Climate4you update September 2010
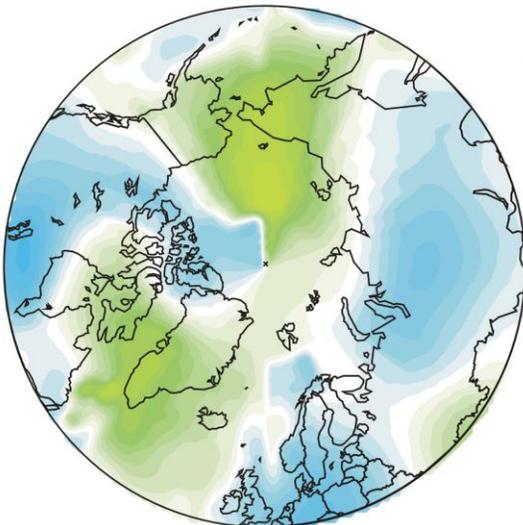
September 2010 global surface air temperature overview

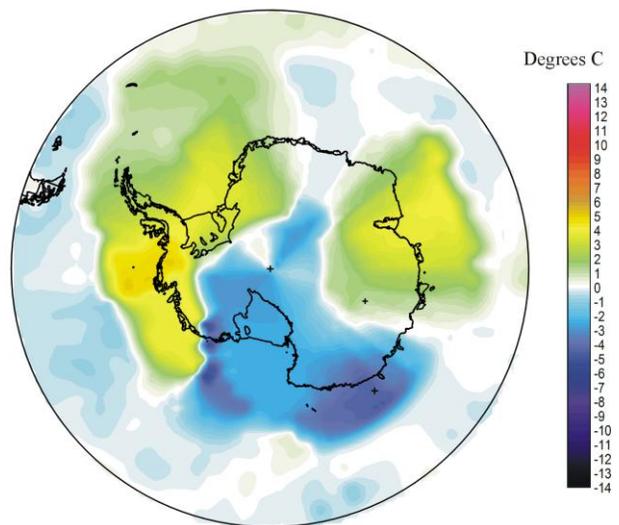Surface air temperature anomaly 2010 09 vs 1998-2006
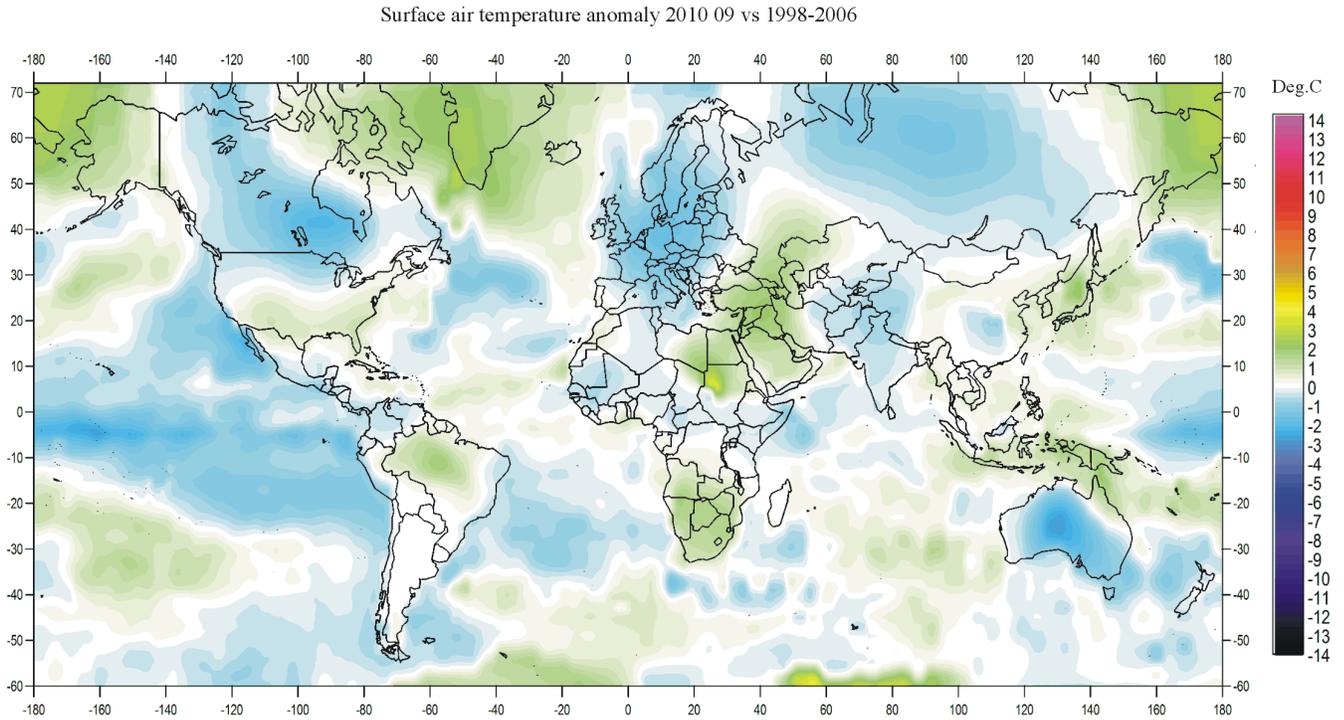
Air temperature 201009 versus average 1998-2006

Air temperature 201009 versus average 1998-2006

1

September 2010 surface air temperature compared to the average 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 September 2010 global surface air temperature overview

This newsletter contains graphs showing a selection of key meteorological variables for September 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 addition to this consideration, the recent temperature development suggests that the time window 1998-2006 may roughly represent a global temperature peak. If so, negative temperature anomalies will gradually become more and more widespread as time goes on. However, if positive anomalies instead gradually become more widespread, this reference period only represented a temperature plateau.

In the other diagrams in this newsletter the thin line represents the monthly global average value, and the thick line indicate a simple running average, in most cases a 37-month average, almost corresponding to three years.

The year 1979 has been chosen as starting point in several of the diagrams, as this roughly corresponds to both the beginning of satellite observations and the onset of the late 20th century warming period.

Global surface air temperatures September 2010 in the Northern Hemisphere was characterised by relatively cold conditions, except parts of the North Atlantic region with Iceland and Greenland, Alaska, eastern Siberia, and parts of eastern Mediterranean. Otherwise, relative cold conditions prevailed, especially in Canada, Europe and central and northern Siberia.

2

The Southern Hemisphere again experienced smaller regional temperature contrasts than the Northern Hemisphere, but in general was relatively cold or close to average conditions. Especially parts of the Pacific and Australia and New Zealand experienced below average temperatures.

Near Equator conditions were influenced by the apparent onset of a new La Nina situation. Relatively low temperatures therefore characterised most of the Equatorial regions.

In the Arctic relatively low temperatures characterised the Europe-Russia-Western Sibir sector, while relatively high temperatures characterised the Alaska-Eastern Siberia sector. The Greenland sector relatively warm, while the Canadian sector was relatively cold.

In the Antarctic relatively warm conditions characterised the Peninsula and parts of both West and East Antarctica. The pole region itself and remaining part of West and East Antarctica was relatively cold.
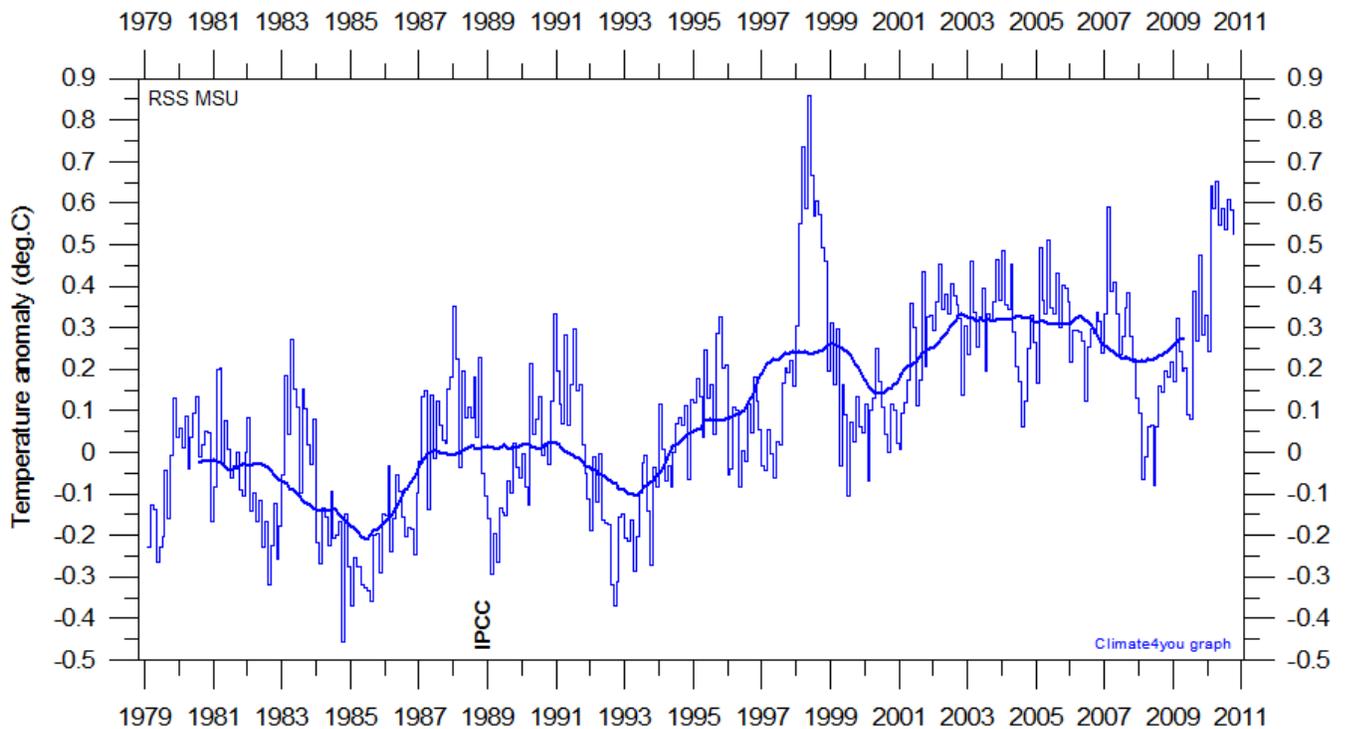
All diagrams shown in this newsletter are available for download on www.climate4you.com

## Lower troposphere temperature from satellites, updated to September 2010
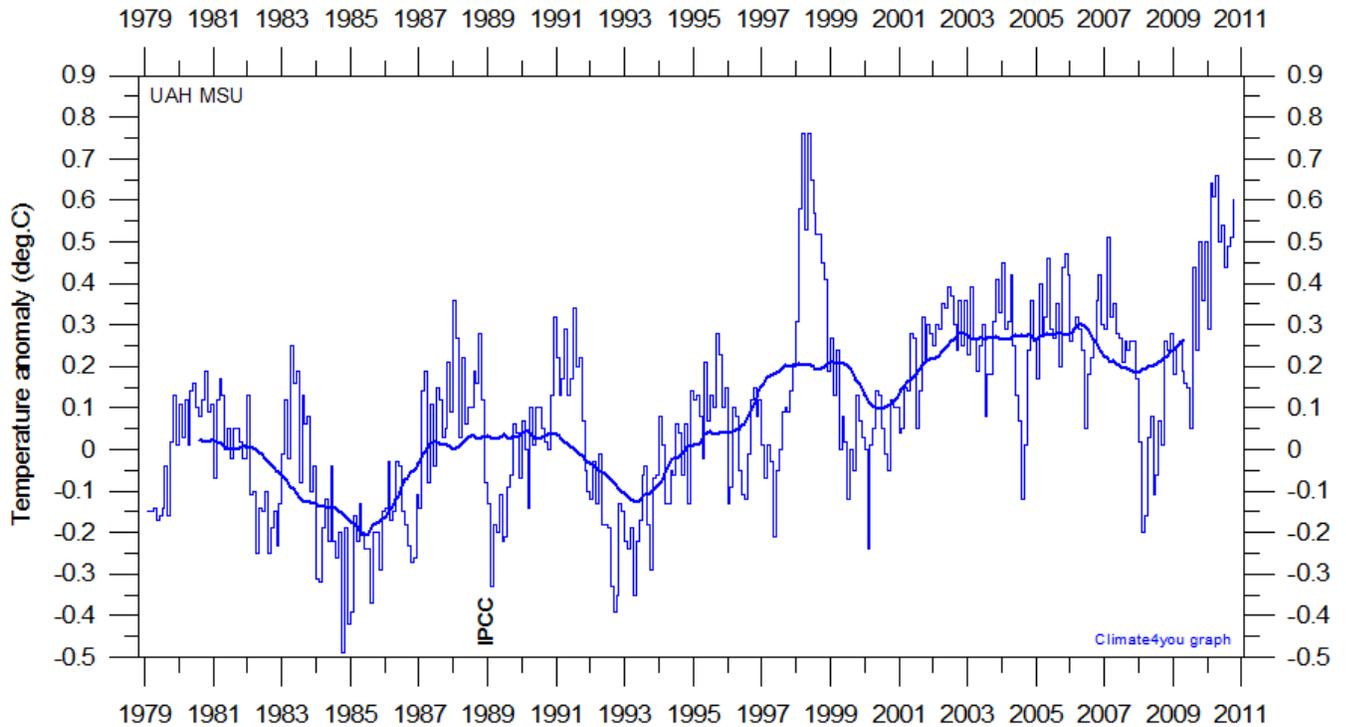
Global monthly average lower troposphere temperature (thin line) since 1979 according to University of Alabama at Huntsville, USA. The thick line is the simple running 37 month average.
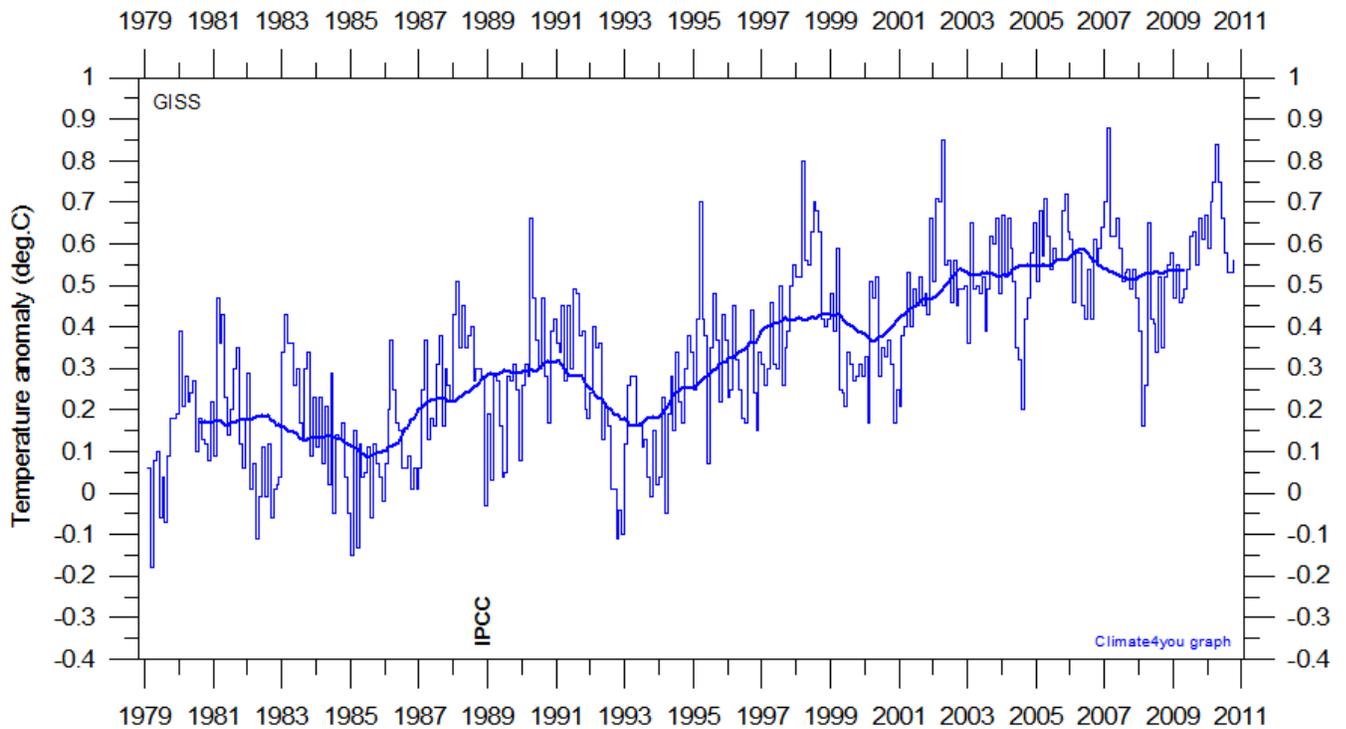
Global monthly average lower troposphere temperature (thin line) since 1979 according to according to Remote Sensing Systems (RSS), USA. The thick line is the simple running 37 month average.

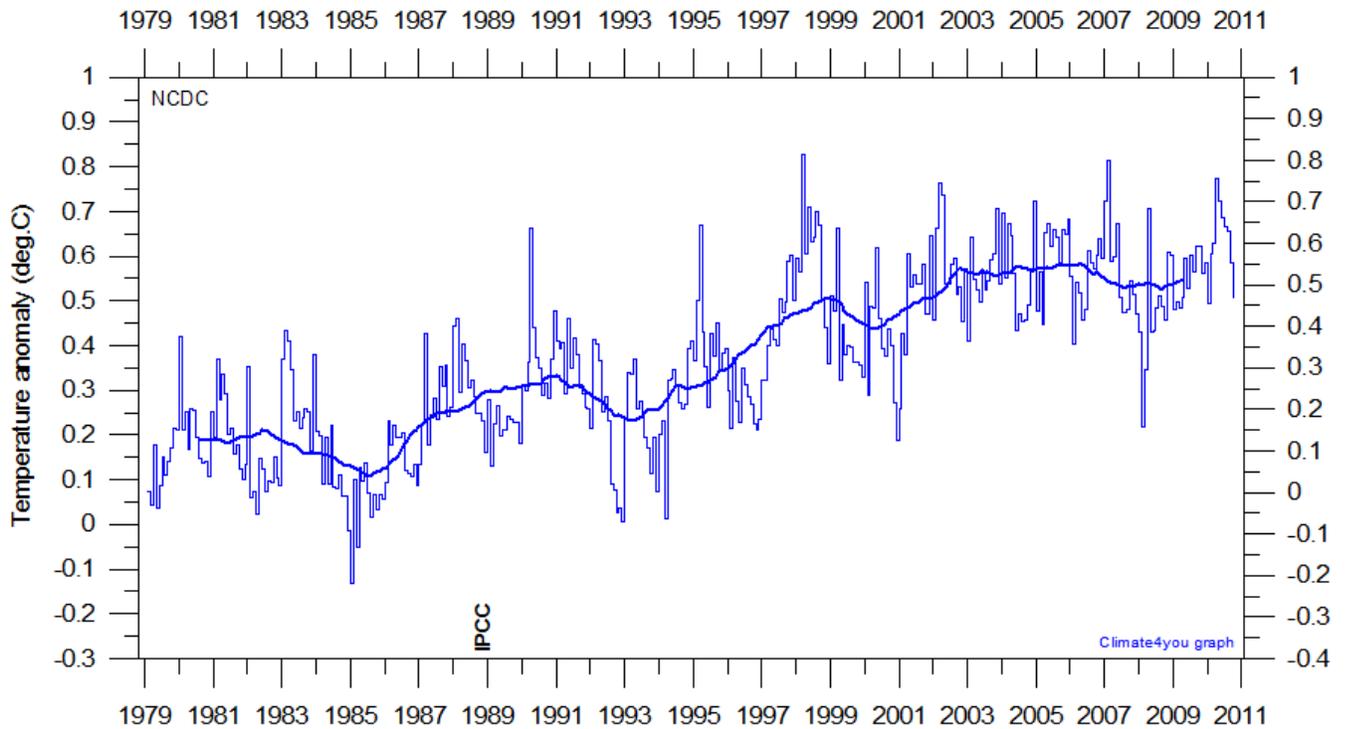## Global surface air temperature, updated to September 2010
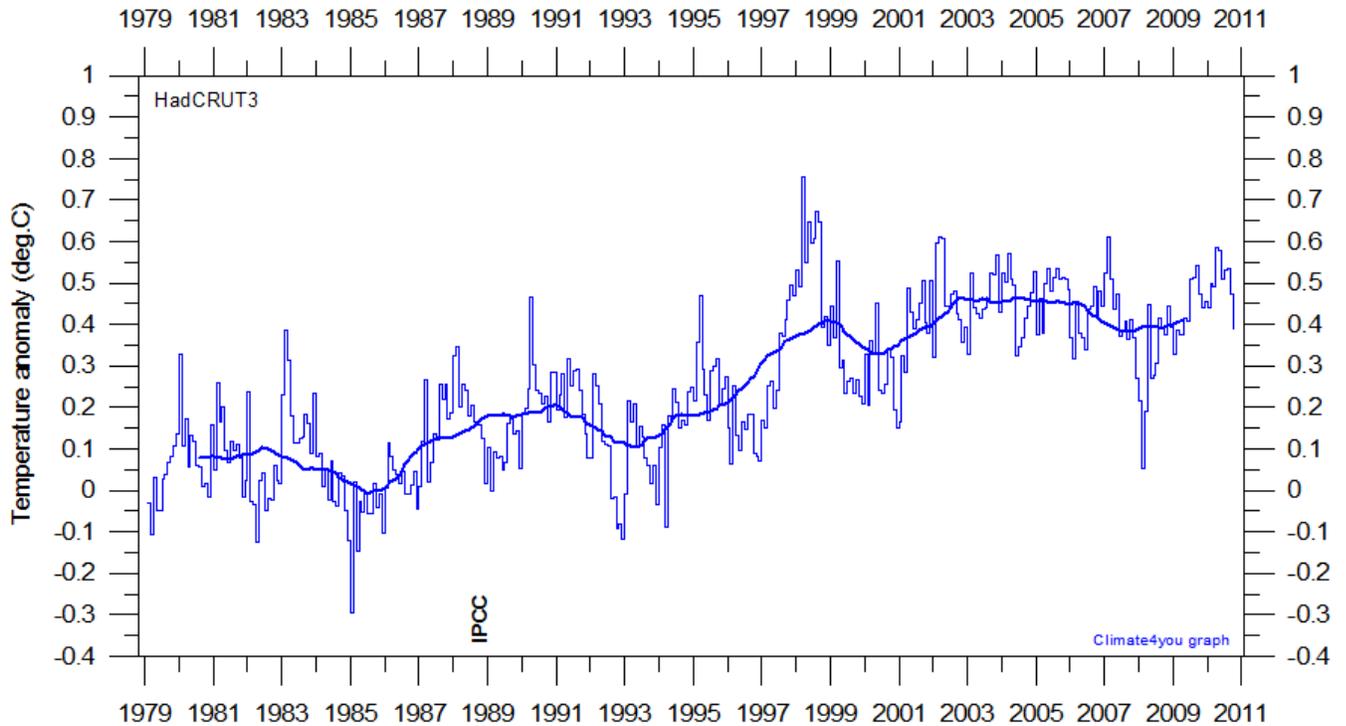
Global monthly average surface air temperature (thin line) since 1979 according to according to the Hadley Centre for Climate Prediction and Research and the University of East Anglia's Climatic Research Unit (CRU), UK. The thick line is the simple running 37 month average.

4
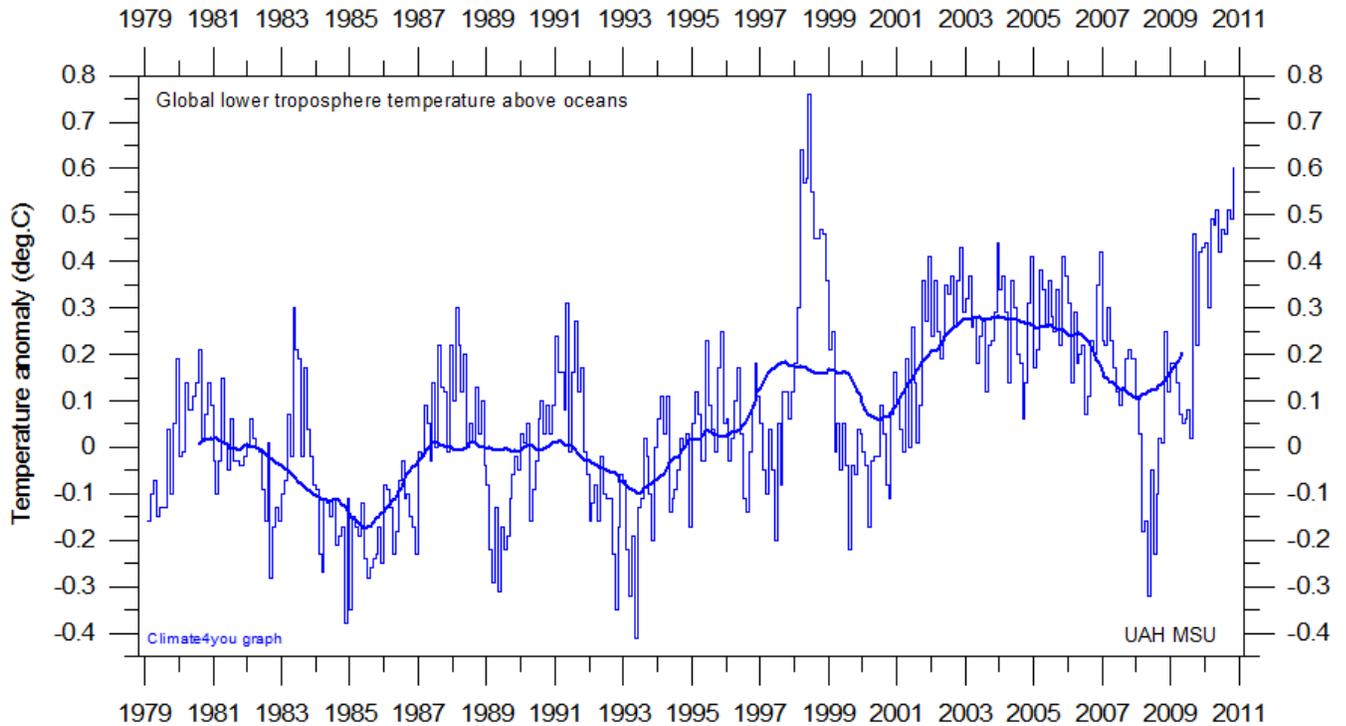

Global monthly average surface air temperature (thin line) since 1979 according to according to the Goddard Institute for Space Studies (GISS), at Columbia University, New York City, USA. The thick line is the simple running 37 month average.

Global monthly average surface air temperature since 1979 according to according to the [National Climatic Data Center](#) (NCDC), USA. The thick line is the simple running 37 month average.

Some readers have noted that several of the above data series display changes when one compare with previous issues of this newsletter, not only for the most recent months, but actually for most of months included in the individual data series. The interested reader may find more on this lack of temporal stability on [www.climate4you](#) (go to: Global Temperature and then Temporal Stability).

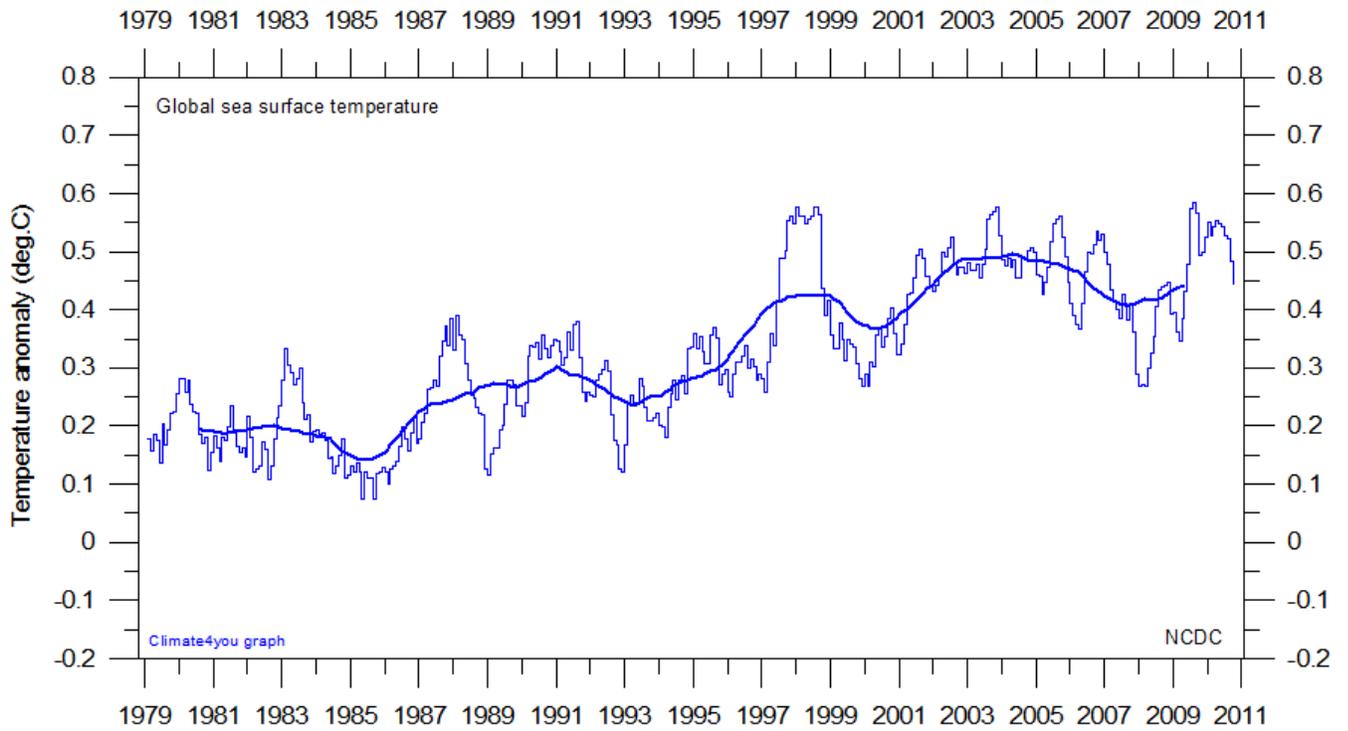## Global sea surface temperature, updated to September 2010

Global monthly average lower troposphere temperature over oceans (thin line) since 1979 according to University of Alabama at Huntsville, USA. The thick line is the simple running 37 month average.
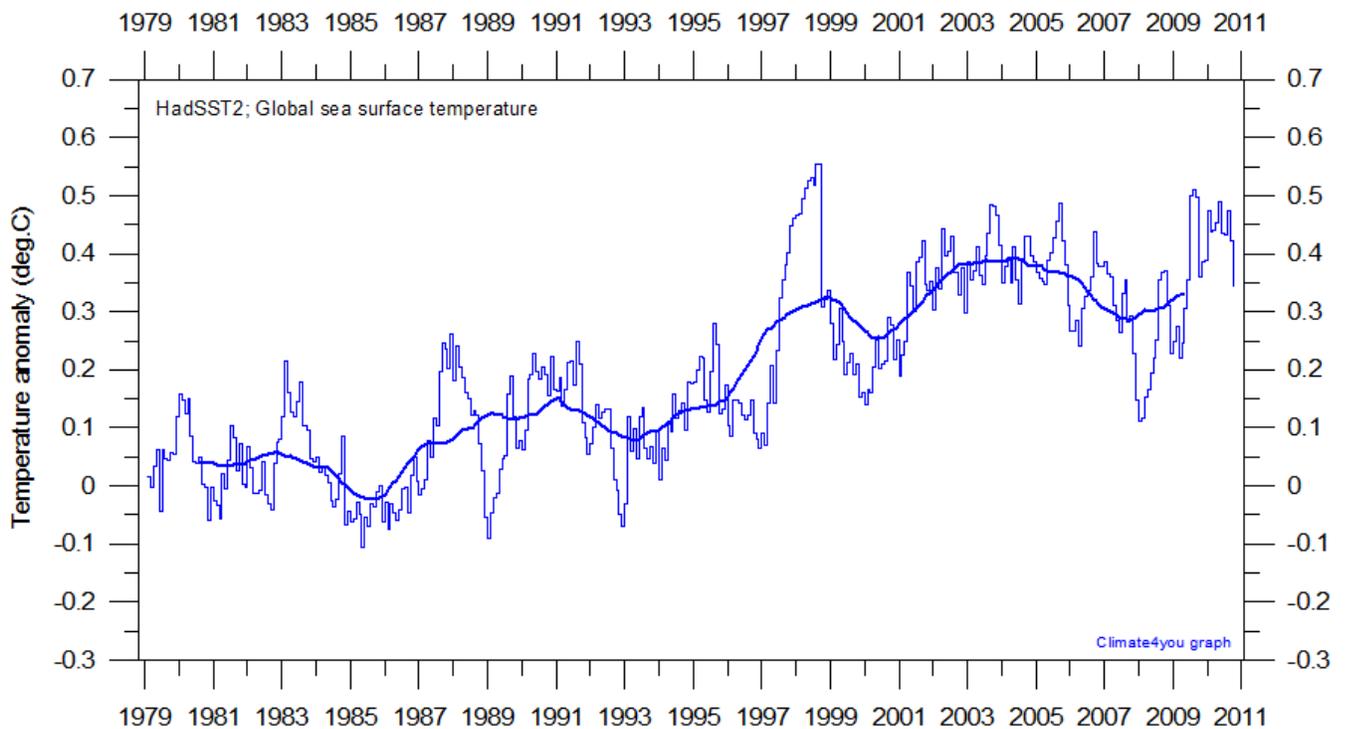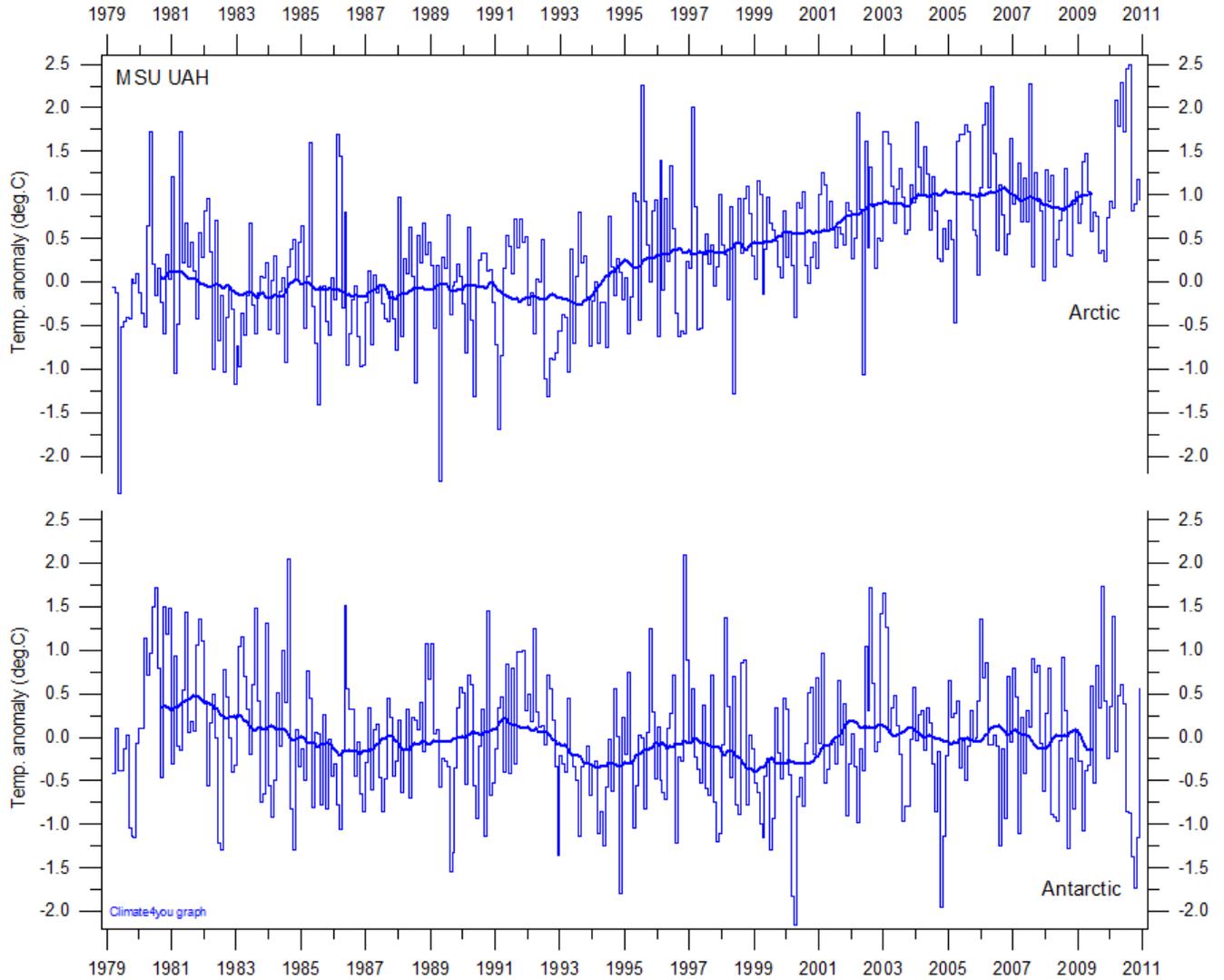
Global monthly average sea surface temperature since 1979 according to University of East Anglia's Climatic Research Unit (CRU), UK. Base period: 1961-1990. The thick line is the simple running 37 month average.

Global monthly average sea surface temperature since 1979 according to the [National Climatic Data Center](#) (NCDC), USA. Base period: 1901-2000. The thick line is the simple running 37 month average.

Arctic and Antarctic lower troposphere temperature, updated to September 2010

Global monthly average lower troposphere temperature since 1979 for the North Pole and South Pole regions, based on satellite observations (University of Alabama at Huntsville, USA). The thick line is the simple running 37 month average, nearly corresponding to a running 3 yr average.

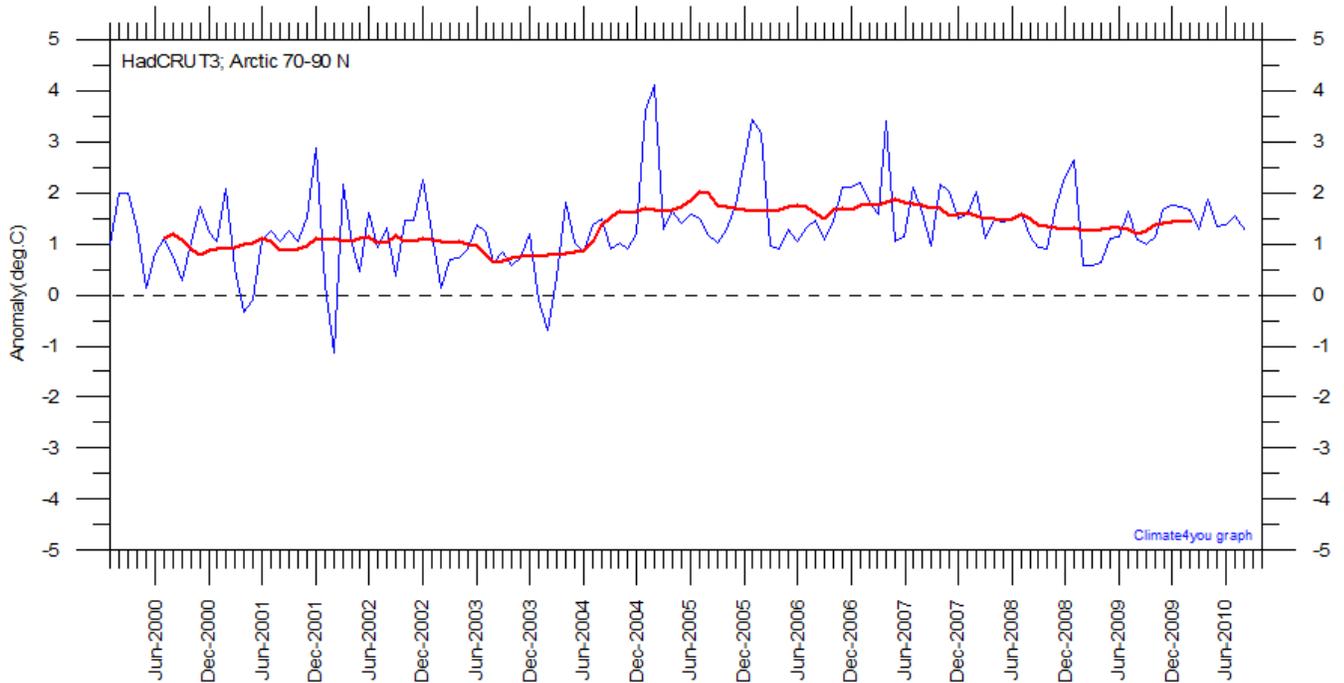# Arctic and Antarctic surface air temperature, updated to August 2010

Diagram showing Arctic monthly surface air temperature anomaly 70-90°N since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's *Climatic Research Unit* (*CRU*), UK.

Diagram showing Antarctic monthly surface air temperature anomaly 70-90°S since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's *Climatic Research Unit* (*CRU*), UK.
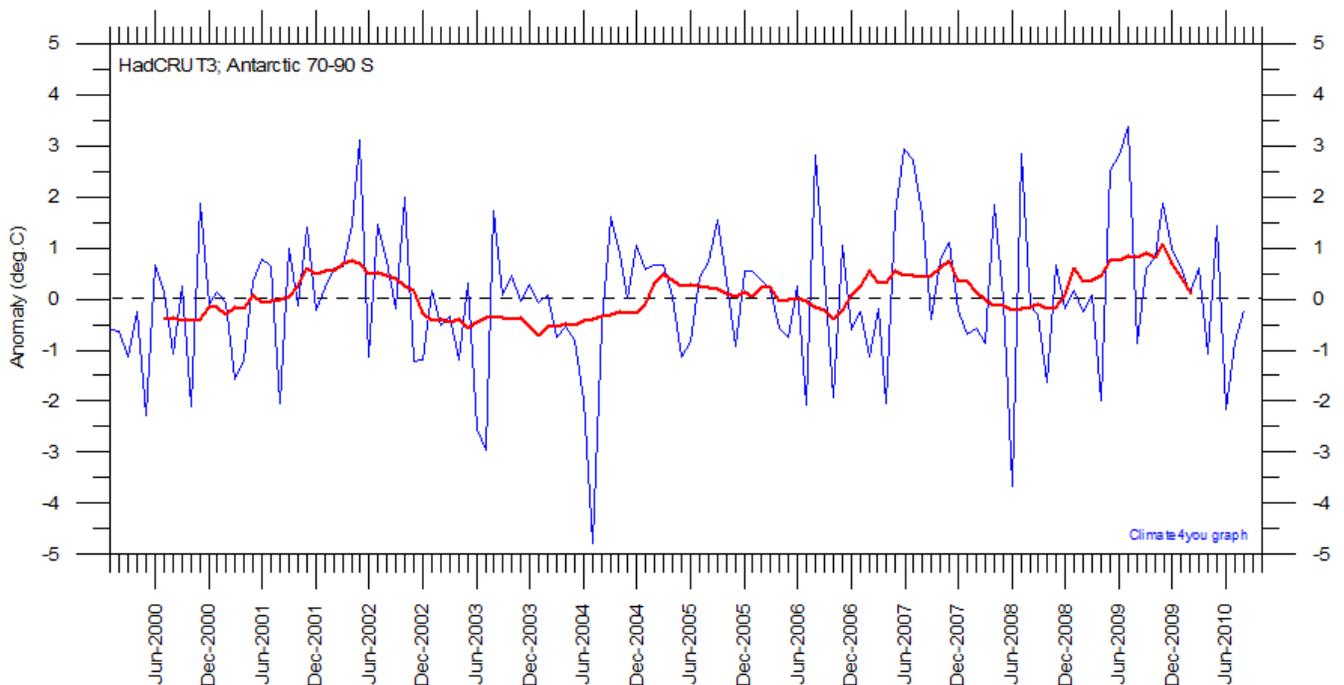
Diagram showing Arctic monthly surface air temperature anomaly 70-90ᵒN since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 has been chosen as starting year, to ensure easy comparison with the maximum length of the realistic Antarctic temperature record shown below. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's [Climatic Research Unit]([CRU]), UK.
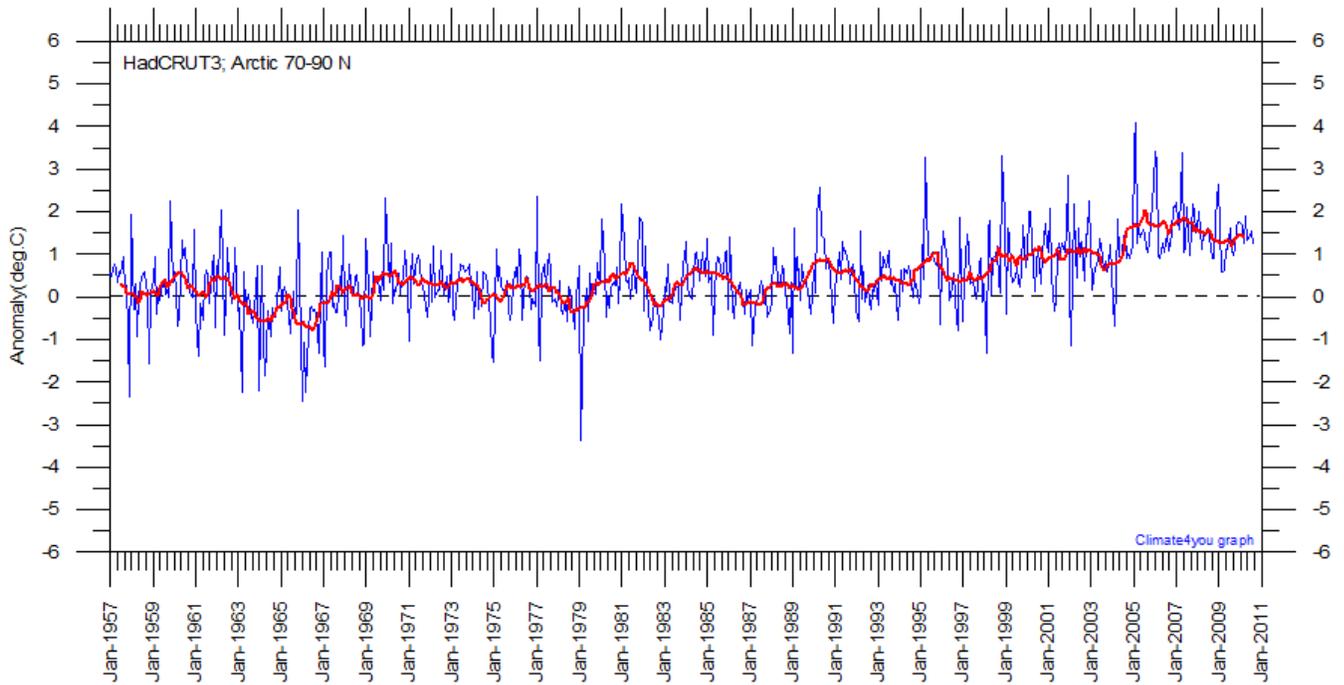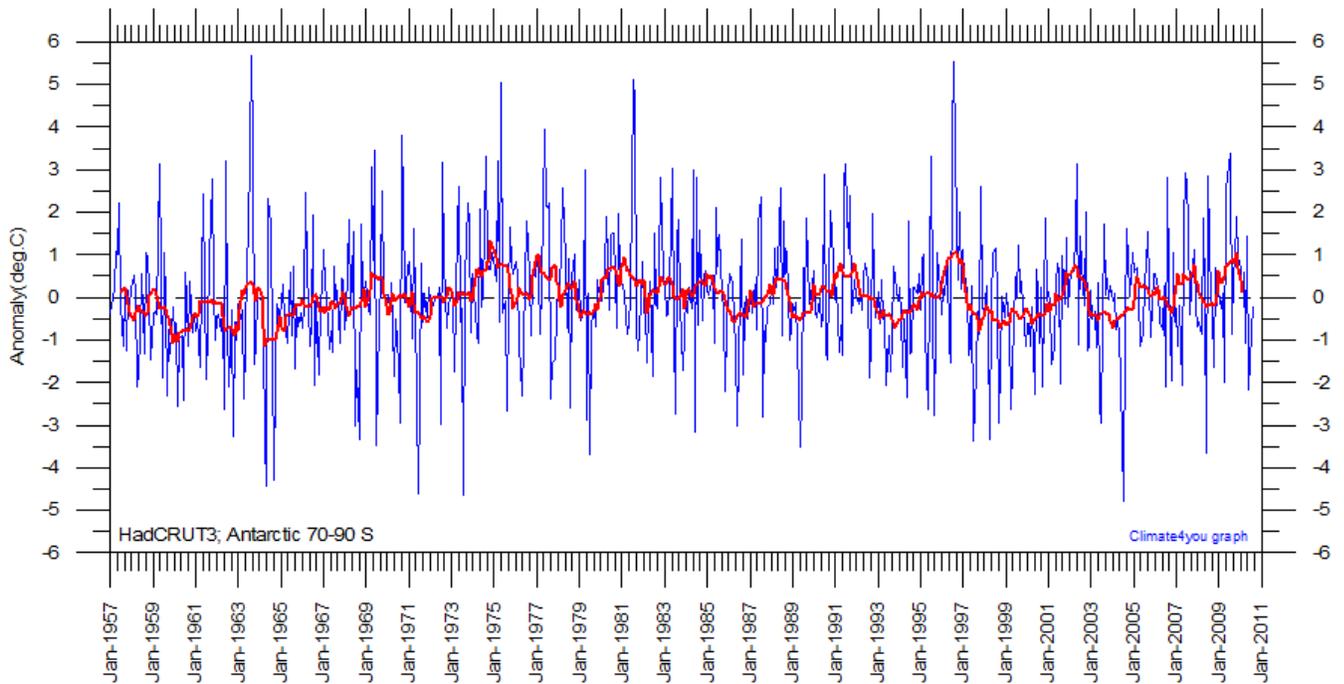
Diagram showing Antarctic monthly surface air temperature anomaly 70-90ᵒS since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 was an international geophysical year, and several meteorological stations were established in the Antarctic because of this. Before 1957, the meteorological coverage of the Antarctic continent is poor. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for
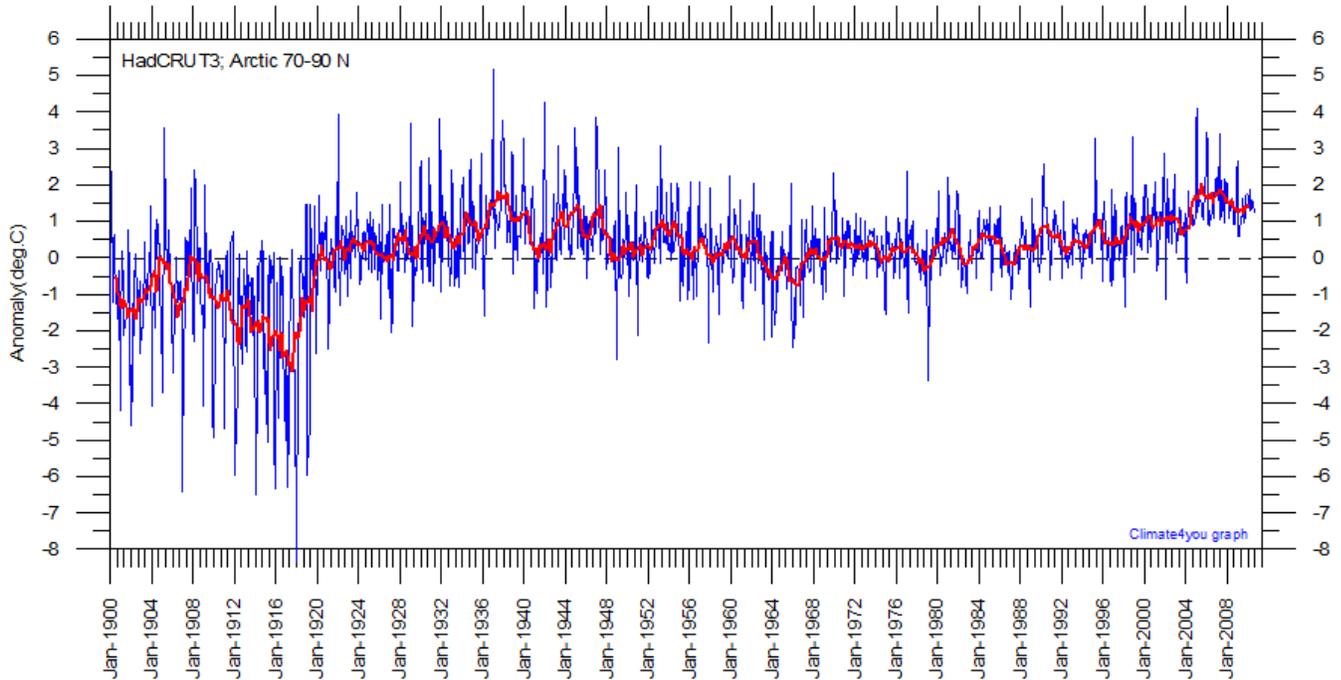
Diagram showing Arctic monthly surface air temperature anomaly 70-90ºN since January 1900, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. In general, the range of monthly temperature variations decreases throughout the first 30-50 years of the record, reflecting the increasing number of meteorological stations north of 70ºN over time. Especially the period from about 1930 saw the establishment of many new Arctic meteorological stations, first in Russia and Siberia, and following the 2nd World War, also in North America. Because of the relatively small number of stations before 1930, details in the early part of the Arctic temperature record should not be over interpreted. The rapid Arctic warming around 1920 is, however, clearly visible, and is also documented by other sources of information. The period since 2000 is warm, about as warm as the period 1930-1940. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's Climatic Research Unit (CRU), UK

In general, the Arctic temperature record appears to be less variable than the contemporary Antarctic record, presumably at least partly due to the higher number of meteorological stations north of 70ºN, compared to the number of stations south of 70ºS.

As data coverage is sparse in the Polar Regions, the procedure of Gillet et al. 2008 has been followed, giving equal weight to data in each 5ºx5º grid cell when calculating means, with no weighting by the areas of the grid dells.

Literature:

Gillett, N.P., Stone, D.A., Stott, P.A., Nozawa, T., Karpechko, A.Y.U., Hegerl, G.C., Wehner, M.F. and Jones, P.D. 2008. Attribution of polar warming to human influence. *Nature Geoscience* 1, 750-754.

Arctic and Antarctic sea ice, updated to September 2010
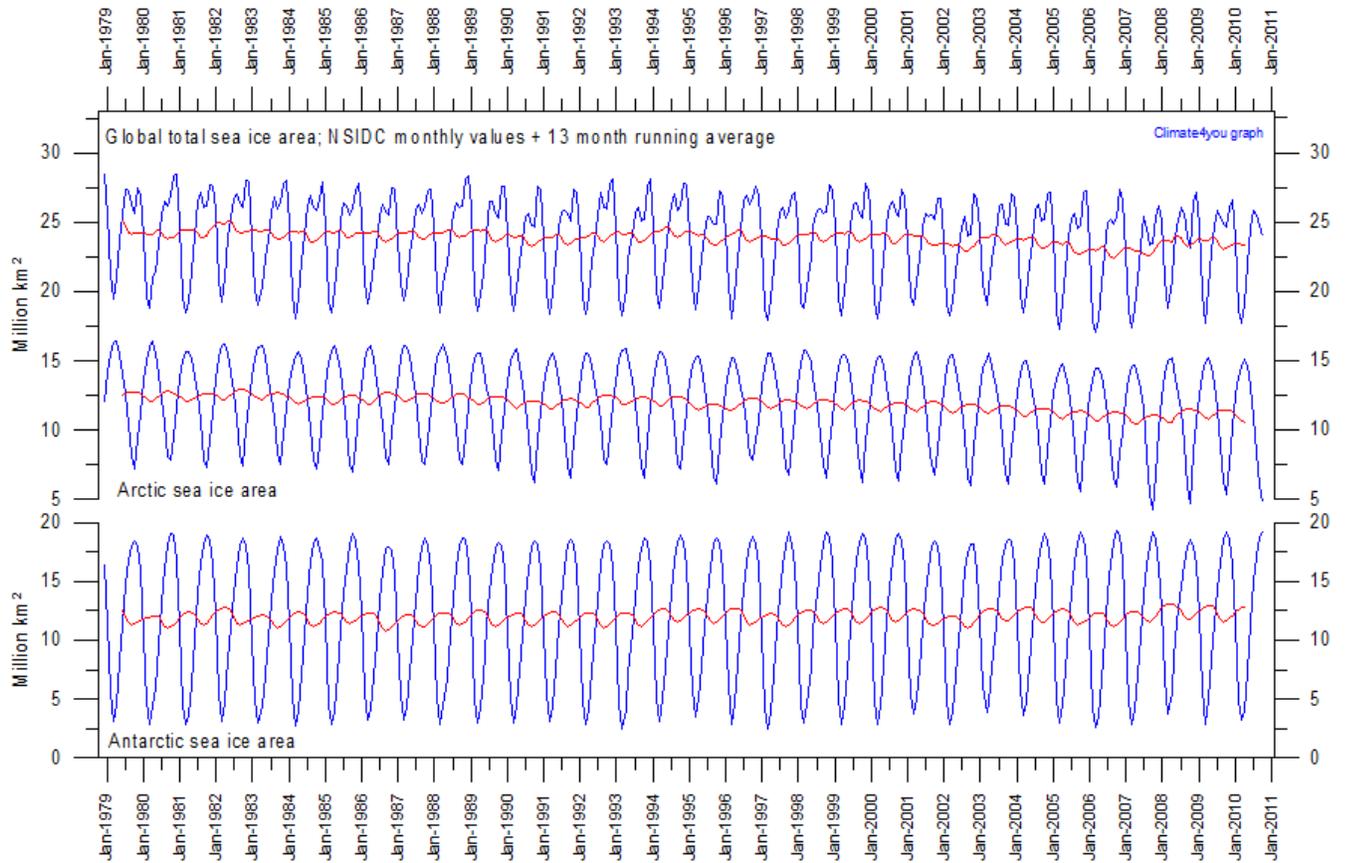
Graphs showing monthly Antarctic, Arctic and global sea ice extent since November 1978, according to the National Snow and Ice data Center (NSIDC).
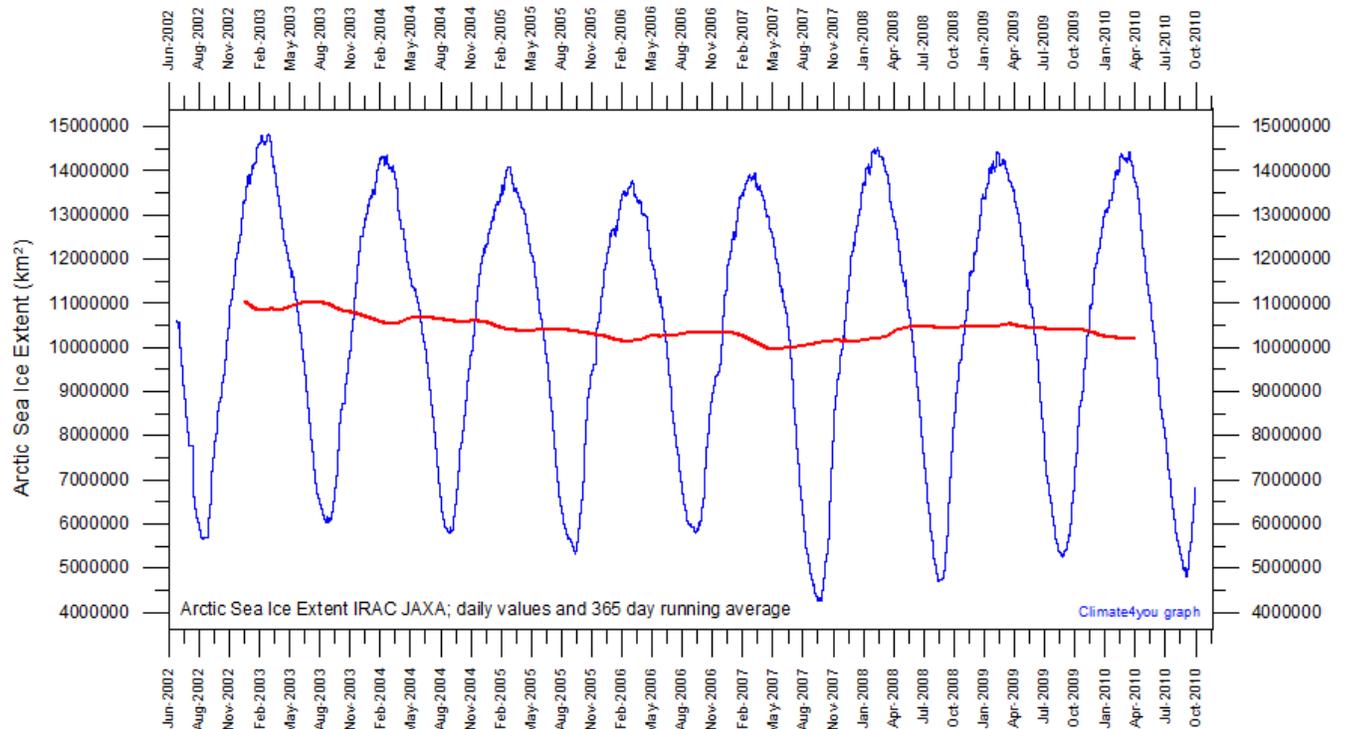
*Graph showing daily Arctic sea ice extent since June 2002, to 15/10 2010, by courtesy of Japan Aerospace Exploration Agency (JAXA).*

Global sea level, updated to September 2010
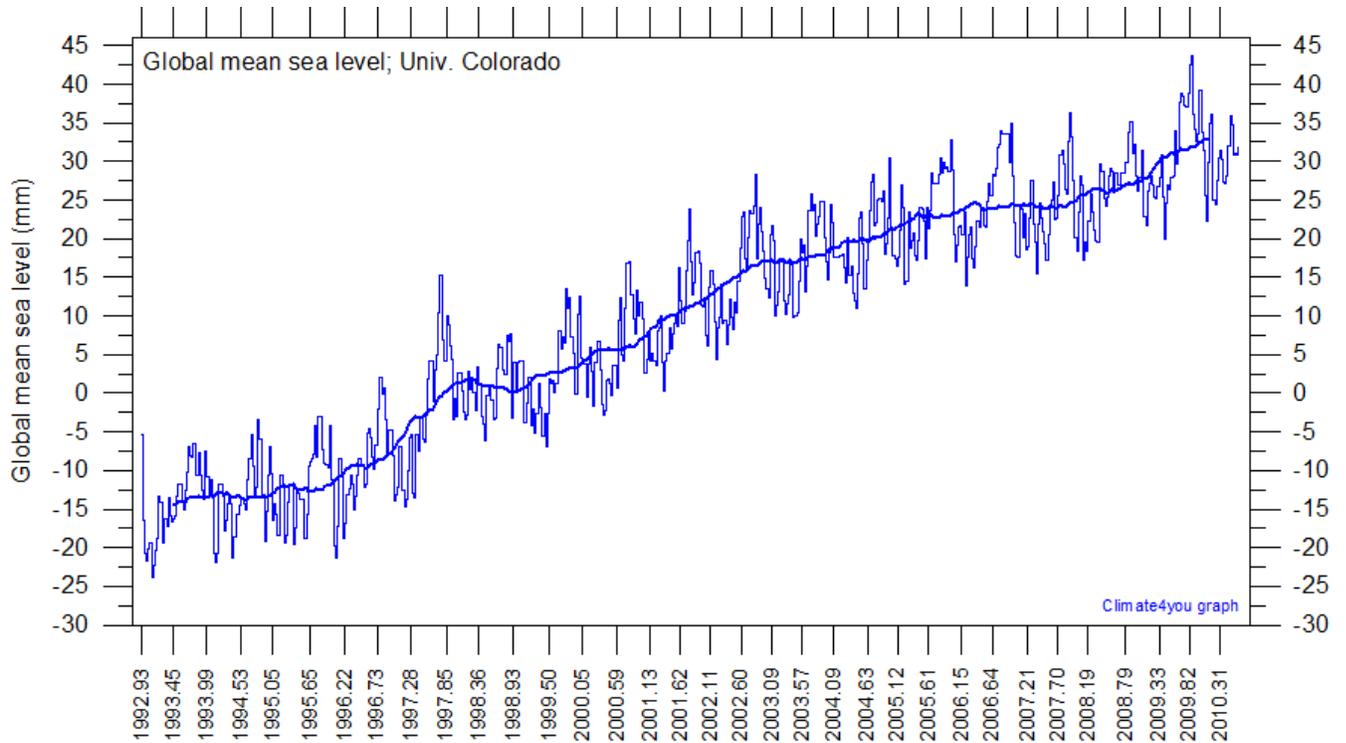
Globa lmonthly sea level since late 1992 according to the Colorado Center for Astrodynamics Research at University of Colorado at Boulder, USA. The thick line is the simple running 37 observation average, nearly corresponding to a running 3 yr average.

13
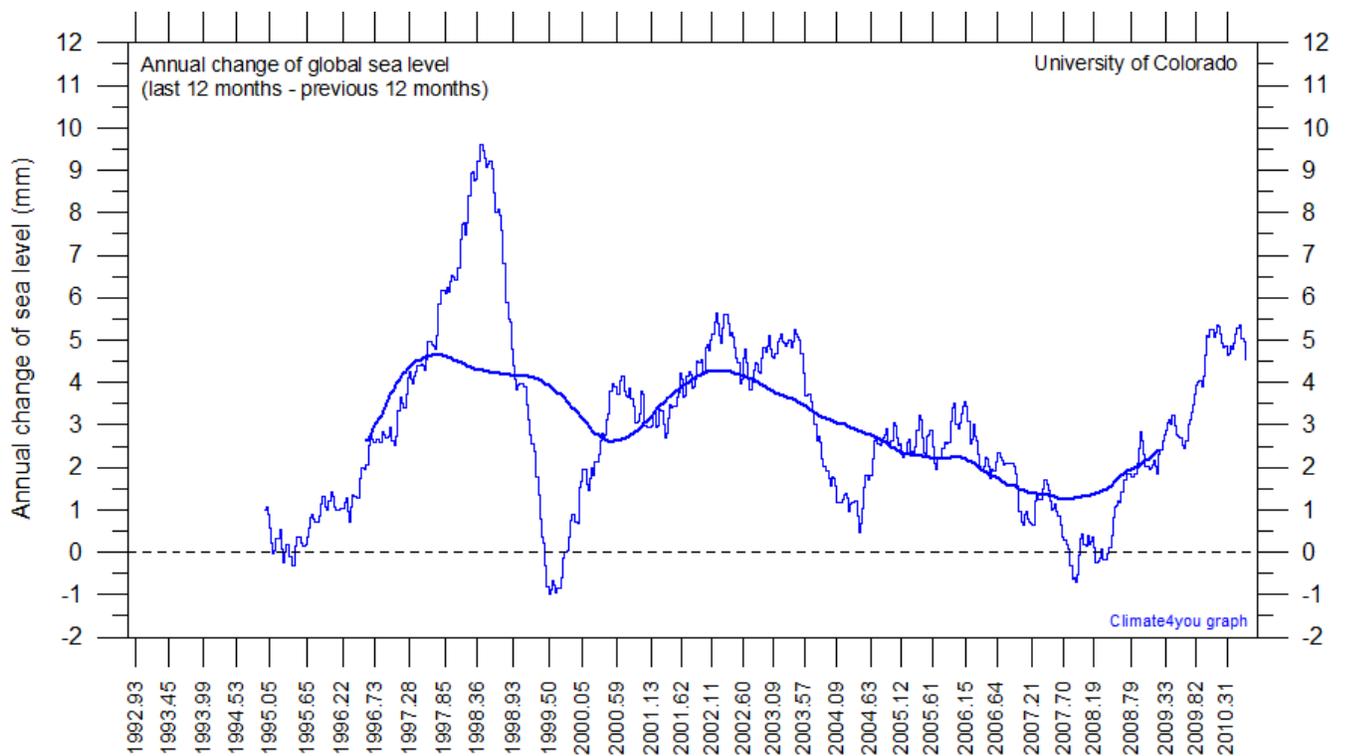
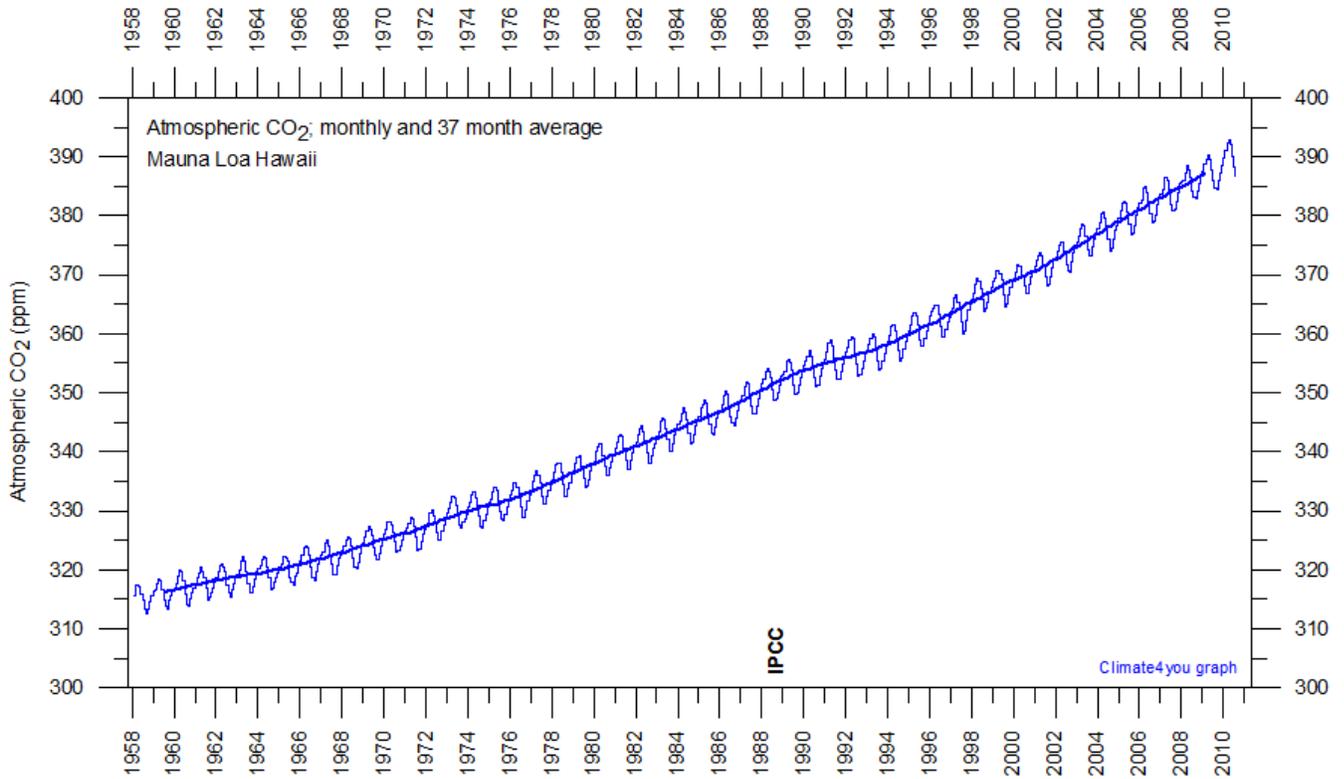*Annual change of global sea level since late 1992 according to the Colorado Center for Astrodynamics Research at University of Colorado at Boulder, USA. The thick line is the simple running 3 yr average.*

Atmospheric CO$_2$, updated to September 2010

Monthly amount of atmospheric CO$_2$ (above) and annual growth rate (below; average last 12 months minus average preceding 12 months) of atmospheric CO$_2$ since 1959, according to data provided by the Mauna Loa Observatory, Hawaii, USA. The thick line is the simple running 37 observation average, nearly corresponding to a running 3 yr average.

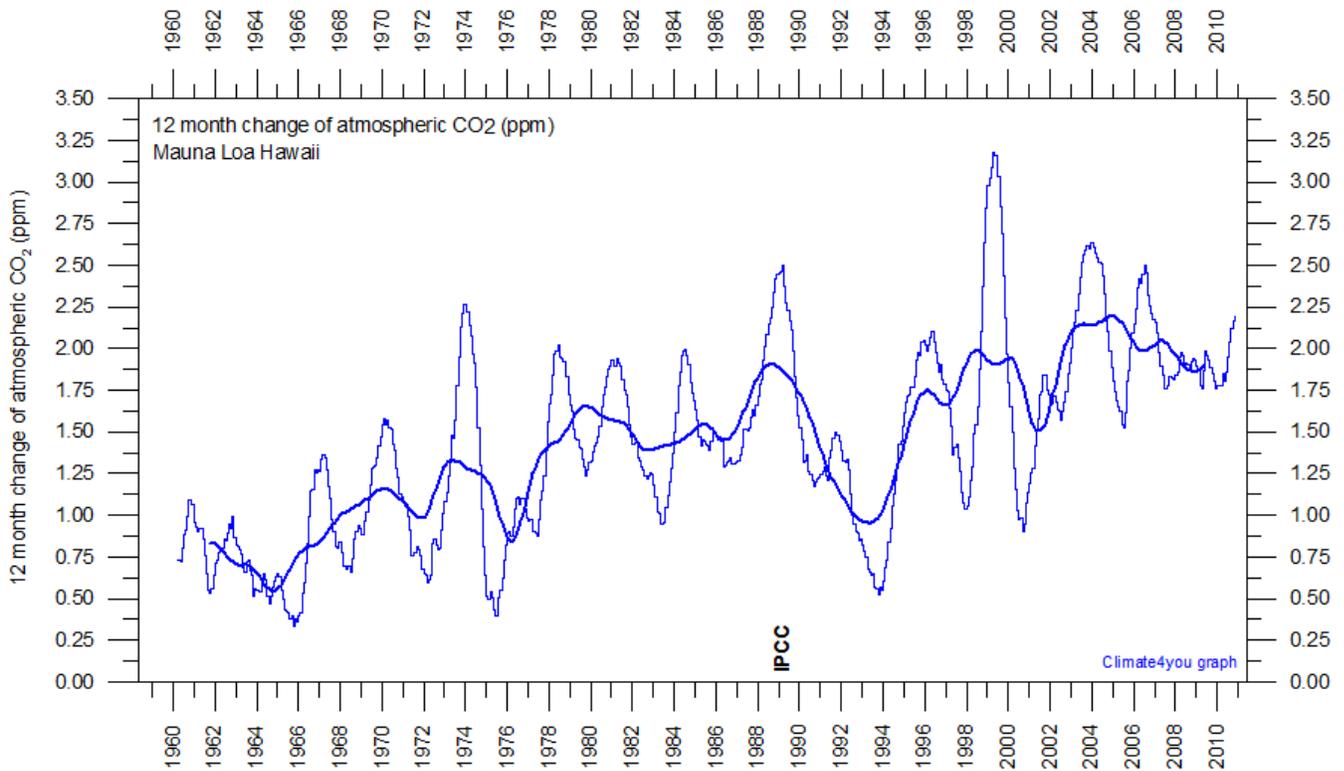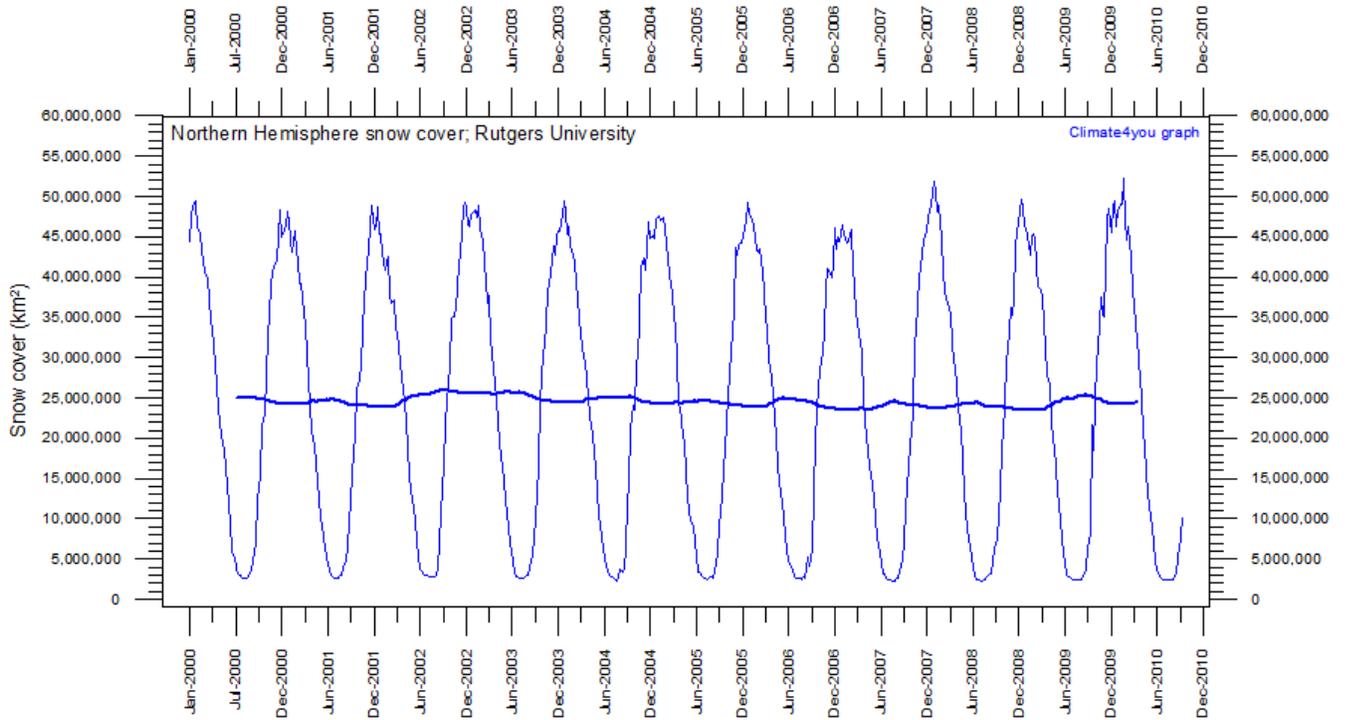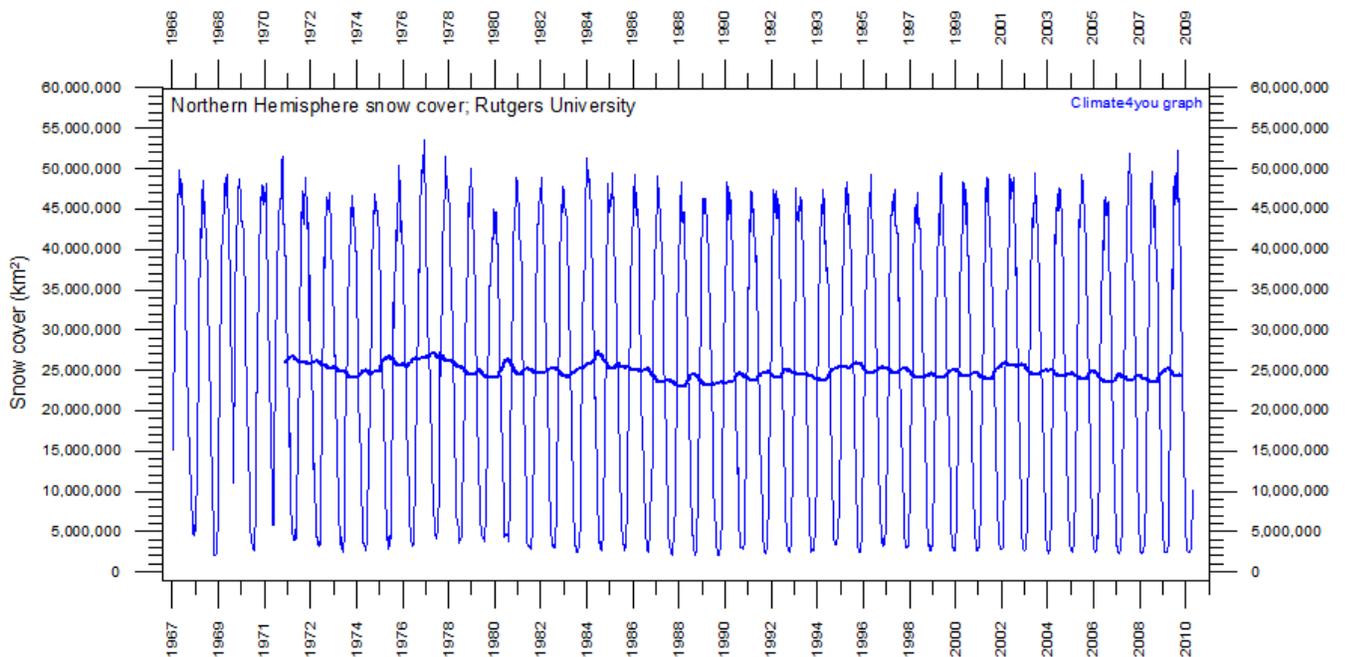# Northern Hemisphere weekly snow cover, updated to week 40, 2010

Northern hemisphere weekly snow cover since January 2000 according to Rutgers University Global Snow Laboratory. The thin line is the weekly data, and the thick line is the running 53 week average (approximately 1 year).

*Northern hemisphere weekly snow cover since October 1966 according to Rutgers University Global Snow Laboratory. The thin line is the weekly data, and the thick l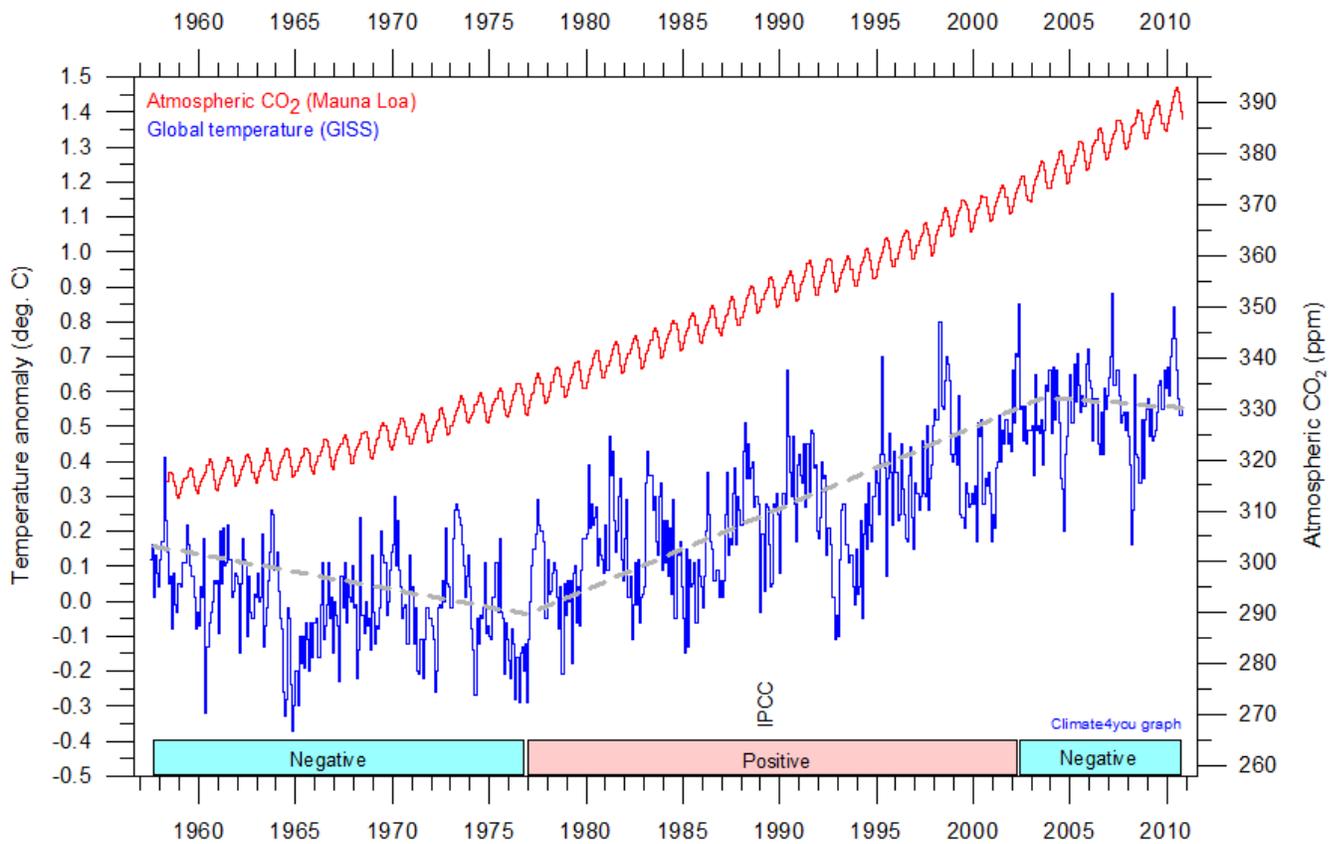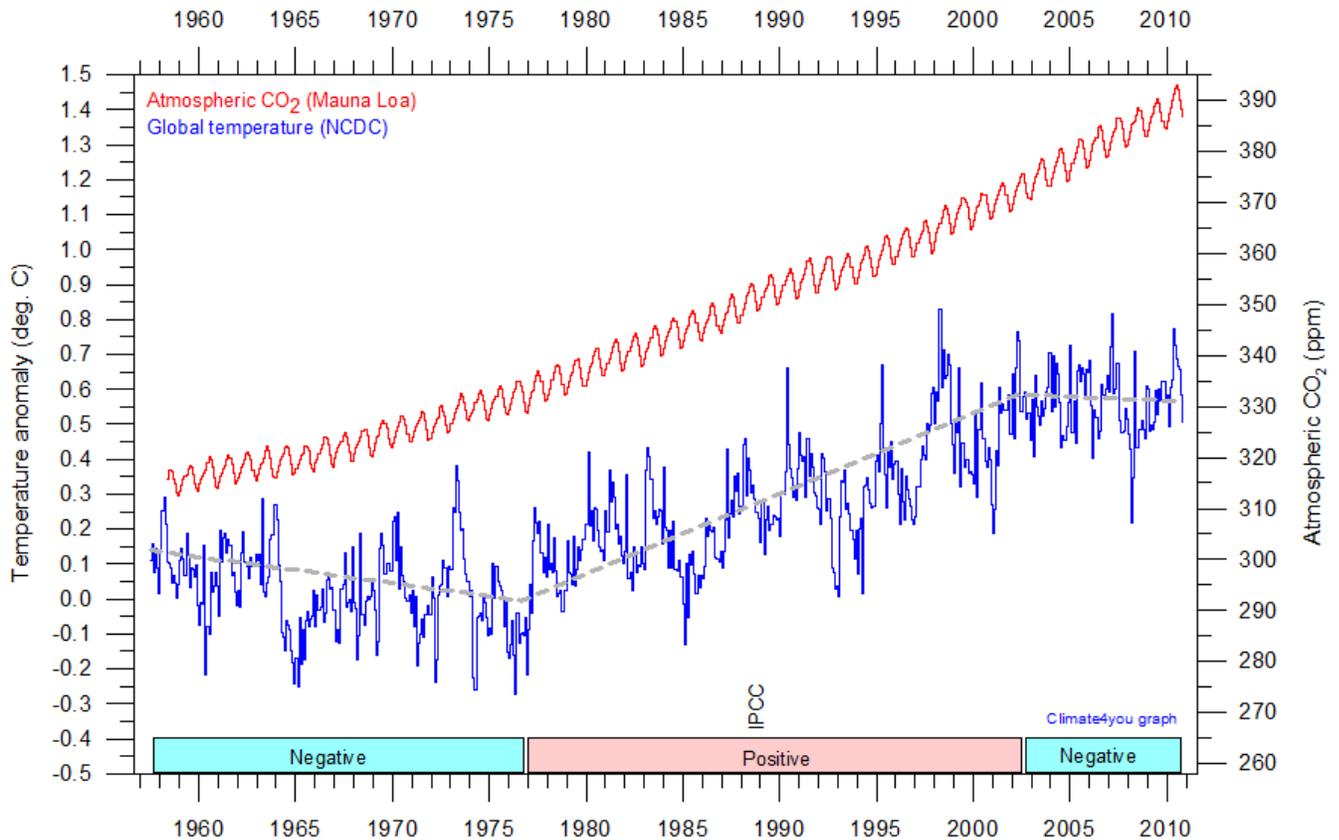ine is the running 53 week average (approximately 1 year). The running average is not calculated before 1971 because of some data irregularities in this early period.*

Global surface air temperature and atmospheric CO₂, updated to September 2010
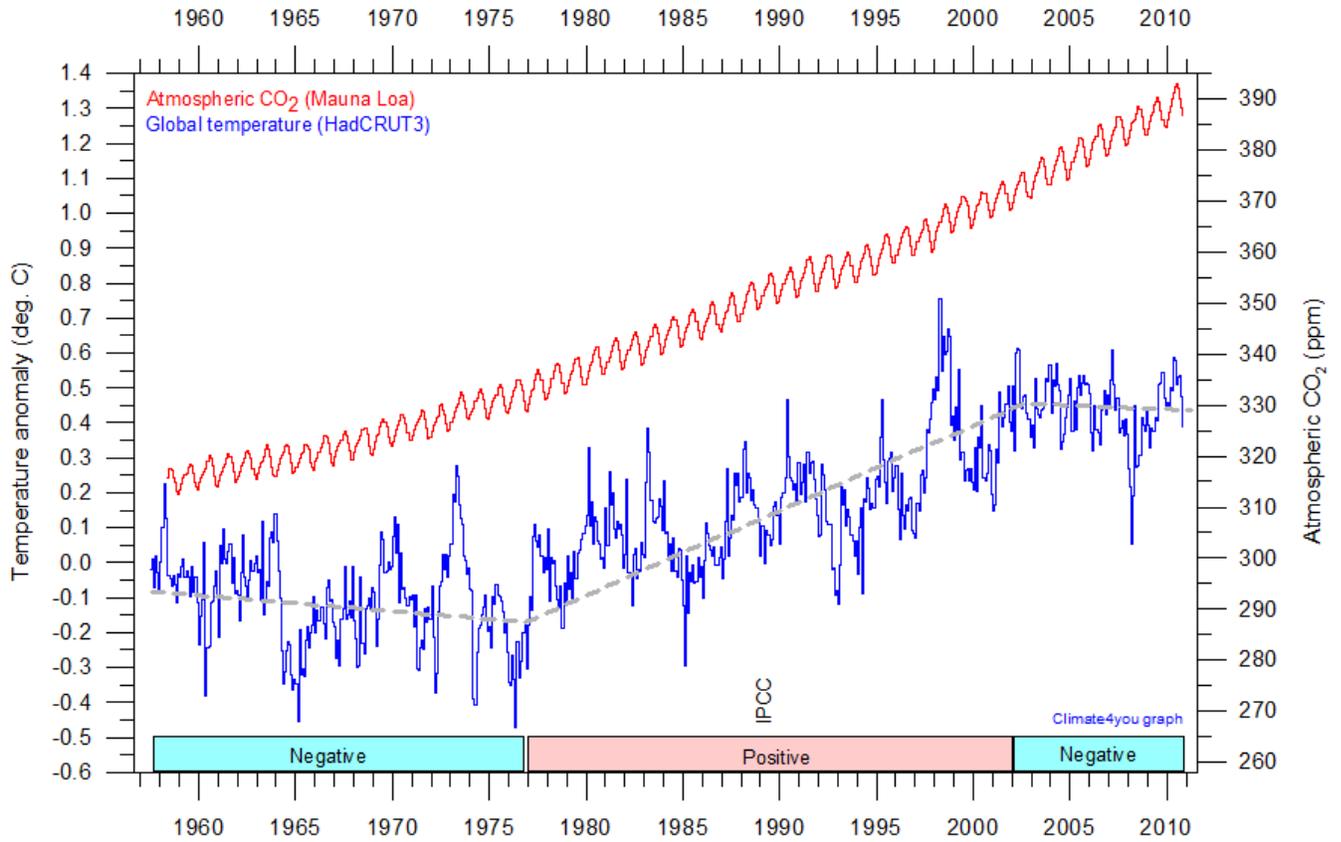
Diagrams showing HadCRUT3, GISS, and NCDC monthly global surface air temperature estimates (blue) and the monthly atmospheric CO_2 content (red) according to the [Mauna Loa Observatory](), Hawaii. The Mauna Loa data series begins in March 1958, and 1958 has therefore been chosen as starting year for the diagrams. Reconstructions of past atmospheric CO_2 concentrations (before 1958) are not incorporated in this diagram, as such past CO_2 values are derived by other means (ice cores, stomata, or older measurements using different methodology, and therefore are not directly comparable with modern atmospheric measurements. The dotted grey line indicates the approximate linear temperature trend, and the boxes in the lower part of the diagram indicate the relation between atmospheric CO_2 and global surface air temperature, negative or positive.

Most climate models assume the greenhouse gas carbon dioxide CO_2 to influence significantly upon global temperature. Thus, it is relevant to compare the different global temperature records with measurements of atmospheric CO_2, as shown in the diagrams above. Any comparison, however, should not be made on a monthly or annual basis, but for a longer time period, as other effects (oceanographic, clouds, etc.) may well override the potential influence of CO_2 on short time scales such as just a few years.

It is of cause equally inappropriate to present new meteorological record values, whether daily, monthly or annual, as support for the hypothesis ascribing high importance of atmospheric CO_2 for global temperatures. Any such short-period meteorological record value may well be the result of other phenomena than atmospheric CO_2.

What exactly defines the critical length of a relevant time period to consider for evaluating the alleged high importance of CO_2 remains elusive, and is still a topic for debate. The critical period length must, however, be inversely proportional to the importance of CO_2 on the global temperature, including feedback effects, such as assumed by most climate models. So if the effect of CO_2 is strong, the length of the critical period is short.

After about 10 years of global temperature increase following global cooling 1940-1978, IPCC was established in 1988. Presumably, several scientists interested in climate then felt intuitively that their empirical and theoretical understanding of climate dynamics was sufficient to conclude about the high importance of CO_2 for global temperature. However, for obtaining public and political support for the CO_2-hyphotesis the 10 year warming period leading up to 1988 in all likelihood was important. Had the global temperature instead been decreasing, public support for the hypothesis would have been difficult to obtain. Adopting this approach as to critical time length, the varying relation (positive or negative) between global temperature and atmospheric CO_2 has been indicated in the lower panels of the three diagrams above.

1346-1349: The Black Death and the Flagellants

Spread of the Black Death across Europe 1346-1949 (left). Victims of the plague (center). Flagellants whipping themselves (right).

The Black Death, or the Black Plague, was one of the most deadly pandemics in human history, widely thought to have been caused by a bacterium named *Yersinia pestis*. Shortly after 1300 rumours began to circulate in Europe about a plague in Central Asia. The general notion at that time was that this represented nothing but Gods fair punishment of all the disbelievers of Christian faith. This common European notion abruptly changed in the year 1346 when a ship from Crimea arrived to the port of Genua in Italy, with a crew dying of plague. The Black Death had arrived in Europe. Within few years the plague spread to all regions of Europe, the Nordic countries being the last to be affected. The plague came to Bergen in Norway with a ship from England in 1349. This first outbreak of plague was presumably the worst, but was followed four subsequent outbreaks during the 12th century.

The total number of deaths worldwide from the pandemic is estimated at 75 million people, worldwide. The total population in Europe was about 80 million before the plague. In Europe there were an estimated 40 to 50 million deaths, killing almost two-thirds of the population. It has been suggested that the general cooling and the many wet summers since 1300 with associated reduced harvest may have contributed towards making people less resistant towards the bacteria infection than else.

Many villages were deserted, and remained a widespread feature of Europe's cultural landscape until the latter half of the 18th century. Doctors were without means to provide help and cure. The Christian Church recommended prayer, hymns, and a Spartan life in all respects. Spontaneously Flagellant groups arose across northern and central Europe in 1349, except in England. Thousands of flagellants gathered in great processions, singing and with crosses and banners, they marched throughout Europe whipping themselves. The mortification of their own flesh was considered a means of obtaining general forgiveness for personal misdeed committed. In Germany, in addition, the Flagellants also organised the burning of thousands of Jews opposed to them. One

19

contemporary chronicler noted that anyone who did not join in the flagellation movement was accused of being in league with the devil.

As in other periods of general distress and difficulty, when the Black Death was raging in Europe, rational behaviour had to step down in favour of blind faith and simplified, often irrational analyses of cause-and-effect.

All above diagrams with supplementary information, including links to data sources, are available on www.climate4you.com

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

16 October 2010.