

Climate4you update YEAR 2013

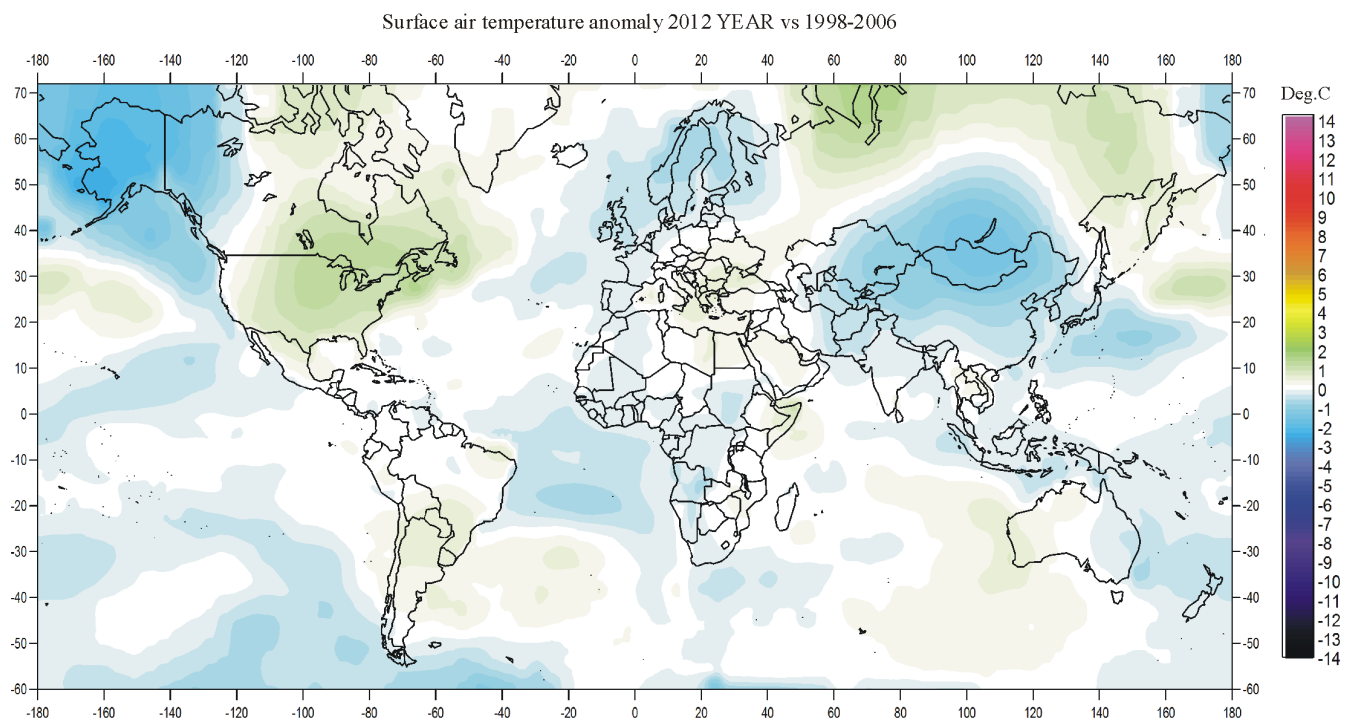
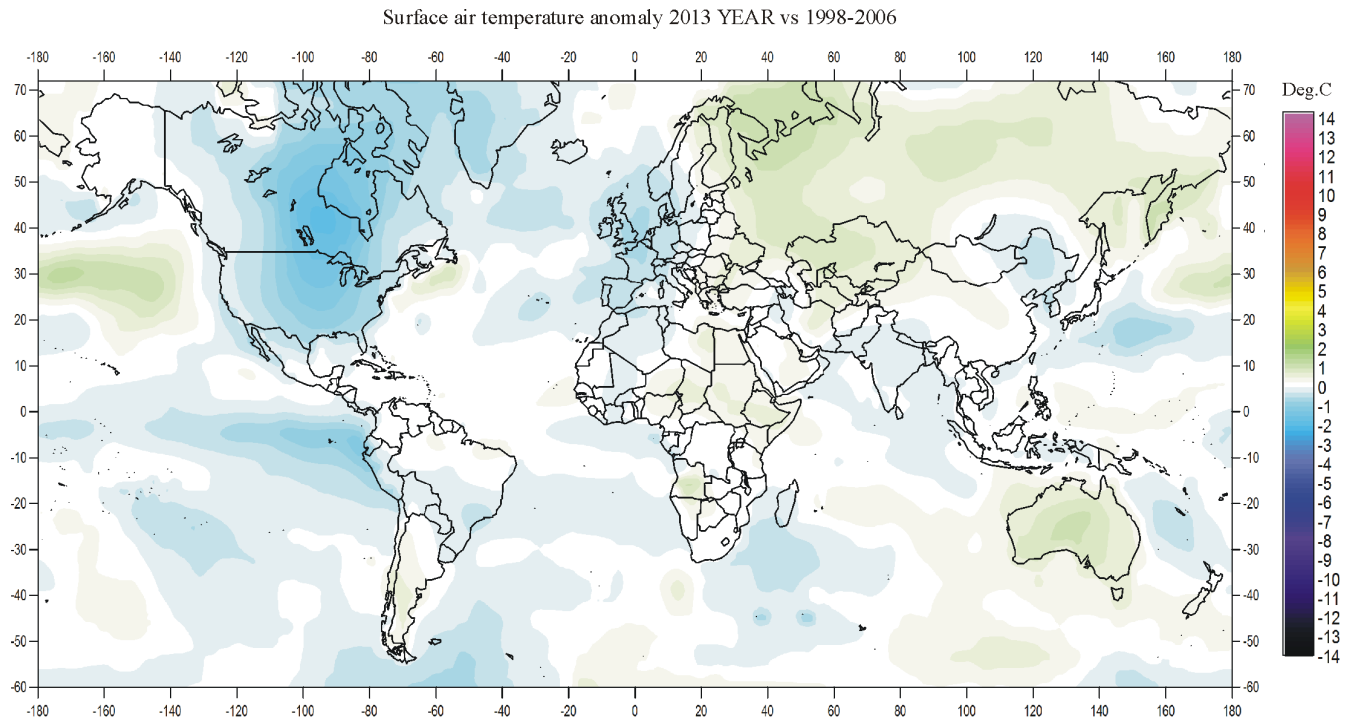


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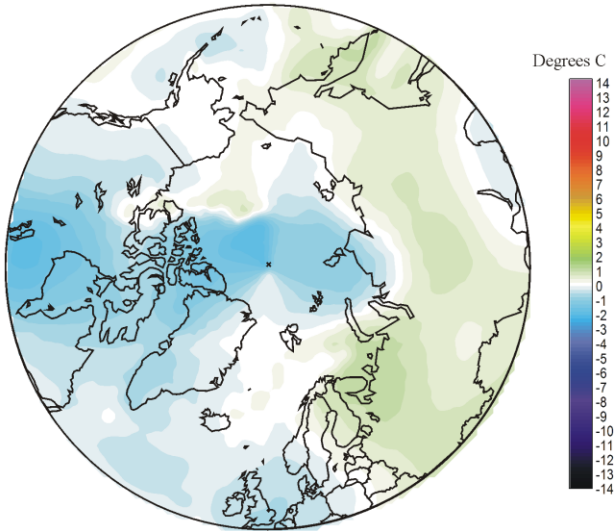
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All diagrams in this newsletter as well as links to the original data are available on www.climate4you.com

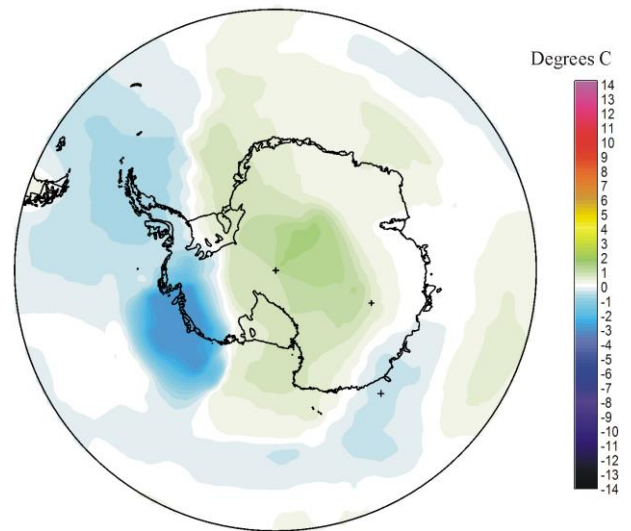
Year 2013 and 2012 global surface air temperature overview



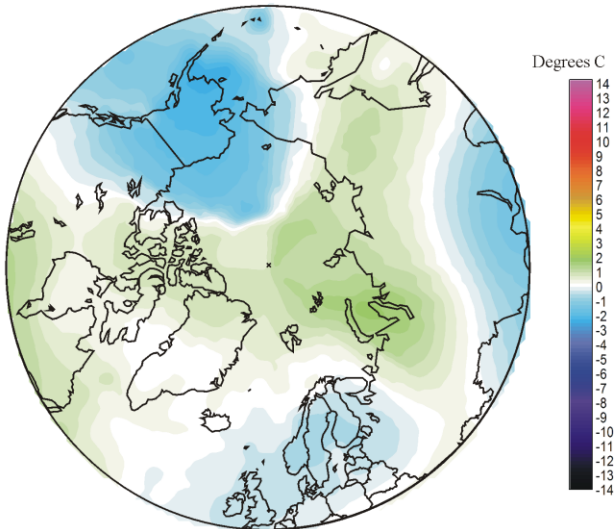
Air temperature 2013 YEAR versus average 1998-2006



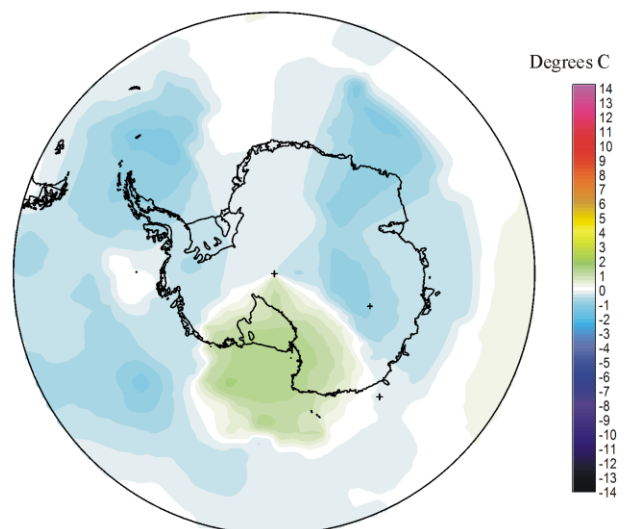
Air temperature 2013 YEAR versus average 1998-2006



Air temperature 2012 YEAR versus average 1998-2006



Air temperature 2012 YEAR versus average 1998-2006



Year 2013 (upper panel) and 2012 (lower panel) surface air temperature compared to the average for 1998-2006. Green-yellow-red colours indicate areas with higher temperature than the 1998-2006 average, while blue colours indicate lower than average temperatures. Data source: [Goddard Institute for Space Studies](https://www.giss.nasa.gov/) (GISS)

Comments to the Year 2013 global surface air temperature overview

This newsletter contains graphs showing a selection of key meteorological variables for the year 2013. All temperatures are given in degrees Celsius.

In the above maps showing the geographical pattern of surface air temperatures, the period 1998-2006 is used as reference period. The reason for comparing with this recent period instead of the official WMO 'normal' period 1961-1990, is that the latter period is affected by the relatively cold period 1945-1980. Almost any comparison with such a low average value will therefore appear as high or warm, and it will be difficult to decide if modern surface air temperatures are increasing or decreasing. Comparing with a more recent period overcomes this problem.

In the other diagrams in this newsletter the thin line represents the monthly global average value and the thick line indicate the simple 3 year running average.

The average global surface air temperature for 2013.

On average, the year 2013 was not very different from 2012. The corresponding sea surface temperature changes 2012-2013 is shown by the diagrams on pages 5-6.

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The Northern Hemisphere was characterised by regional contrasts. Most of North America and Europe had below annual average 1998-2006 temperature conditions, while most of Russia and Siberia had had relatively warm conditions.

Temperature conditions near Equator were near or somewhat below the 1998-2006 temperature average.

In the Southern Hemisphere surface air temperatures were near or below the 1998-2006 average. Australia had above average annual temperature.

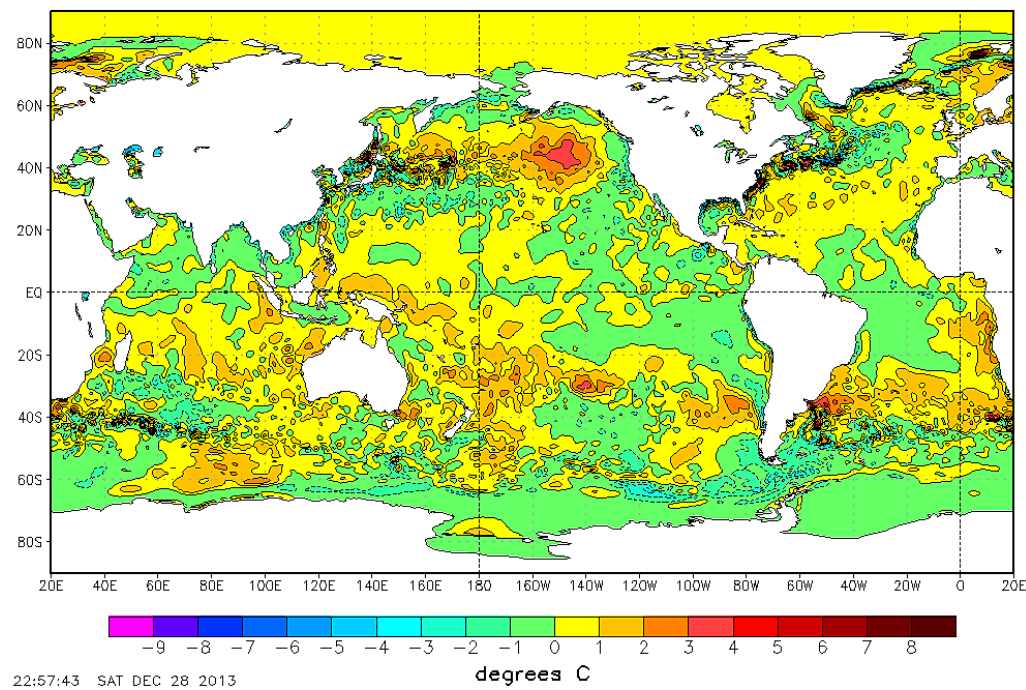
The Arctic generally had below average temperatures, the only exception being coastal regions in northern Russia.

Most of East Antarctic had above average temperature conditions, and most of West Antarctica had below average temperatures.

Sea surface temperature anomaly at the end of the years 2013 and 2012

NOAA/NWS/NCEP/EMC Marine Modeling and Analysis Branch

RTG_SST Anomaly (0.5 deg X 0.5 deg) for 28 Dec 2013

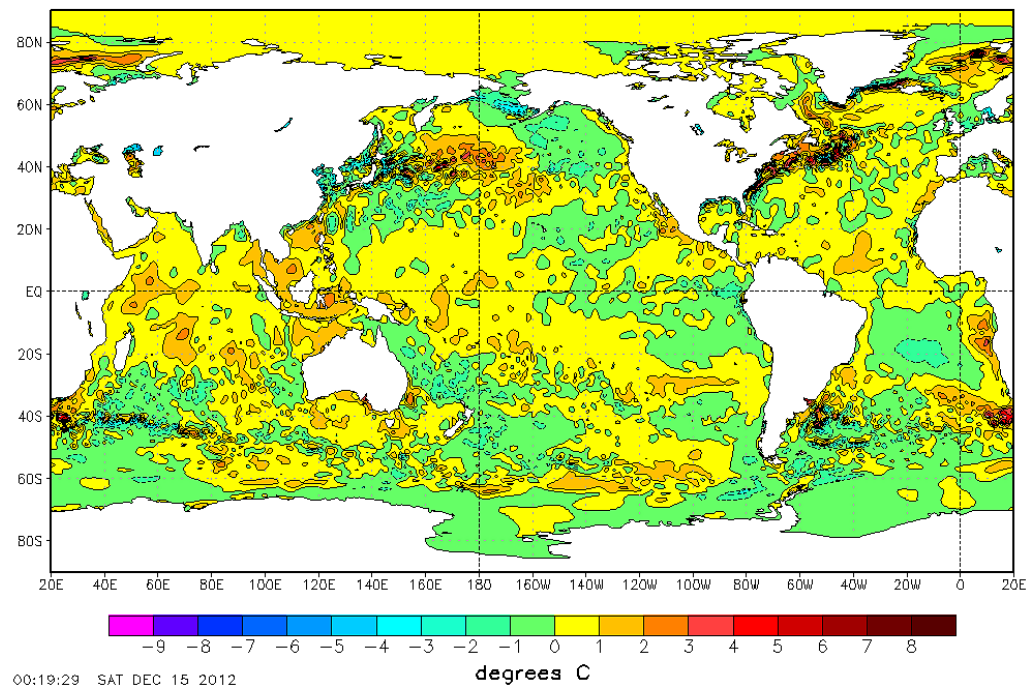


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Sea surface temperature anomaly in late December 2013.

NOAA/NWS/NCEP/EMC Marine Modeling and Analysis Branch

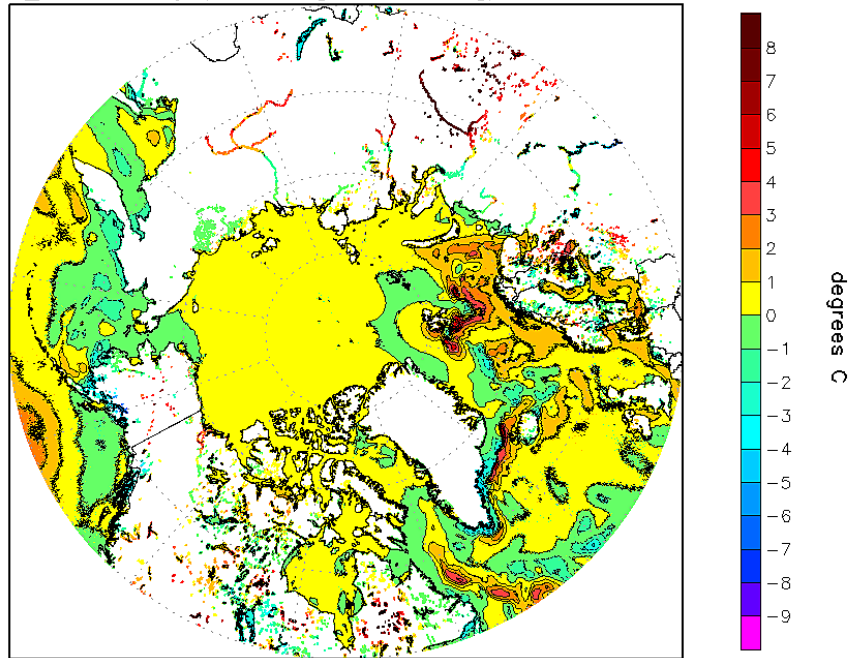
RTG_SST Anomaly (0.5 deg X 0.5 deg) for 14 Dec 2012



Sea surface temperature anomaly December 2012.

NOAA/NWS/NCEP/EMC Marine Modeling and Analysis Branch Oper H.R.

RTG_SST Anomaly (0.083 deg X 0.083 deg) for 28 Dec 2013



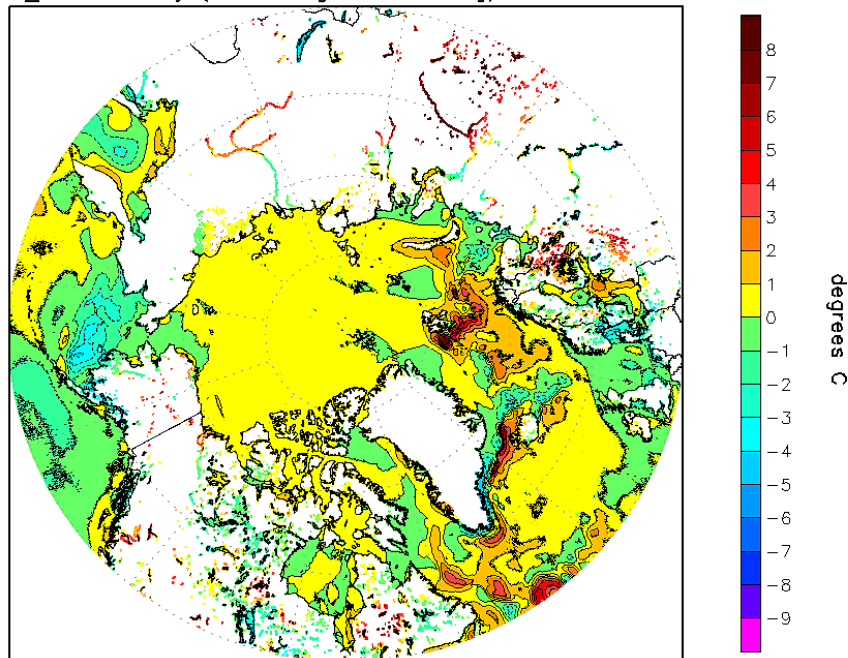
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Arctic sea surface temperature anomaly late December 2013.

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NOAA/NWS/NCEP/EMC Marine Modeling and Analysis Branch Oper H.R.

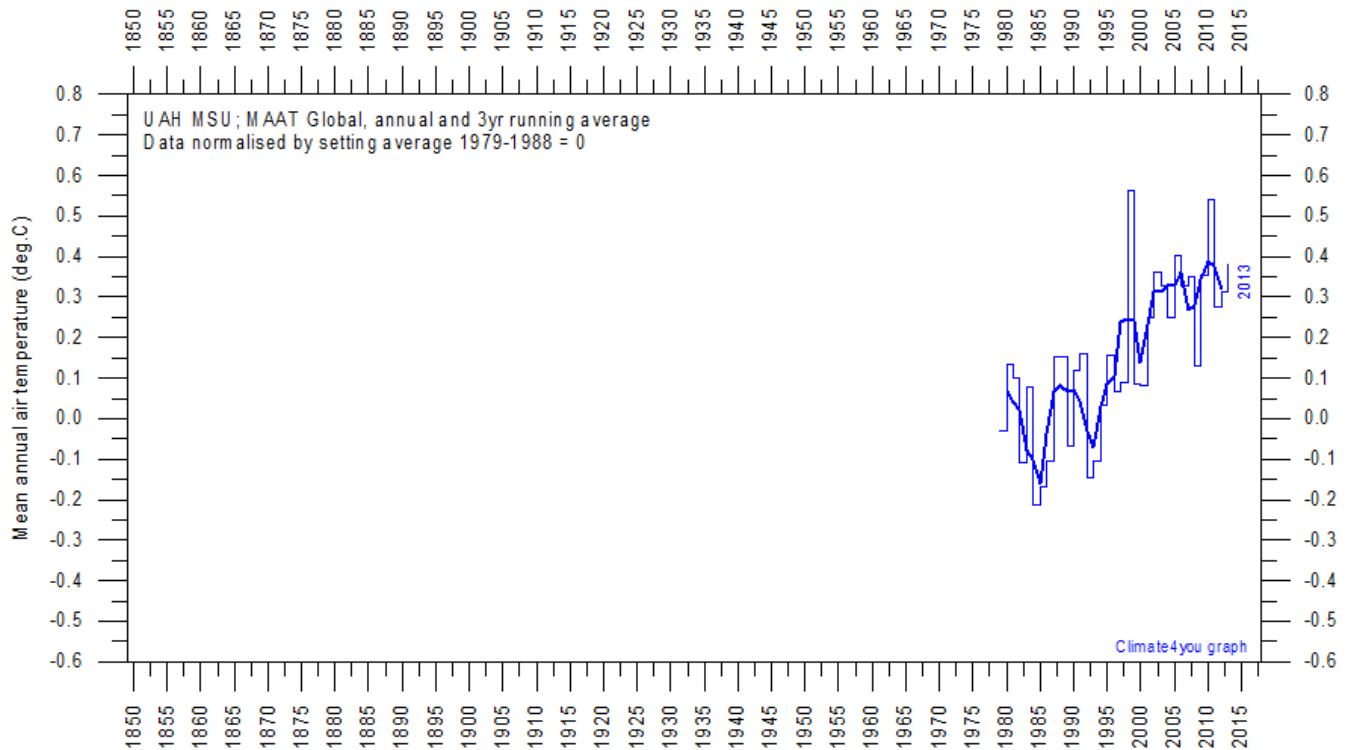
RTG_SST Anomaly (0.083 deg X 0.083 deg) for 14 Dec 2012



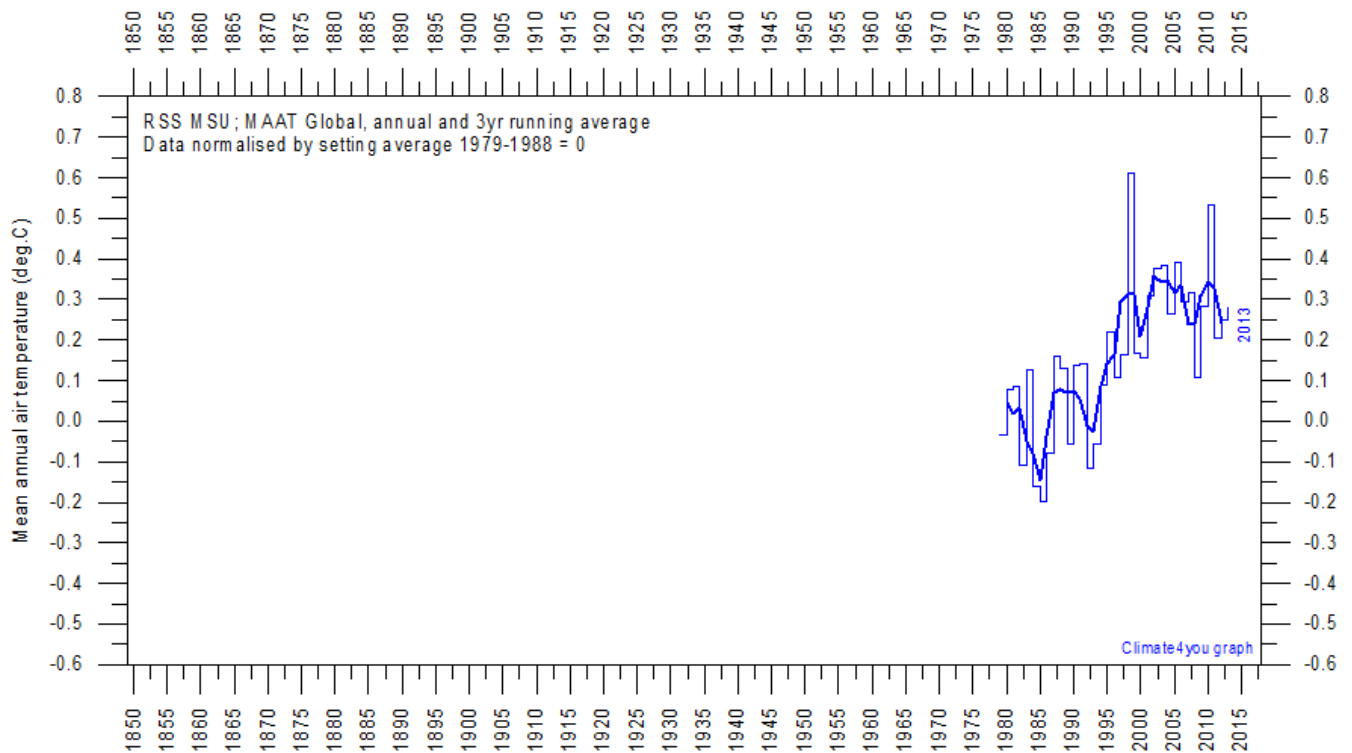
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Arctic sea surface temperature anomaly December 2012.

Lower troposphere temperature from satellites, updated to year 2013

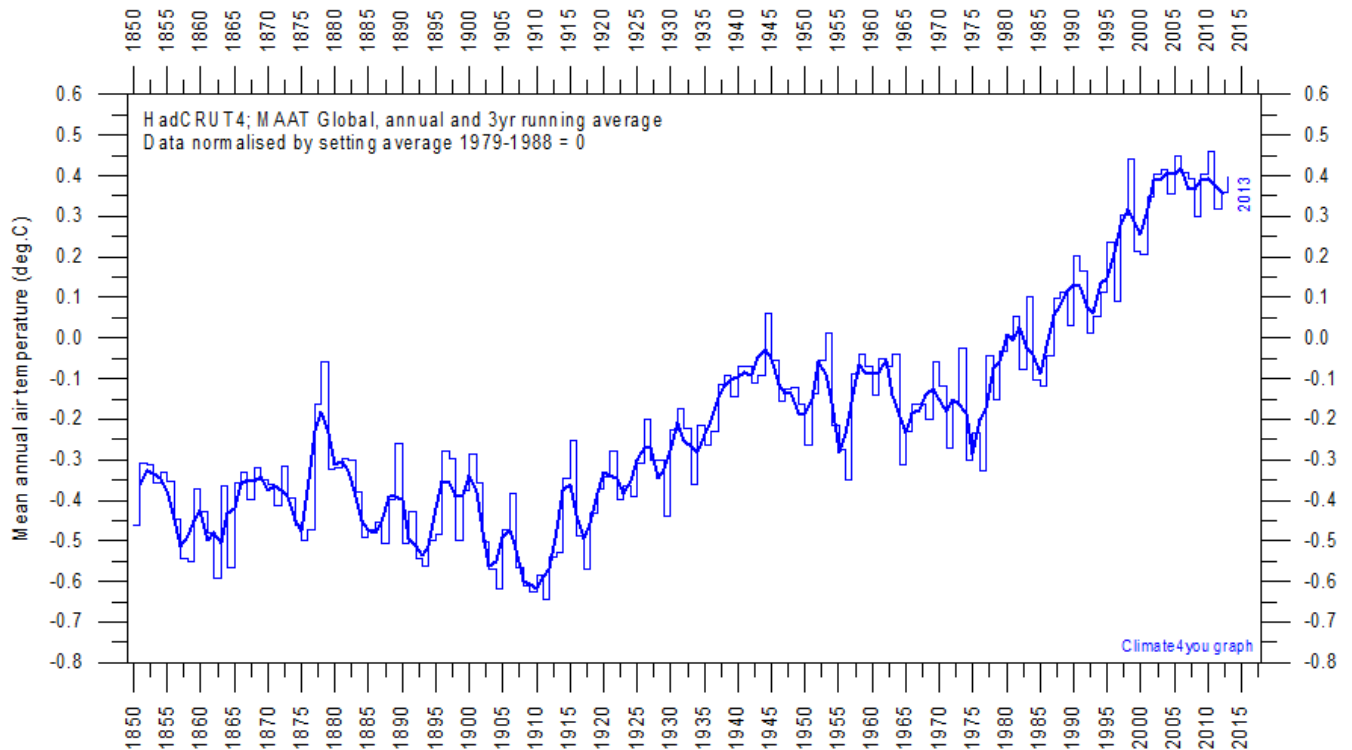


Mean annually lower troposphere temperature anomaly (thin line) since 1979 according to [University of Alabama](#) at Huntsville, USA. The thick line is the simple running 3 year average. The average for 1979-1988 (10 yrs) has been set to zero, to make comparison with other temperature data series easy.



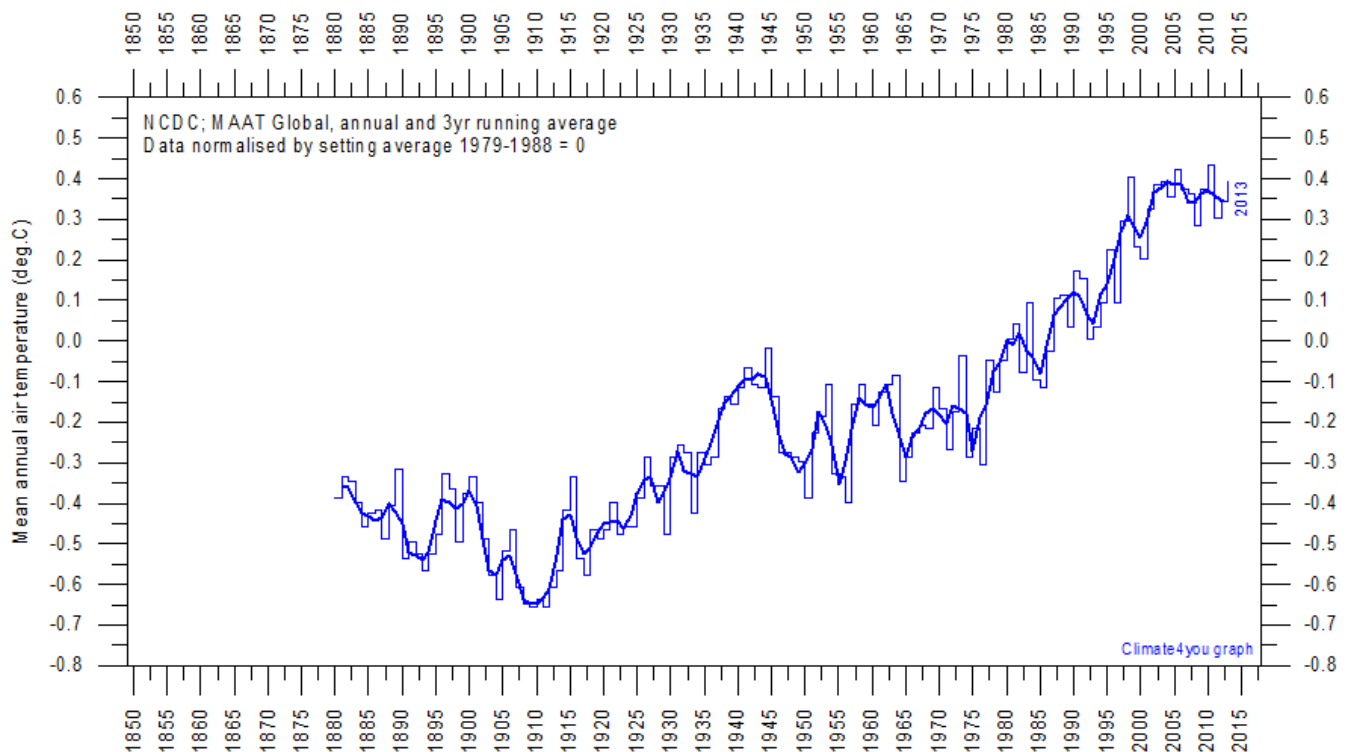
Mean annual lower troposphere temperature anomaly (thin line) since 1979 according to according to [Remote Sensing Systems](#) (RSS), USA. The thick line is the simple running 3 year average. The average for 1979-1988 (10 yrs) has been set to zero, to make comparison with other temperature data series easy.

Global surface air temperature, updated to year 2013

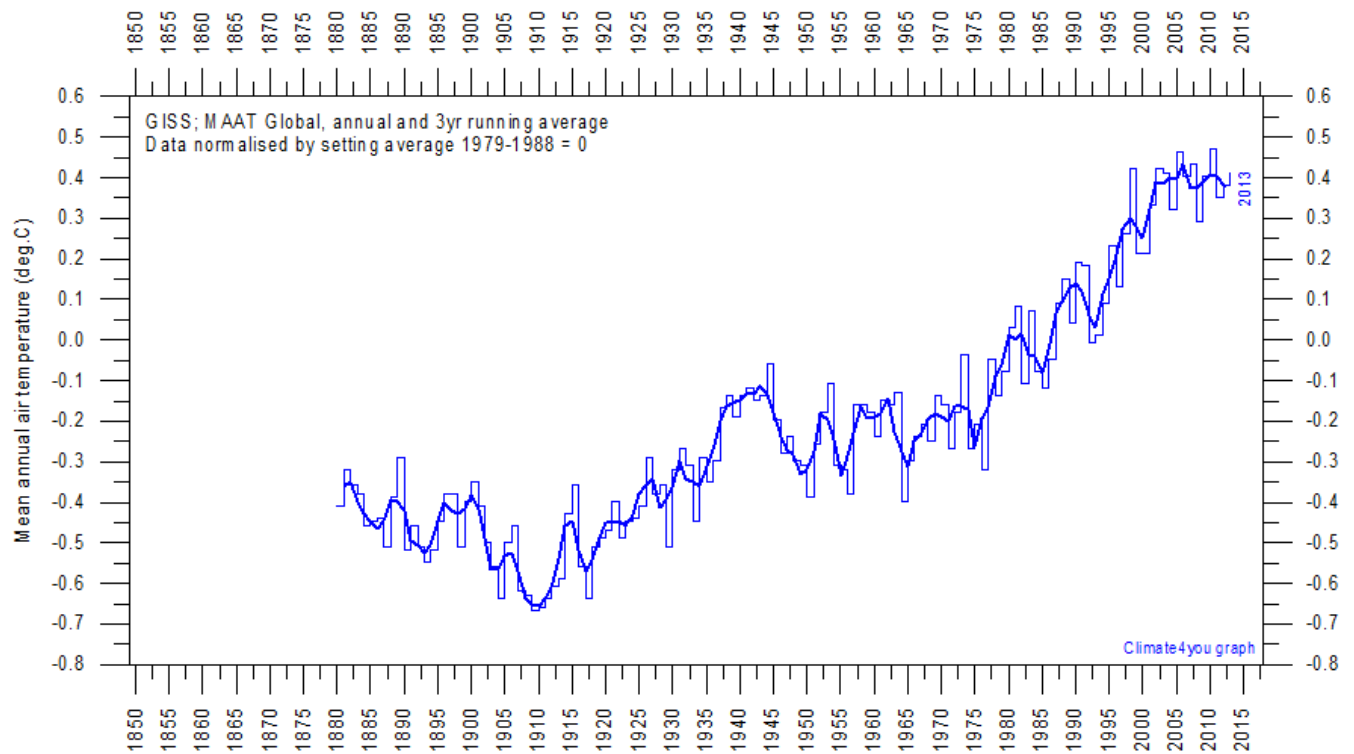


Mean annual global surface air temperature (thin line) since 1850 according to according to the Hadley Centre for Climate Prediction and Research and the University of East Anglia's [Climatic Research Unit \(CRU\)](#), UK. The thick line is the simple running 3 year average. The average for 1979-1988 (10 yrs) has been set to zero.

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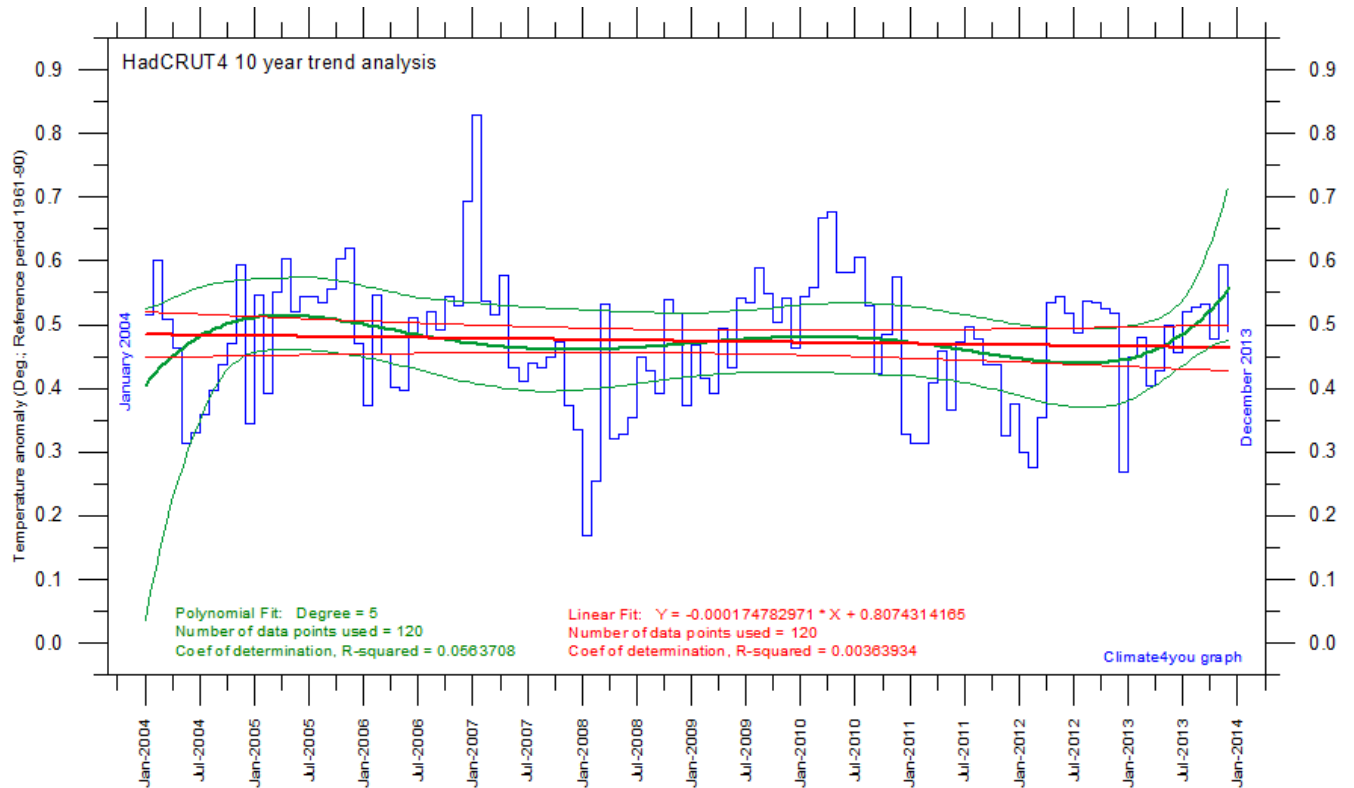


Mean annual global surface air temperature since 1880 according to according to the [National Climatic Data Center \(NCDC\)](#), USA. The thick line is the simple running 3 year average. The average for 1979-1988 (10 yrs) has been set to zero, to make comparison with other temperature data series easy.

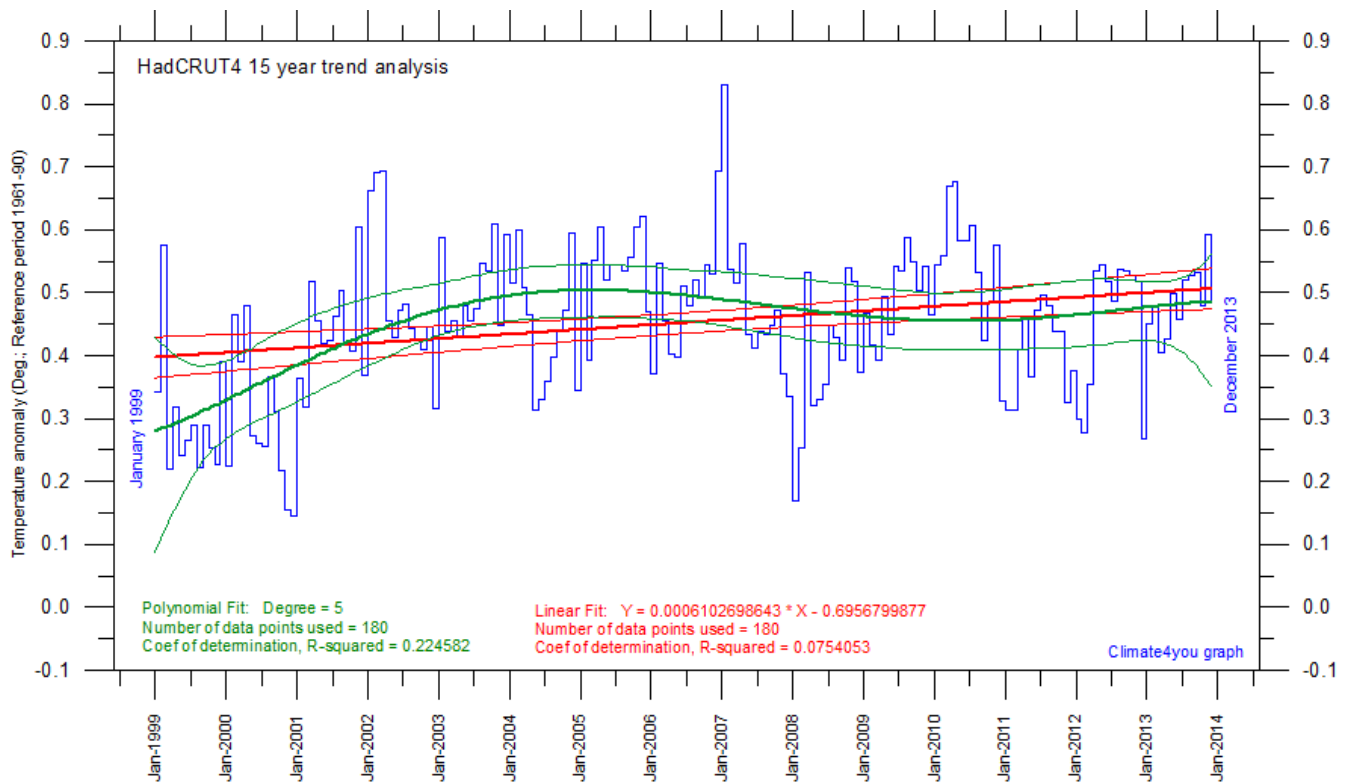


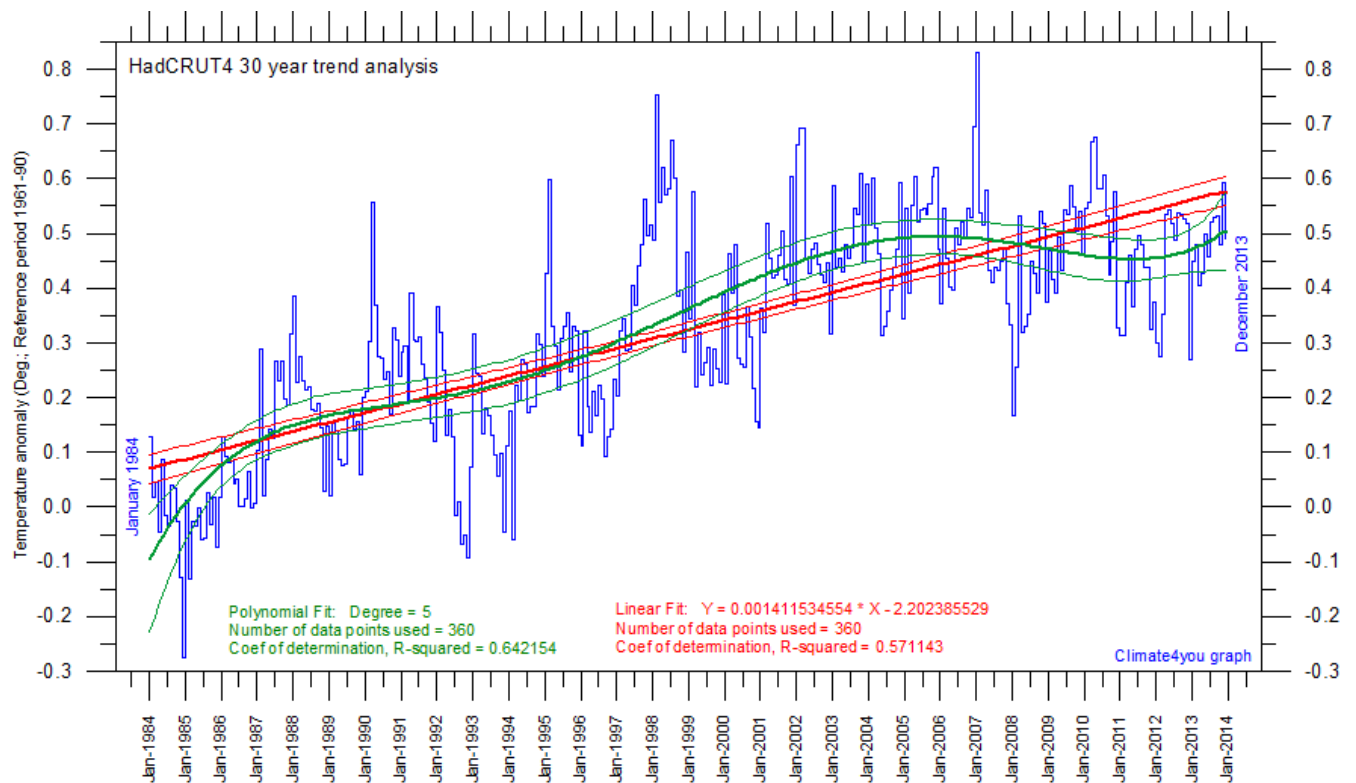
Mean annual global surface air temperature (thin line) since 1880 according to the [Goddard Institute for Space Studies](#) (GISS), at Columbia University, New York City, USA. The thick line is the simple running 3 year average. The average for 1979-1988 (10 yrs) has been set to zero, to make comparison with other temperature data series easy.

HadCRUT4 global surface air temperature last 10, 15 and 30 years, updated to December 2013



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Last 10, 15 and 30 years global monthly average surface air temperature according to Hadley CRUT4. The thin blue line represents the monthly values. The thick red line is the linear fit, with 95% confidence intervals indicated by the two thin red lines. The thick green line represents a 5-degree polynomial fit, with 95% confidence intervals indicated by the two thin green lines. A few key statistics is given in the lower part of the diagrams.

Global satellite temperature trends calculated for different periods before December 2013

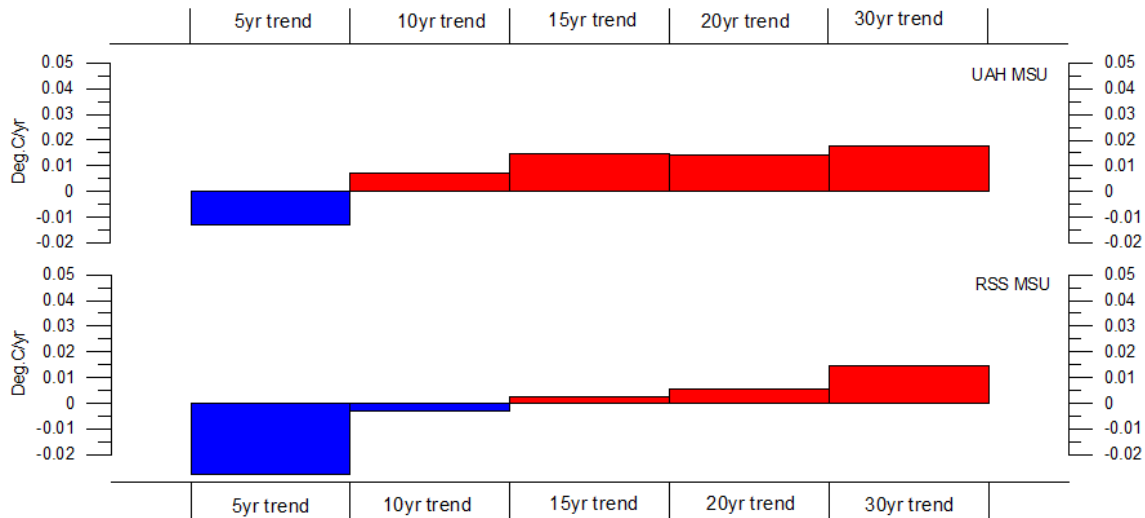


Diagram showing the latest 5, 10, 20 and 30 yr linear annual global temperature trend, calculated as the slope of the linear regression line through the data points, for two satellite-based temperature estimates (UAH MSU and RSS MSU).

Global surface air temperature trends calculated for different periods before December 2013

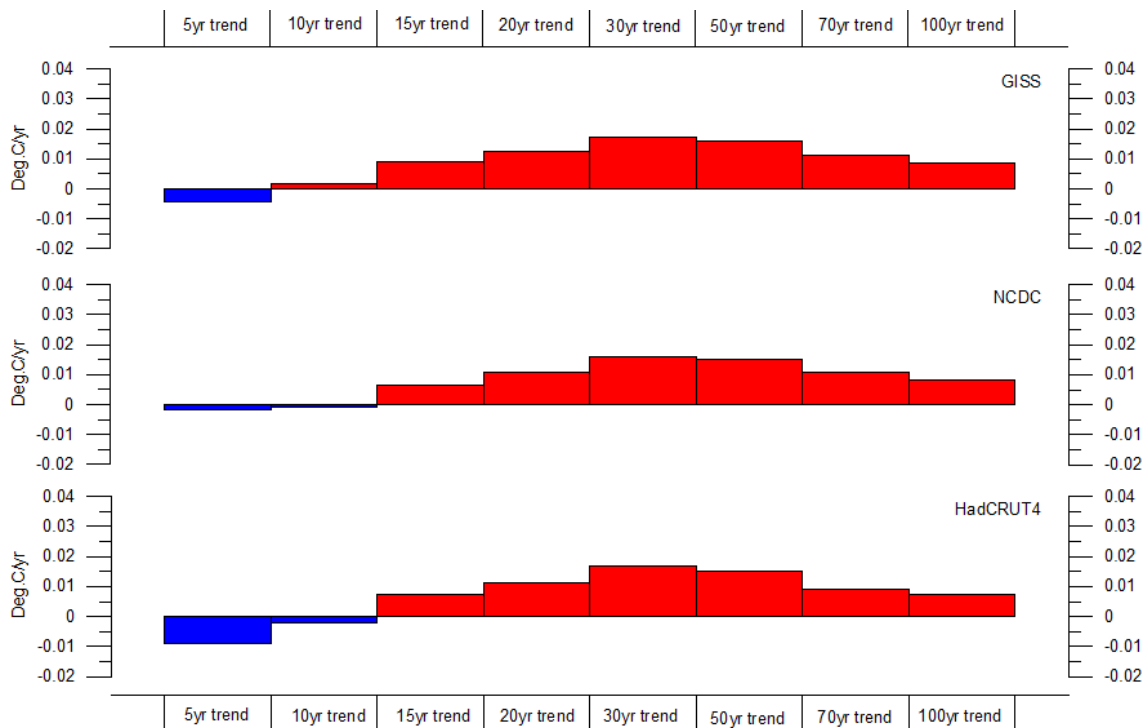
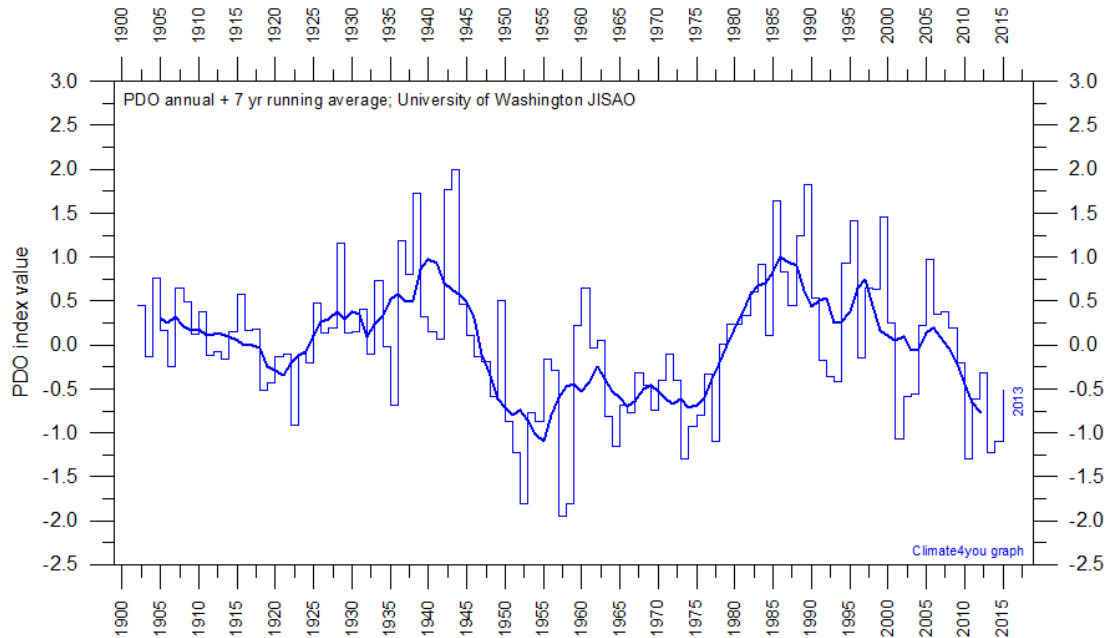


Diagram showing the latest 5, 10, 15, 20, 30, 50, 70 and 100 yr linear annual global temperature trend, calculated as the slope of the linear regression line through the data points, for three surface-based temperature estimates (GISS, NCDC and HadCRUT3). Last month included in analysis: December 2013.

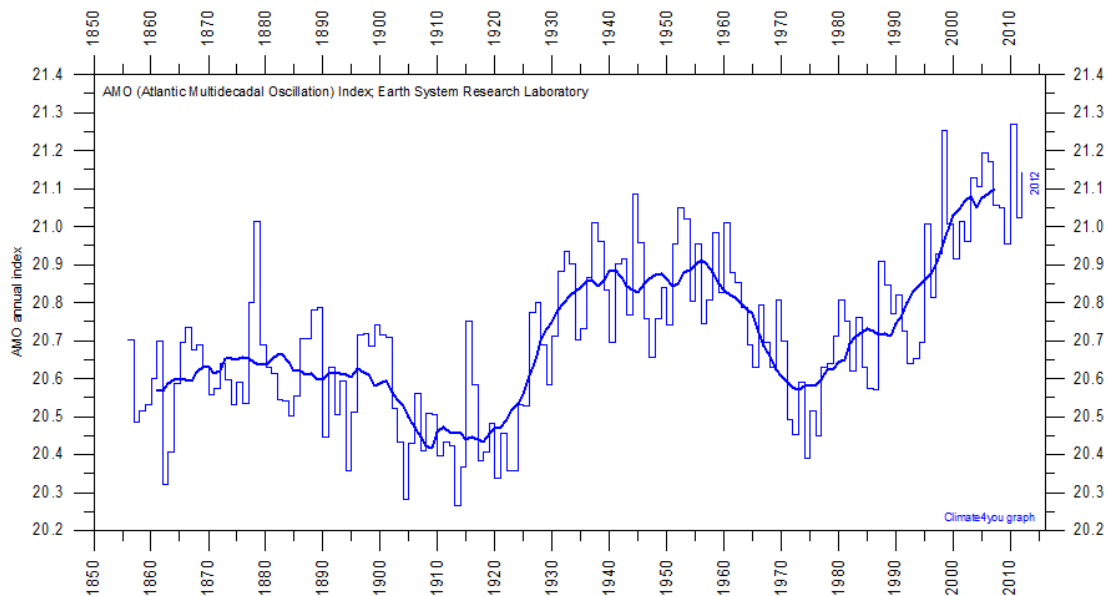
PDO - Pacific Decadal Oscillation



Annual values of the Pacific Decadal Oscillation (PDO) according to the Joint Institute for the Study of the Atmosphere and Ocean (JISAO), a Cooperative Institute between the National Oceanic and Atmospheric Administration and the University of Washington. The PDO is a long-lived El Niño-like pattern of Pacific climate variability, and the data series goes back to January 1900. The thin line indicates annual PDO values, and the thick line is the simple running 7 year average. Last year shown: 2013.

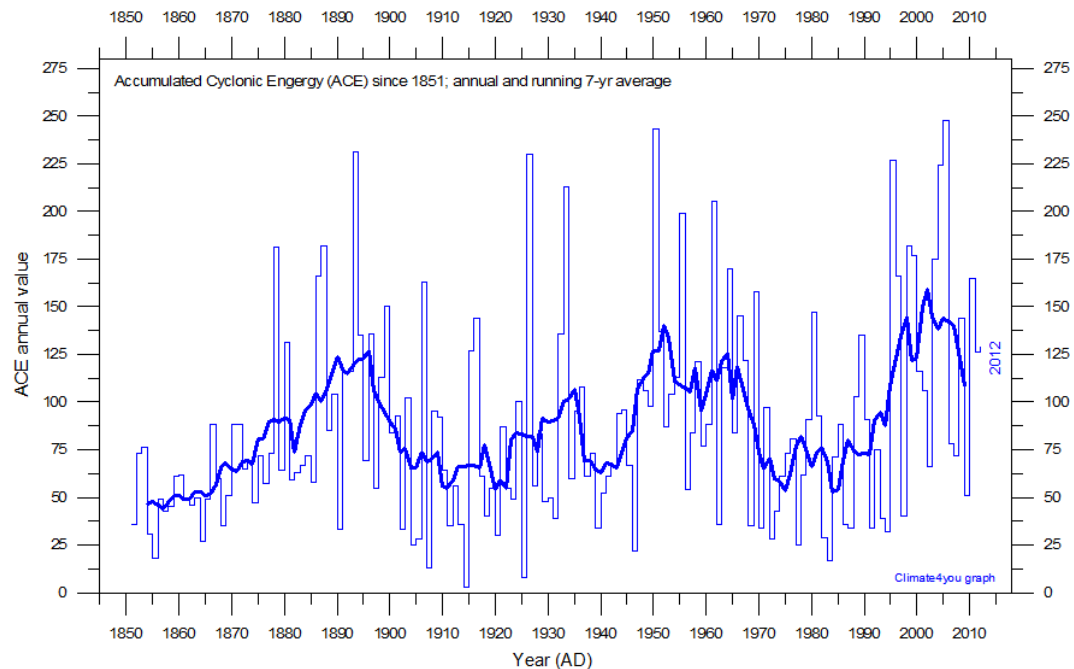
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AMO (Atlantic Multidecadal Oscillation) Index



Annual Atlantic Multidecadal Oscillation (AMO) index values since 1856. The thin line indicates 3 month average values, and the thick line is the simple running 11 year average. Further explanation in text [above](#). Data source: Earth System Research Laboratory at NOAA. Last year shown: 2012.

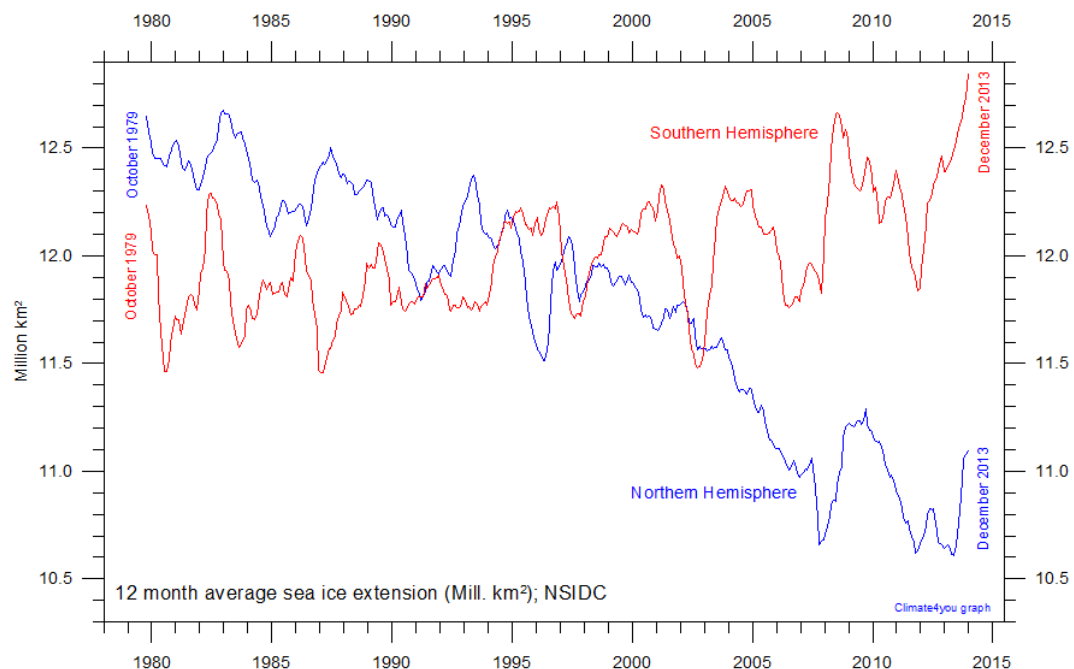
Annual accumulated cyclone energy (ACE) Atlantic Basin



Accumulated cyclonic energy (ACE; Atlantic basin) per year since 1850 AD, according to data from the [Atlantic Oceanographic and Meteorological Laboratory, Hurricane research Division](#). Thin lines show annual ACE values, and the thick line shows the running 7-yr average. Last year shown: 2012.

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Arctic and Antarctic sea ice extension, updated to December 2013



12 month running average sea ice extension in both hemispheres since 1979, the satellite-era. Data source: National Snow and Ice Data Center (NSIDC).

All above diagrams with supplementary information (including links to data sources and previous issues of this newsletter) are available on www.climate4you.com

Yours sincerely, Ole Humlum (Ole.Humlum@geo.uio.no)

January 28, 2014.