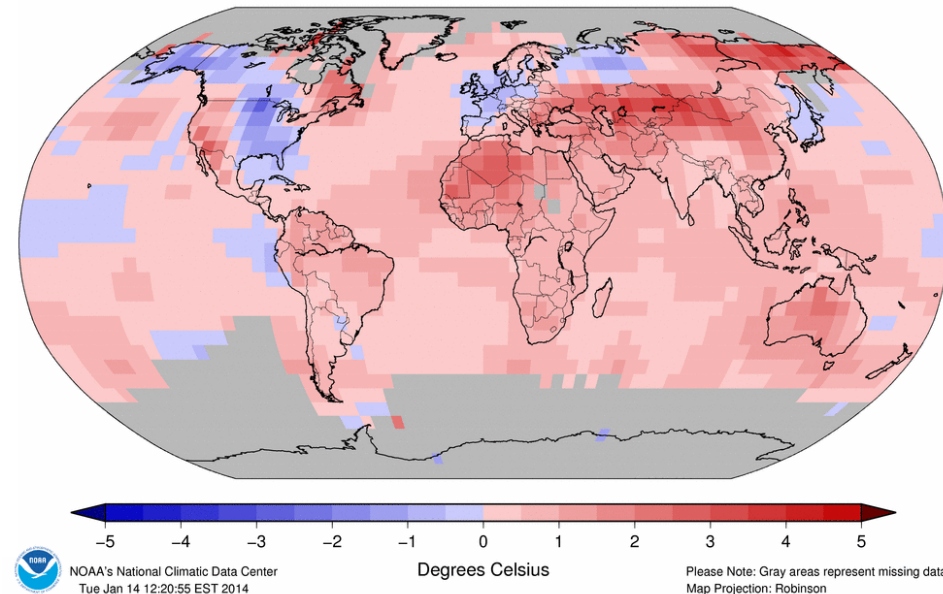
GISTEMP Land–Ocean Temperature Index  
Mar–Apr–May 2013 (w.r.t. 1951–1980)



Anomaly (1951–80 base period): 0.54°C  
Anomaly (20<sup>th</sup> Century average): 0.57°C

## NOAA

Land & Ocean Temperature Anomalies Mar–May 2013  
(with respect to a 1951–1980 base period)  
Data Source: GHCN–M version 3.2.2 & ERSST version 3b



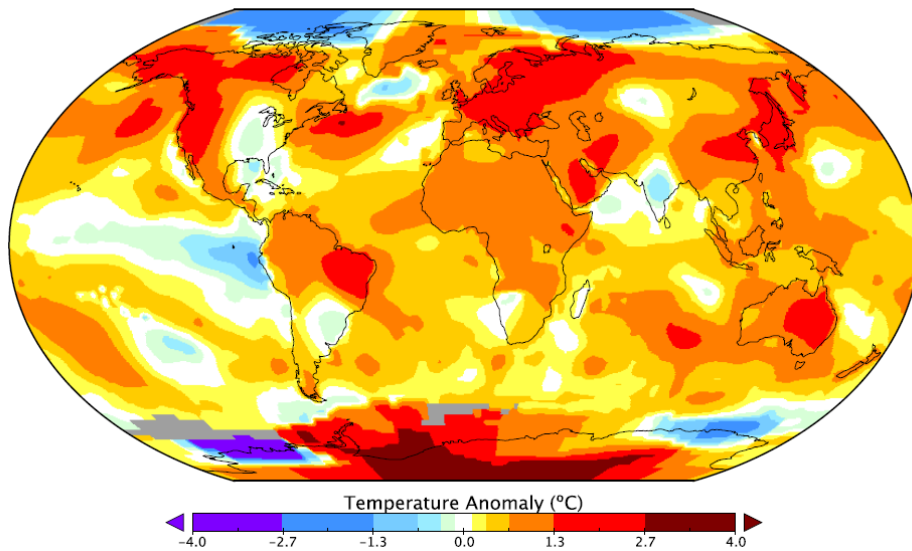
Anomaly (1951–80 base period): 0.55°C  
Anomaly (20<sup>th</sup> Century average): 0.59°C



# June – August 2013

## NASA

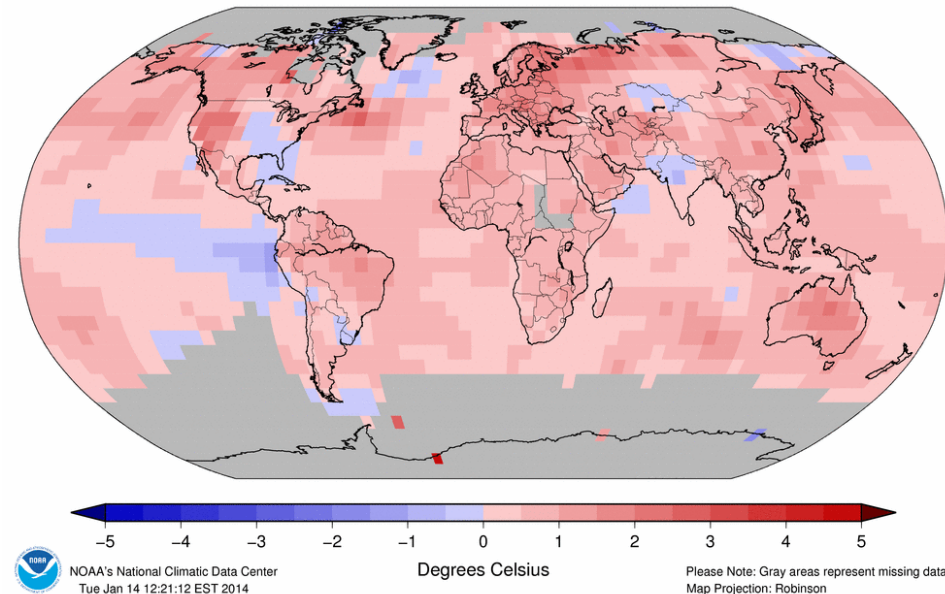
GISTEMP Land–Ocean Temperature Index  
Jun–Jul–Aug 2013 (w.r.t. 1951–1980)



Anomaly (1951–80 base period): 0.58°C  
Anomaly (20<sup>th</sup> Century average): 0.61°C

## NOAA

Land & Ocean Temperature Anomalies Jun–Aug 2013  
(with respect to a 1951–1980 base period)  
Data Source: GHCN–M version 3.2.2 & ERSST version 3b

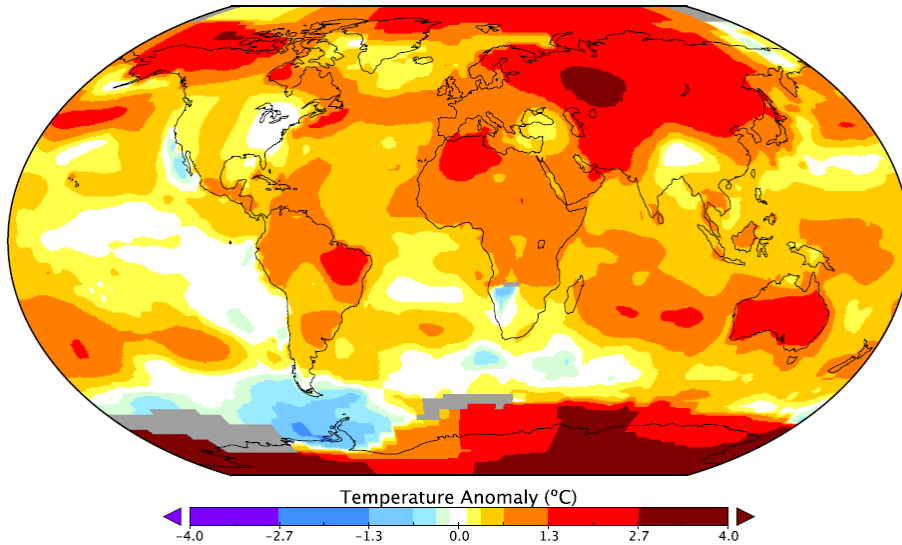


Anomaly (1951–80 base period): 0.57°C  
Anomaly (20<sup>th</sup> Century average): 0.62°C

# September – November 2013

## NASA

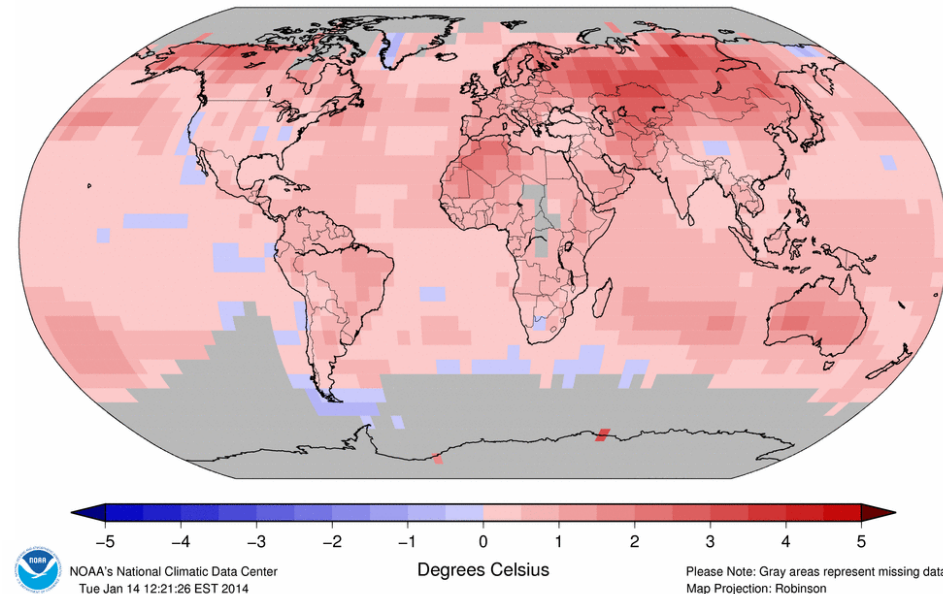
GISTEMP Land–Ocean Temperature Index  
Sep–Oct–Nov 2013 (w.r.t. 1951–1980)



Anomaly (1951–80 base period): 0.72°C  
Anomaly (20<sup>th</sup> Century average): 0.74°C

## NOAA

Land & Ocean Temperature Anomalies Sep–Nov 2013  
(with respect to a 1951–1980 base period)  
Data Source: GHCN–M version 3.2.2 & ERSST version 3b



Anomaly (1951–80 base period): 0.64°C  
Anomaly (20<sup>th</sup> Century average): 0.68°C

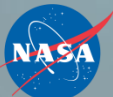
# NOAA/NASA Top Ten Years on Record

## NASA

Rank	Year	51-80 Anomaly
1 (tie)	2010	0.67°C
1 (tie)	2005	0.66°C
3	2007	0.63°C
4 (tie)	2002	0.62°C
4 (tie)	1998	0.62°C
6	2003	0.61°C
7 (tie)	2013	0.60°C
7 (tie)	2009	0.60°C
7 (tie)	2006	0.60°C
10	2012	0.58°C

## NOAA

Rank	Year	51-80 Anomaly
1	2010	0.62°C
2	2005	0.61°C
3	1998	0.59°C
4 (tie)	2003	0.58°C
4 (tie)	2013	0.58°C
6	2002	0.57°C
7 (tie)	2006	0.56°C
7 (tie)	2009	0.56°C
9	2007	0.55°C
10	2004	0.54°C

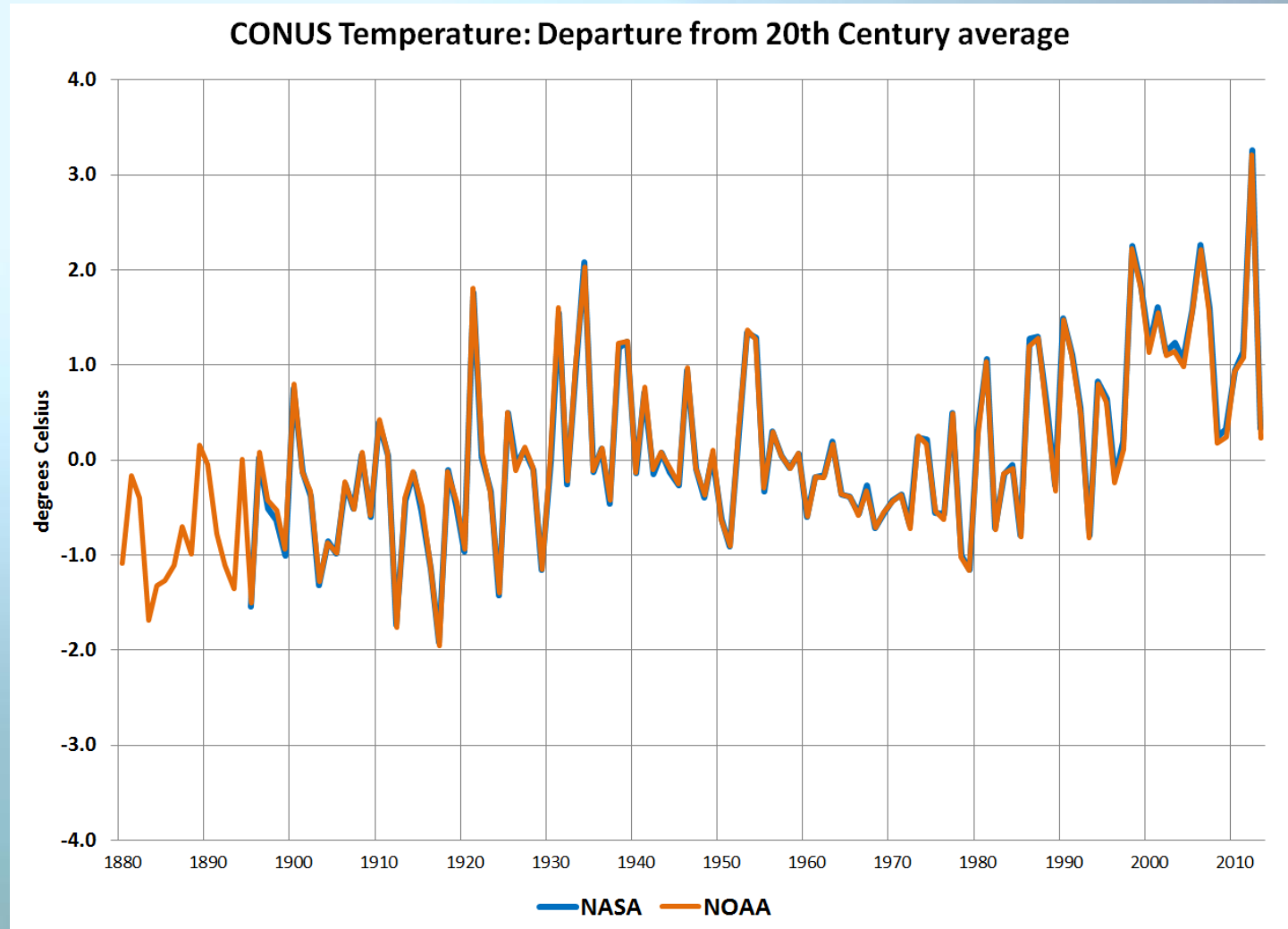




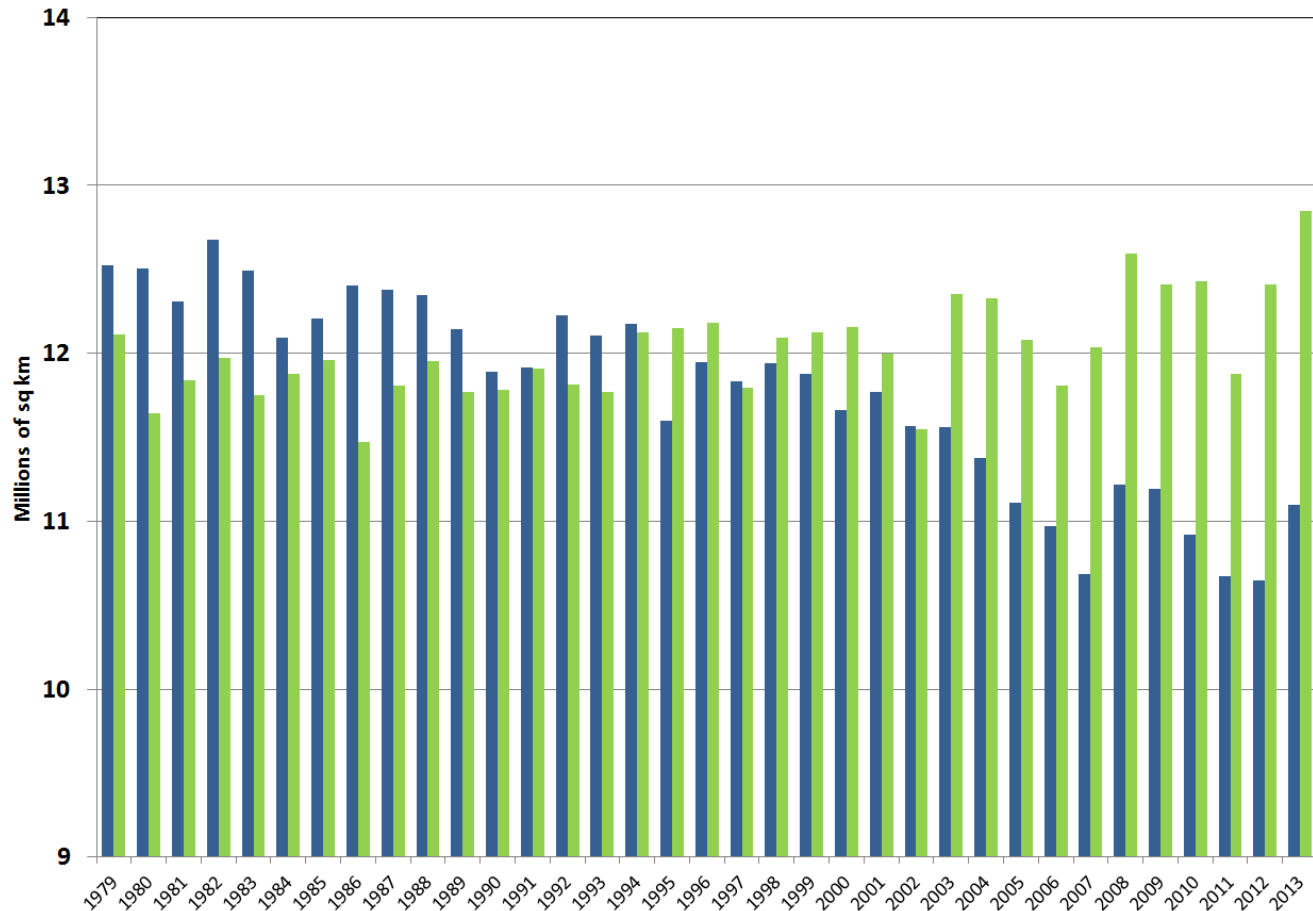
# NOAA Warmest Years on Record

Year	Among Warmest Five Years	Among Warmest Ten Years
2010	Likely	Very Likely
2005	Likely	Very Likely
1998	Likely	Very Likely
2003	More Likely than Not	Very Likely
<b>2013</b>	<b>More Likely than Not</b>	<b>Likely</b>
2002	More Unlikely than Likely	Very Likely
2006	Unlikely	Likely
2009	Unlikely	Likely
2007	Unlikely	Likely
2004	Unlikely	More Likely than Not

# Contiguous United States Temperature



# Polar Sea Ice Extent



Annual average sea ice extent: Arctic (blue) and Antarctic (green)

Calculated from data processed at the National Snow & Ice Data Center

## • Arctic in 2013:

- Average March extent: 5<sup>th</sup> smallest on record
- Average Sept. extent: 6<sup>th</sup> smallest on record
- much below normal throughout the year

## • Antarctic in 2013:

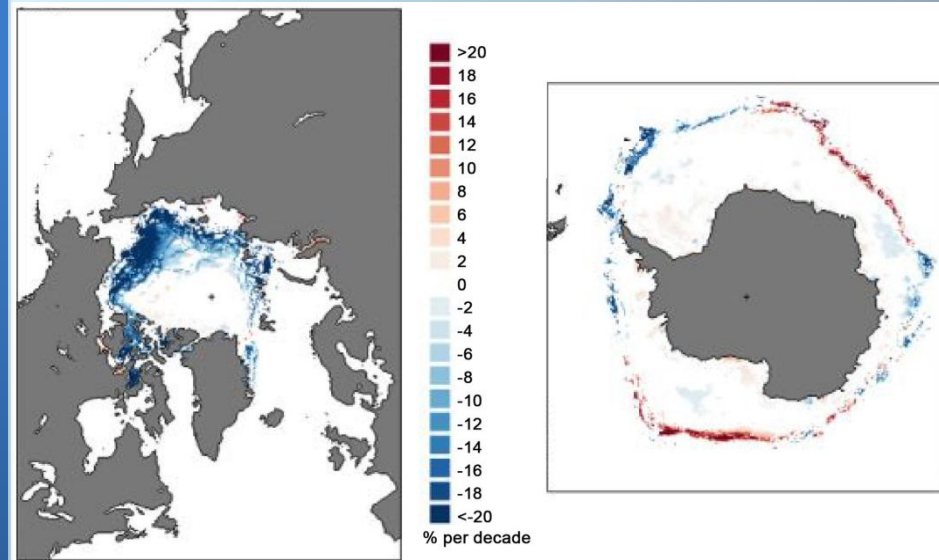
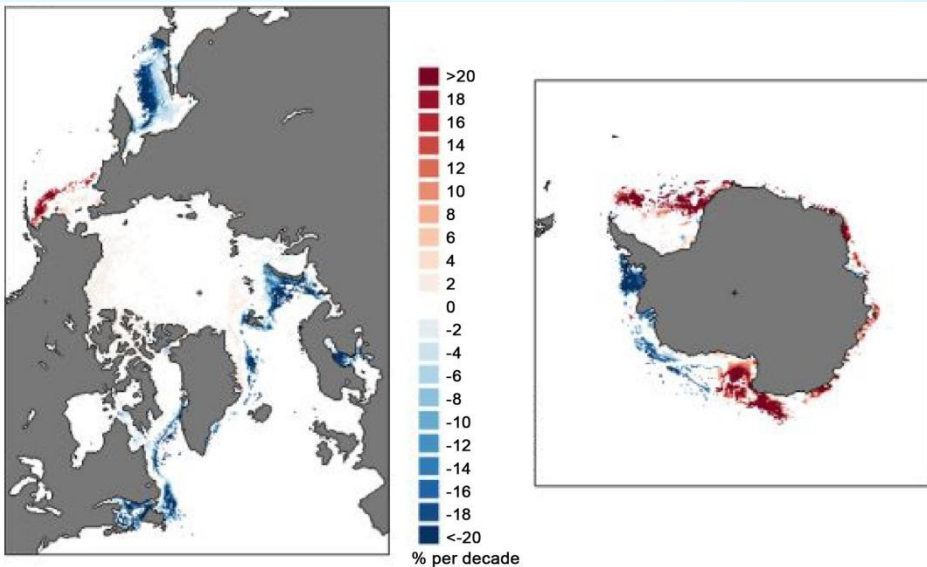
- Average March extent: 2<sup>nd</sup> largest on record
- Average Sept. extent: largest on record
- above normal to much above normal throughout the year

# Sea Ice Concentration Trends

1978 - 2013

## March

## September



Calculated from data processed at the National Snow & Ice Data Center

**Reds:** Increasing Ice coverage over time  
**Blues:** Decreasing Ice coverage over time

NOAA/NASA

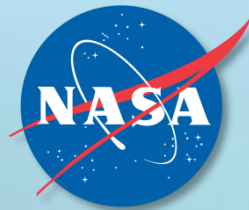
Thank you

Questions?

**Gavin A. Schmidt**

*Deputy Chief*

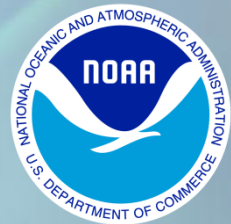
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