# Climate4you update Year 2010

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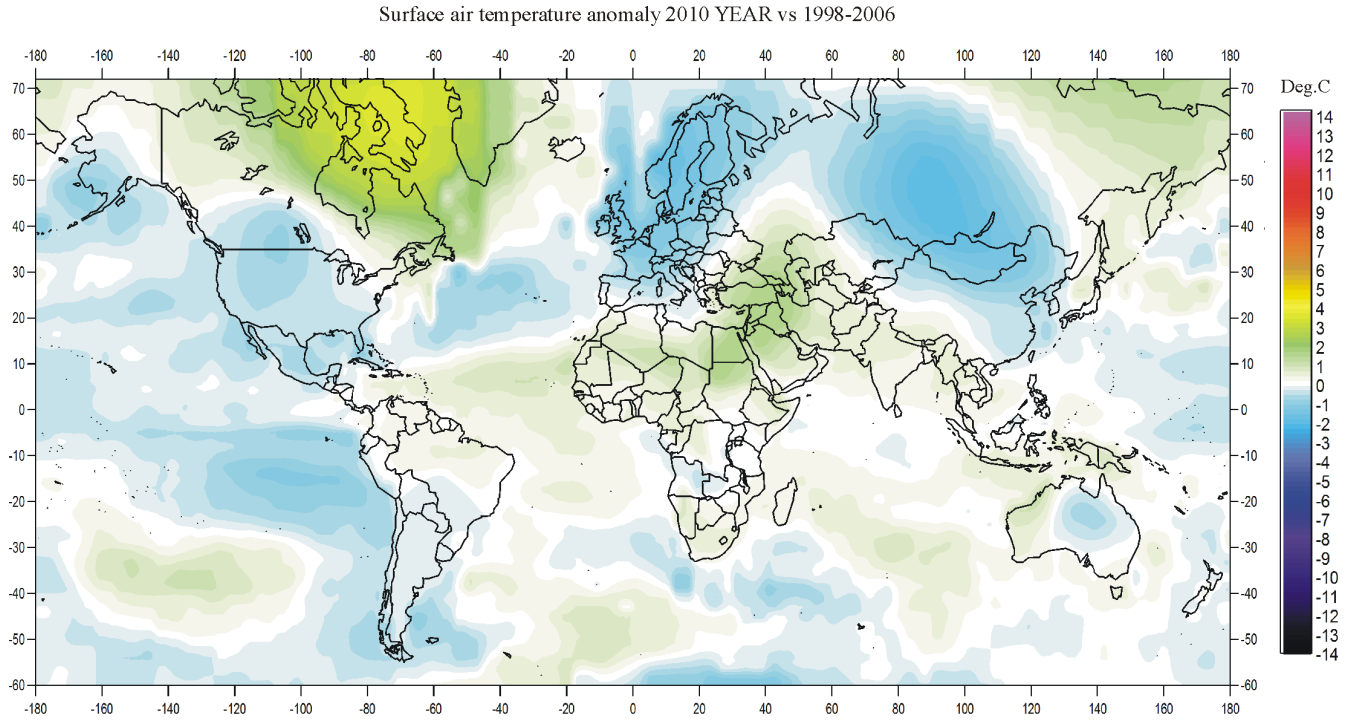
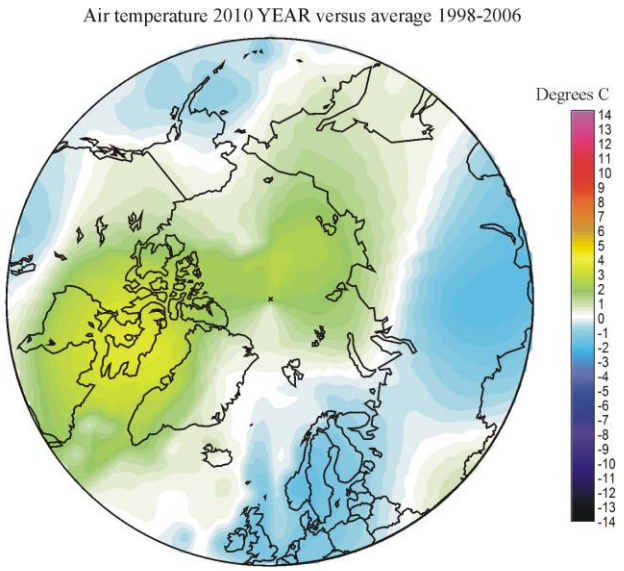
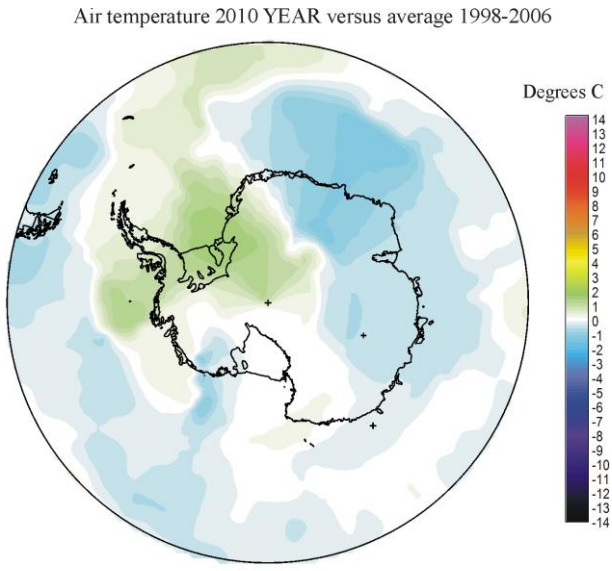
## Year 2010 global surface air temperature overview




*Year 2010 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 (GISS)*

## Comments to the Year 2010 global surface air temperature overview

This newsletter contains graphs showing a selection of key meteorological variables for the year 2010. 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 2010.

On the whole, the year 2010 was warmer than 2009, mainly due to the effects of the now ended El Niño situation in the Pacific Ocean. The corresponding sea surface temperature changes 2009-2010 is shown by the diagrams on the following two pages.

In the Northern Hemisphere close to normal or relatively low air temperatures characterized most regions. Relatively warm conditions characterised north-eastern Canada, western Greenland, parts of northern Siberia, northern Africa, and eastern Mediterranean. A zone of below average temperatures extents from western Siberia over Europe, the North Atlantic, USA and southern Canada, into the Pacific.

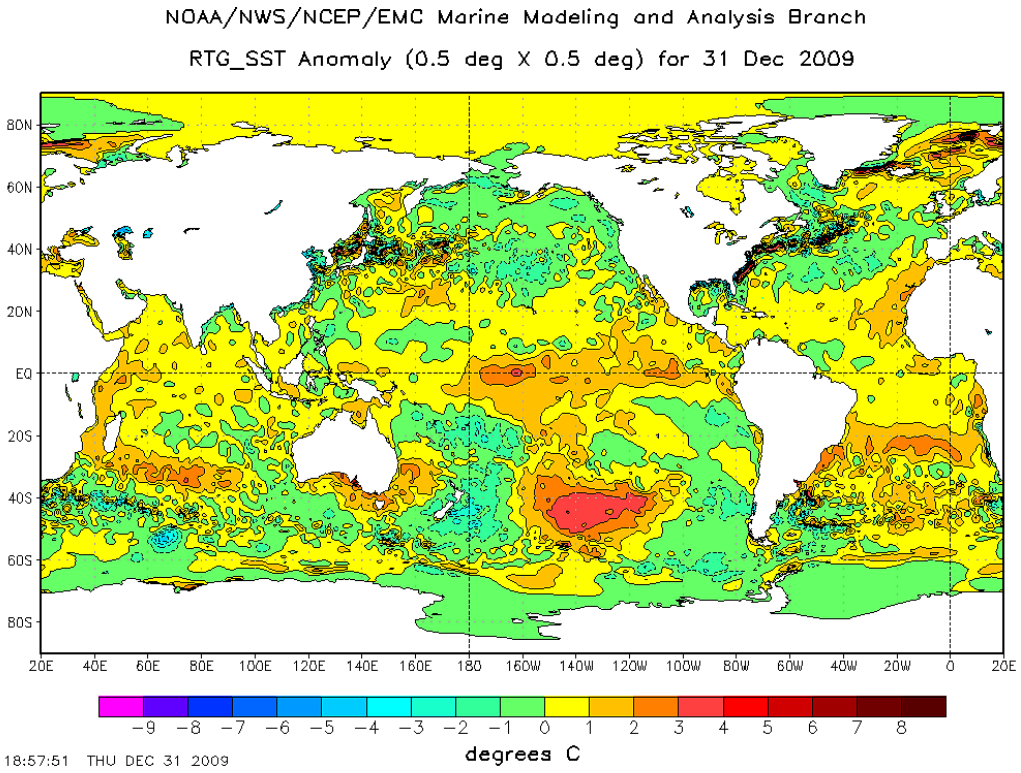


Conditions near Equator were influenced early in 2010 by a warm El Niño situation in the Pacific Ocean, but this was later offset by a subsequent cold La Nina situation. Most of equatorial Pacific thereby ended up with generally below 1998-2006 average temperatures. In Equatorial Atlantic and North Africa relatively warm conditions prevailed. The change in equatorial sea surface temperatures 2009-2010 are illustrated by the maps on page 3.

In the Southern Hemisphere temperatures were close to average, or slightly below.

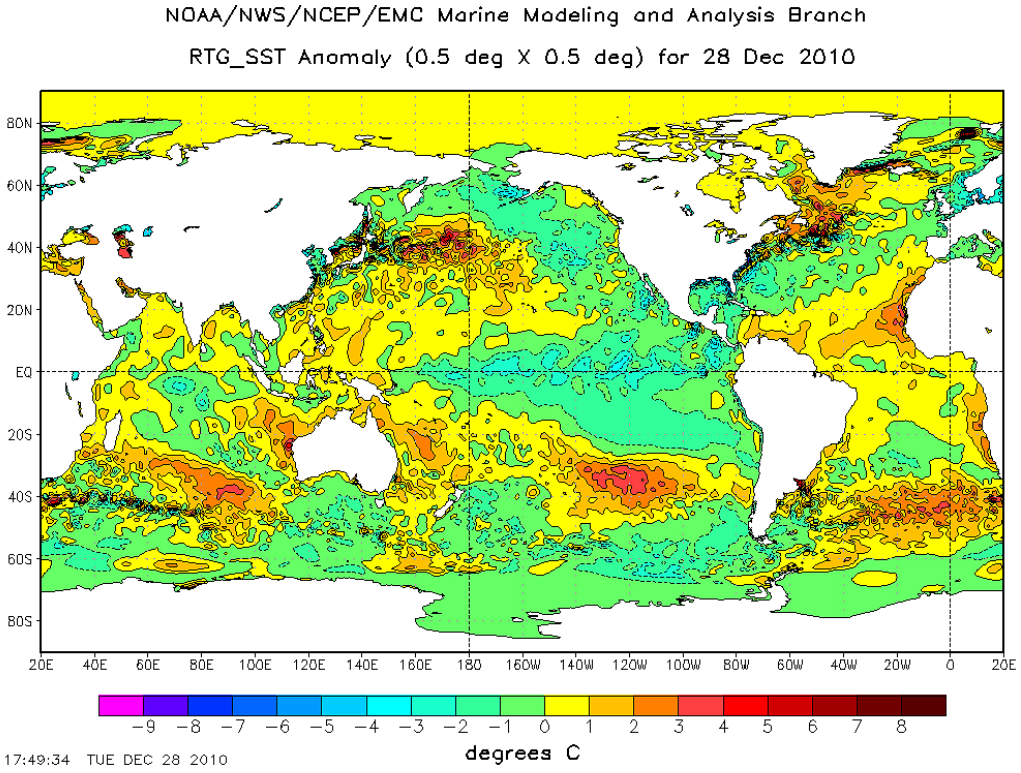
The Arctic was a region of relatively large contrasts temperature wise. North-eastern Canada, western Greenland and eastern Siberia experienced above average temperatures. On the other hand, western Siberia, northern Europe and parts of Alaska experienced below average temperatures. Both Pacific and North Atlantic Arctic sea surface temperatures have declined since 2009, with the exception of the Atlantic between Labrador and southern Greenland, where the sea surface temperature increased from 2009 to 2010 (see maps on page 4).

In the Antarctic parts of East Antarctica had below average temperatures, while areas around the Weddell Sea experienced above average temperatures.

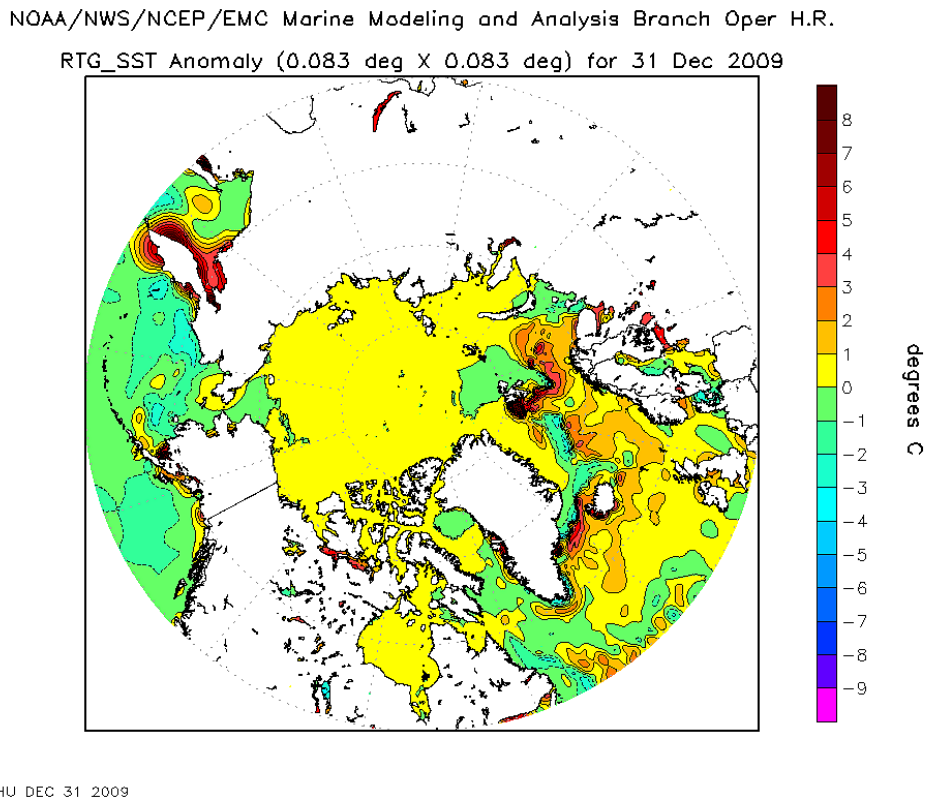



*Sea surface temperature anomaly at the end of 2009.*



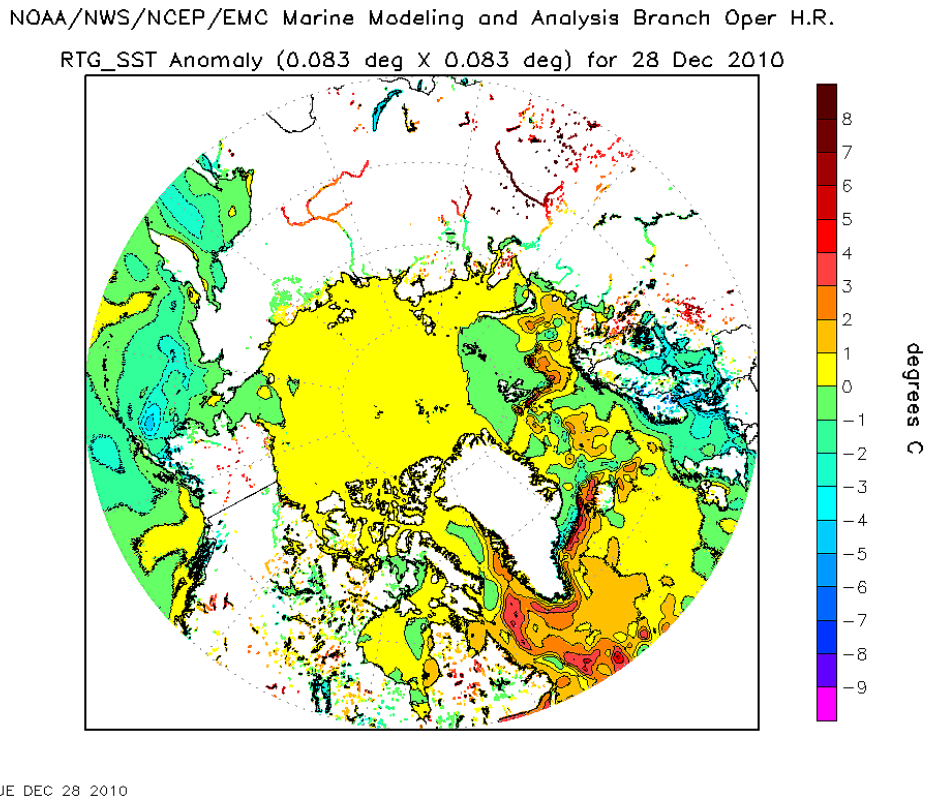



*Sea surface temperature anomaly at the end of 2010.*



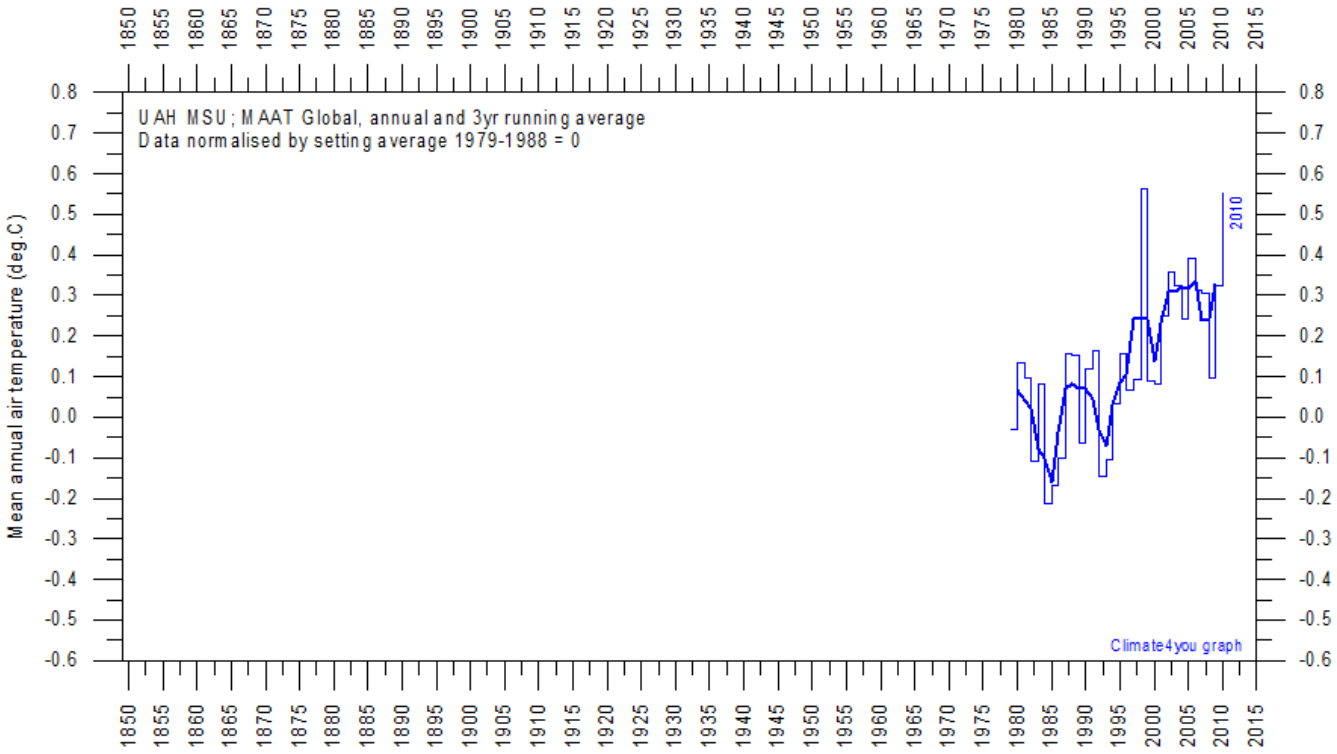

*Arctic sea surface temperature anomaly at the end of 2009.*






*Arctic sea surface temperature anomaly at the end of 2010.*

## Lower troposphere temperature from satellites, updated to year 2010




*Mean annualy 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.*

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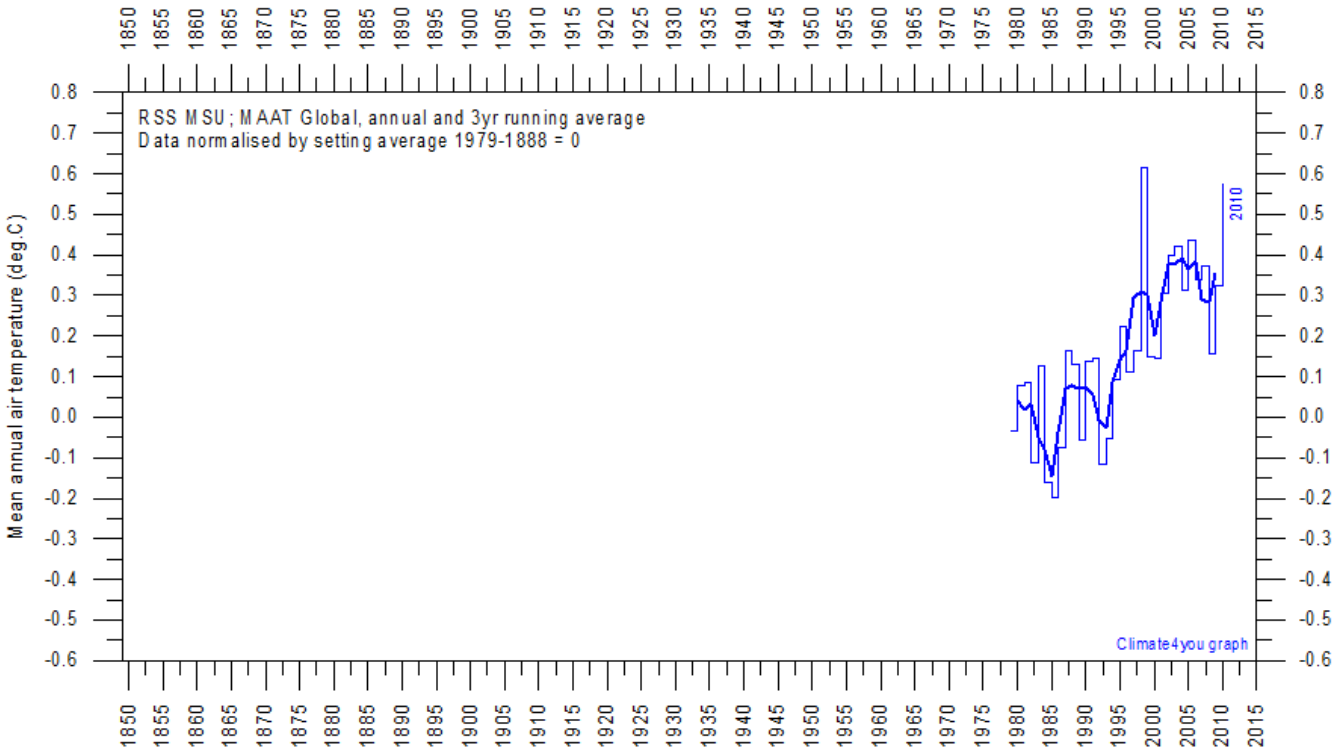
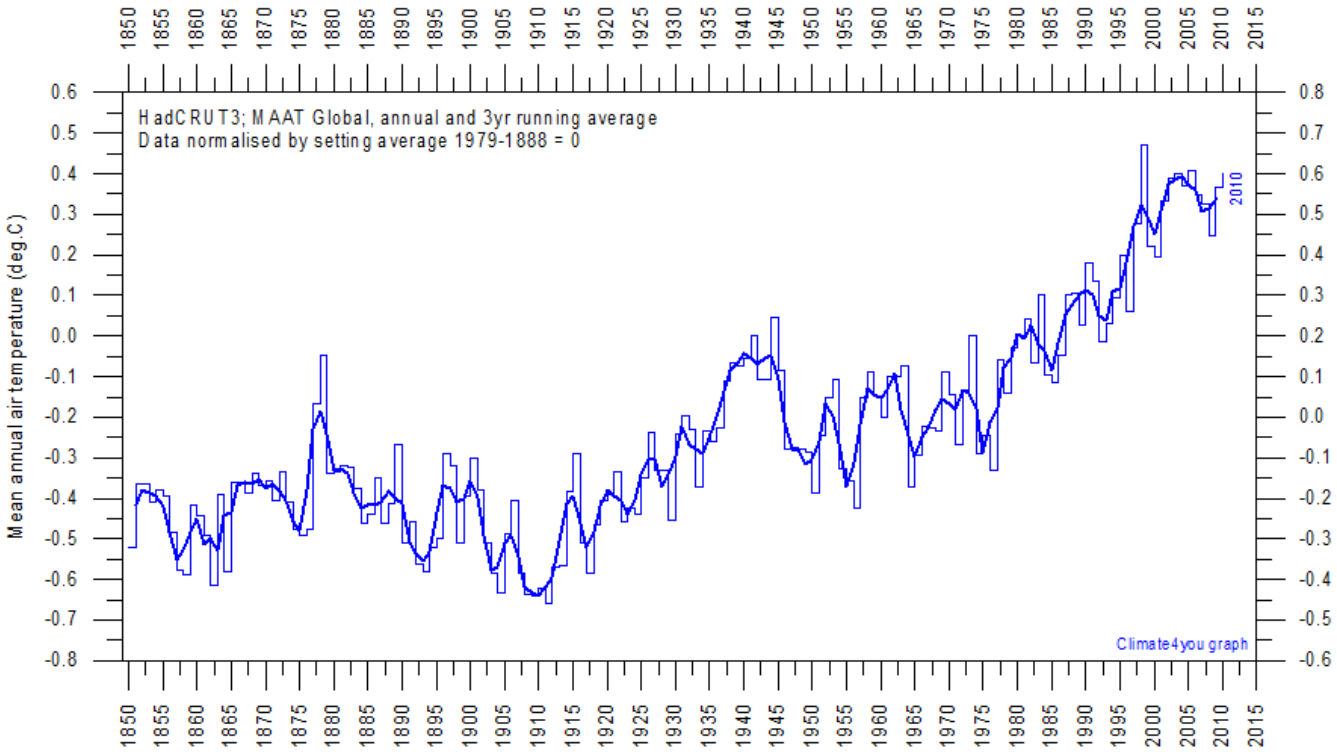


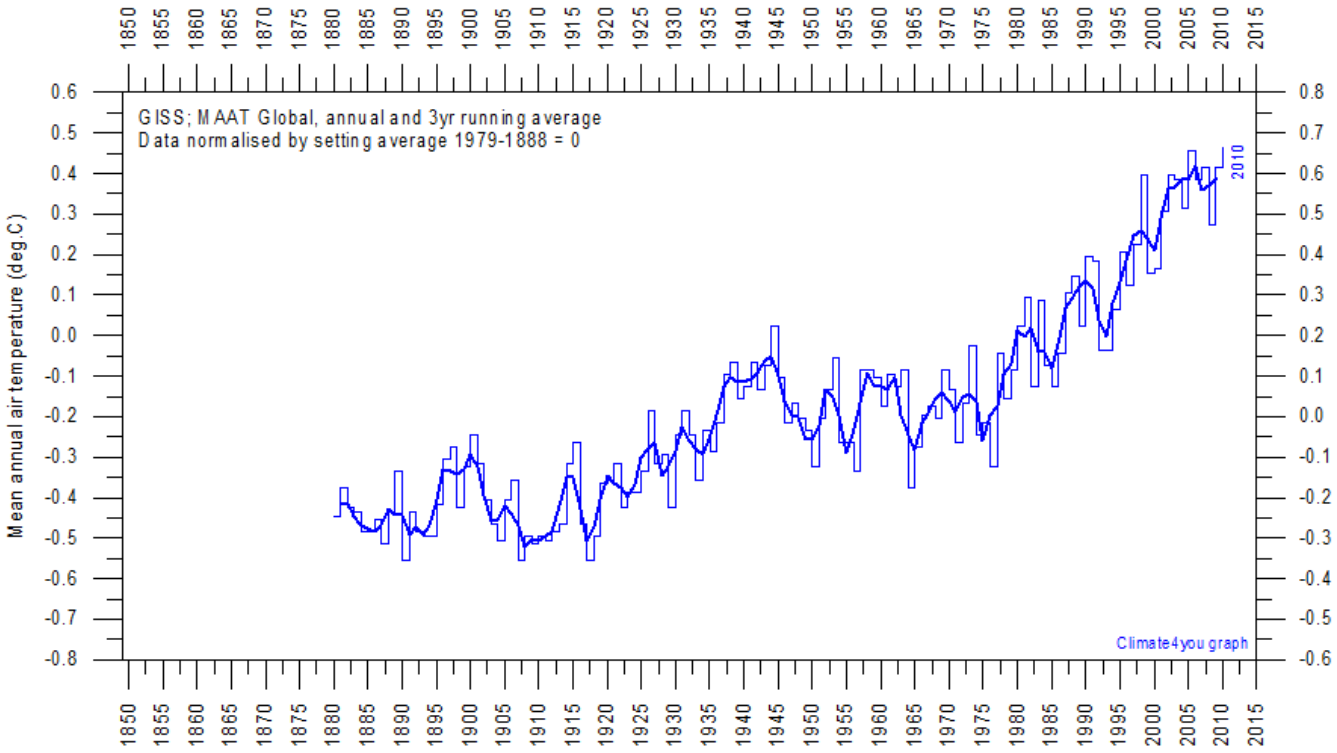

*Mean annual lower troposphere temperature anomaly (thin line) since 1979 according to according to Remote Sensing Systems (RSS), USA. The thick line is the simple running 3 year average. The average for 1979-1988 (10 yrs) has been set to zero, to make comparison with other temperature data series easy.*

## Global surface air temperature, updated to year 2010

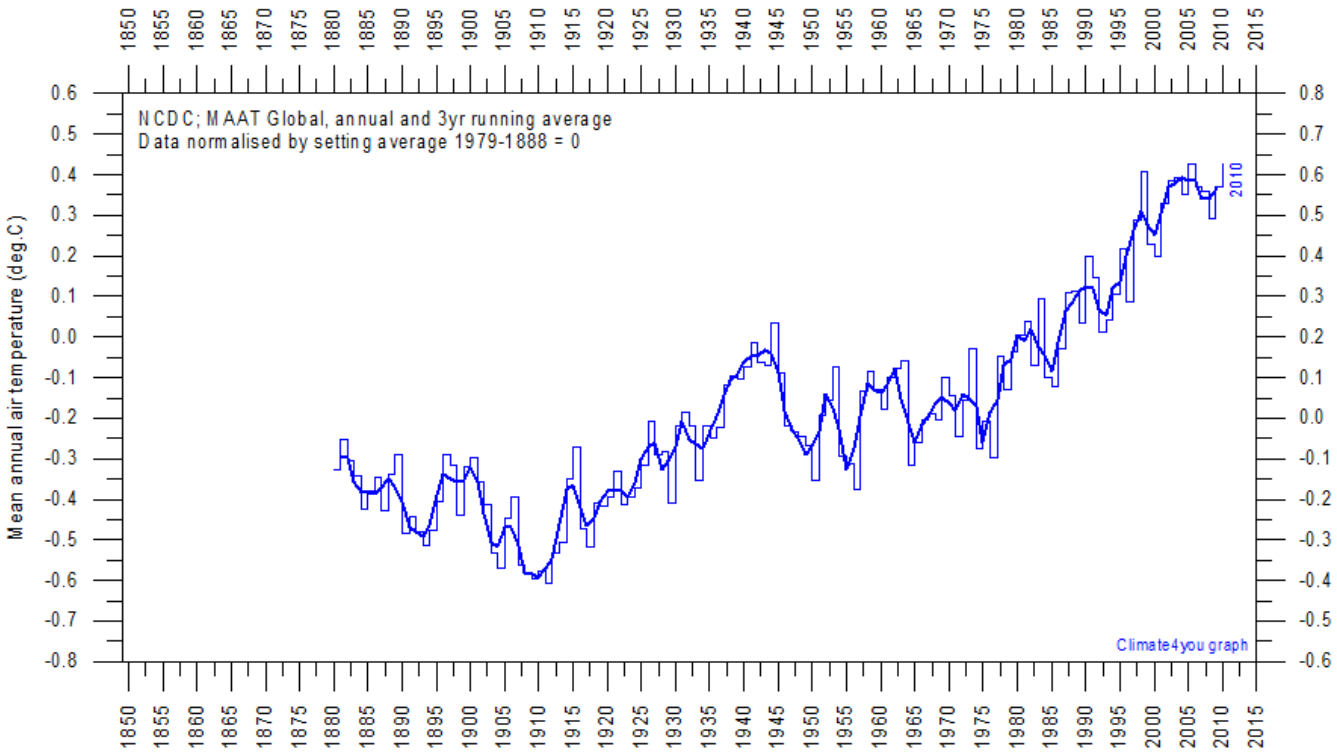



*Mean annual global surface air temperature (thin line) since 1850 according to according to the Hadley Centre for Climate Prediction and Research and the University of East Anglia's Climatic Research Unit (CRU), UK. The thick line is the simple running 3 year average. The average for 1979-1988 (10 yrs)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






*Mean annual global surface air temperature (thin line) since 1880 according to 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.*

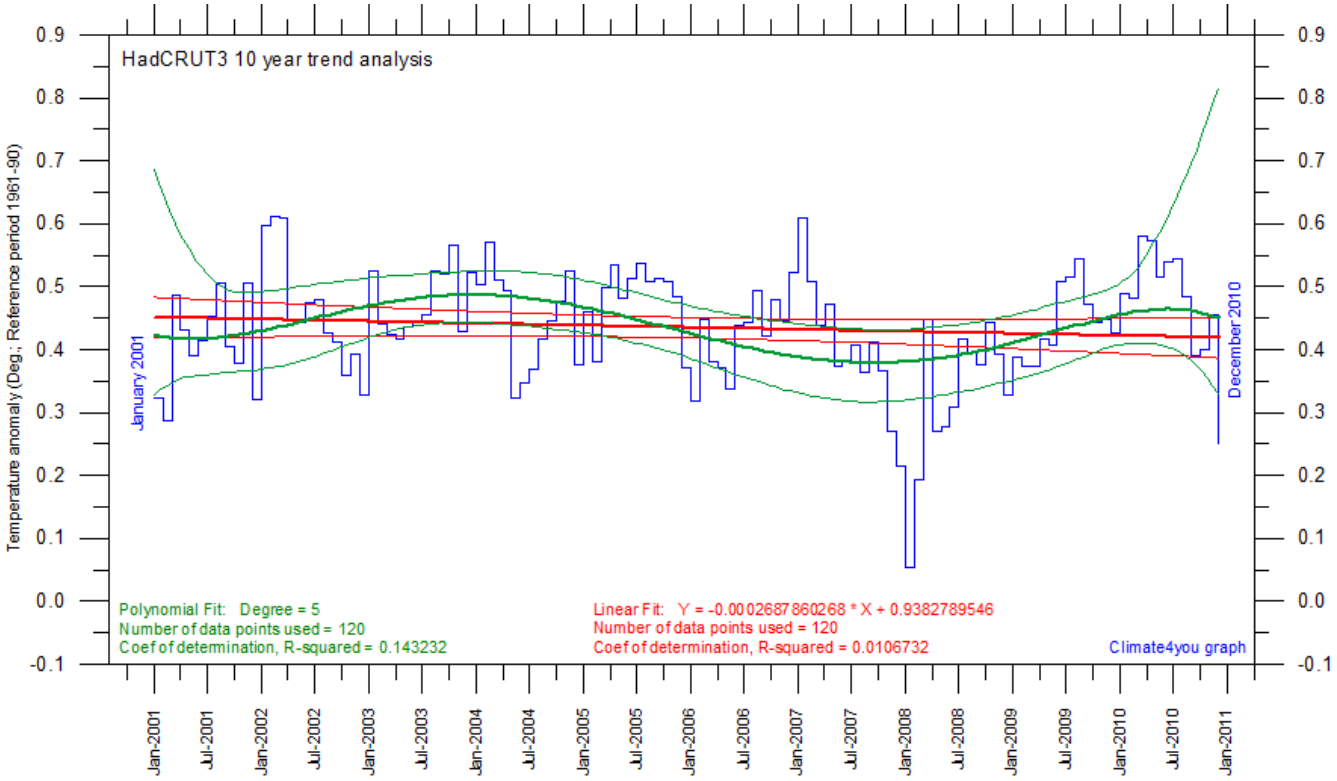



*Mean annual global surface air temperature since 1880 according to according to the National Climatic Data Center (NCDC), USA. The thick line is the simple running 3 year average. The average for 1979-1988 (10 yrs) has been set to zero, to make comparison with other temperature data series easy.*



The 2010 global MAAT value published by GISS (page 6) is the highest in this particular record, slightly higher (0.01°C) than the 2005 value. This is, however, achieved by adding changes to the GISS record during the last year. The global 2005 MAAT value published by GISS last year is equal to the now published global MAAT value for 2010, but has since been changed, so it now is -0.01°C lower than published last year.

## HadCRUT3 global surface air temperature 10 yr trend 2001-2010






*Last 10 years global monthly average surface air temperature according to Hadley CRUT, a cooperative effort between the* Hadley Centre for Climate Prediction and Research *and the* University of East Anglia's Climatic Research Unit *(*CRU*), UK. 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 diagram.*

The HadCRUT3 global surface air temperature 10 yr trend is now negative, but still close to zero.

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)

20 January 2011.