Climate4you update November 2009

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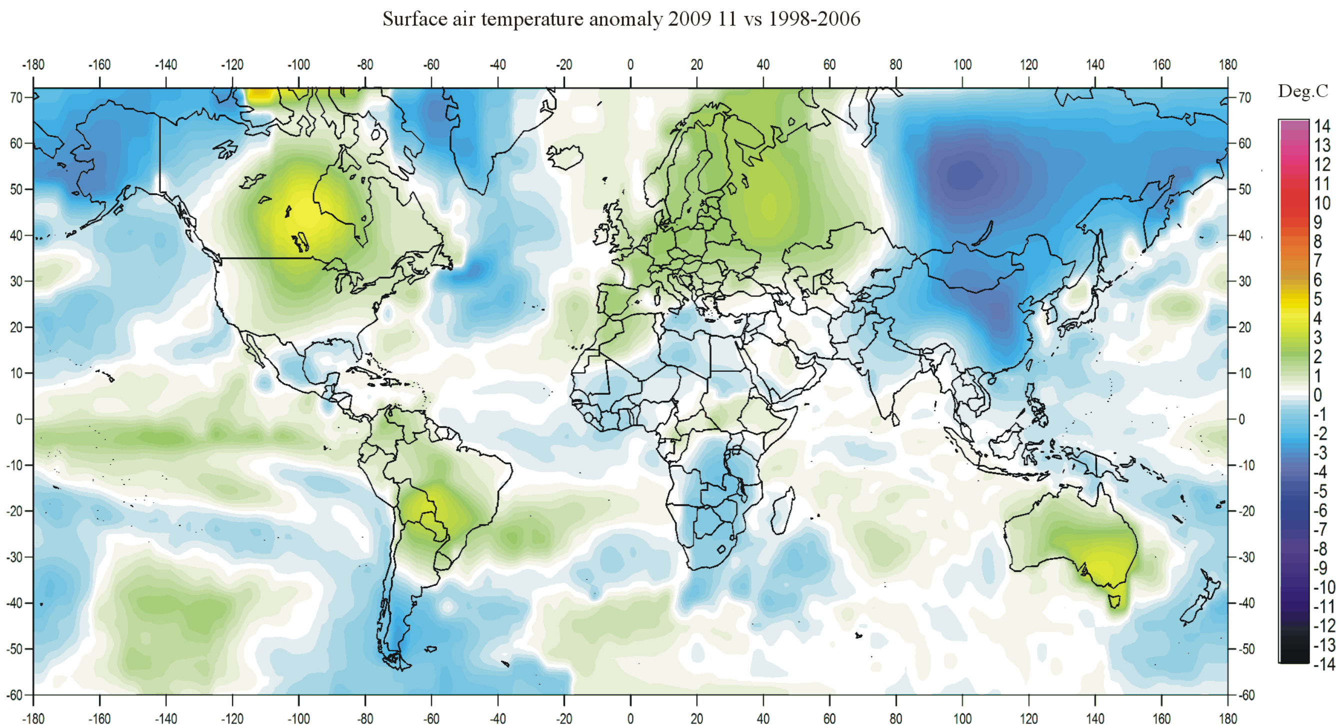
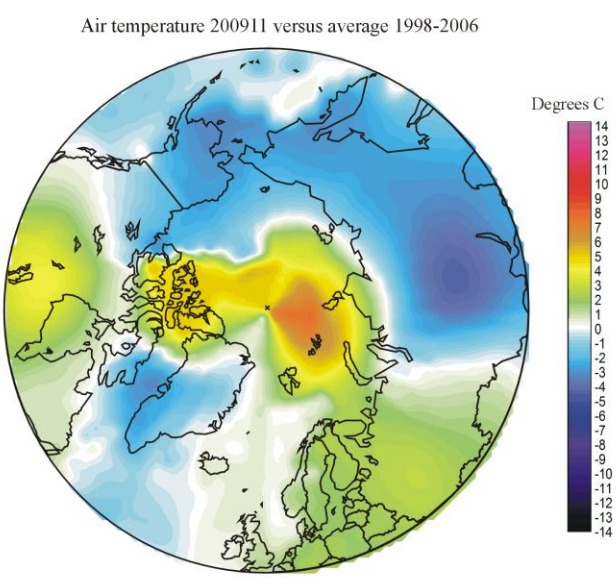
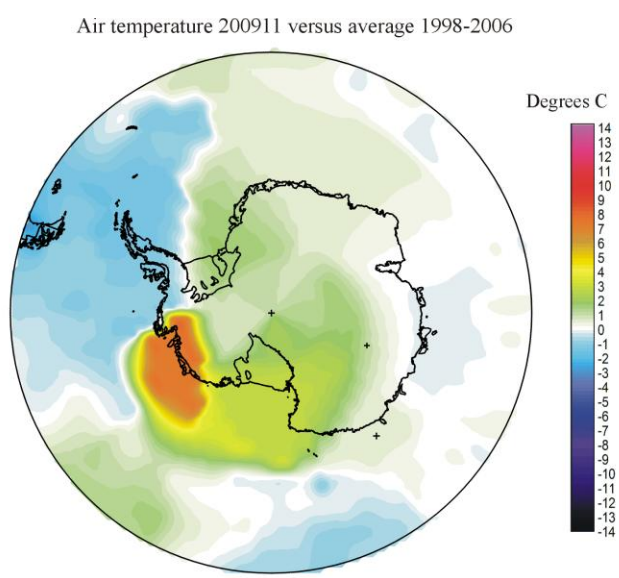
November 2009 global surface air temperature overview







November2009 surface air temperature compared to the average for November 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](http://www.giss.nasa.gov/) (GISS)

Comments to the November 2009 global surface air temperature overview

This newsletter contains graphs showing a selection of key meteorological variables for November 2009. 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 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.

HadCRUT3 data from CRU (Climate Research Unit, UK) are not updated to November 2009 at the moment.

Global surface air temperatures November 2009 was generally somewhat lower than the average for the reference period 1998-2006.

In the northern hemisphere especially Asia, Siberia and Alaska experienced low temperatures. Western Russia, Europe and central Canada on the other hand had relatively high temperatures. Snow cover and low temperatures in Siberia resulted in a relatively strong Siberian high pressure throughout most of November, which frequently caused advection of relatively warm air masses from east and southeast, across western Russia, Europe and the European part of the Arctic. Should this meteorological situation continue, and air temperatures in Siberia and southern Russia therefore drop to low values, presumably this will result in frequent cold southeasterly air flow across Europe in December.

Conditions near Equator were influenced by the ongoing El Niño in the Pacific Ocean. The atmospheric warming derived from this was partly offset by relatively cold conditions in the western Pacific and in Equatorial Atlantic. Most of Africa also experienced relatively low temperatures.

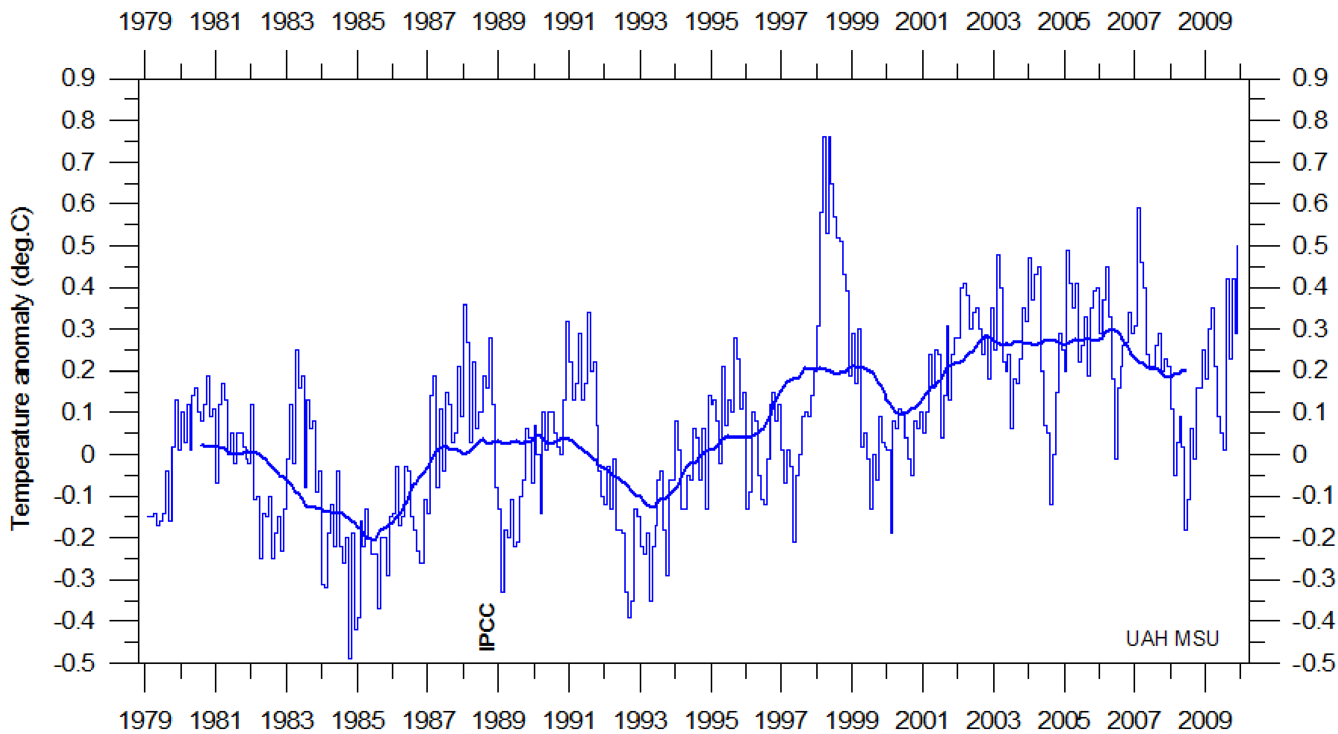
In the southern hemisphere the southern part of South America had relatively low temperatures, while the remaining part of the continent had relatively high temperatures. Australia had relatively high air temperatures, while the New Zealand region experienced relatively low temperatures.

In the Arctic, Greenland, Alaska and Siberia were relatively cold, while the central Arctic Ocean, including Svalbard, was warm. As mentioned above, this is partly explained by the strong high air pressure over Siberia.

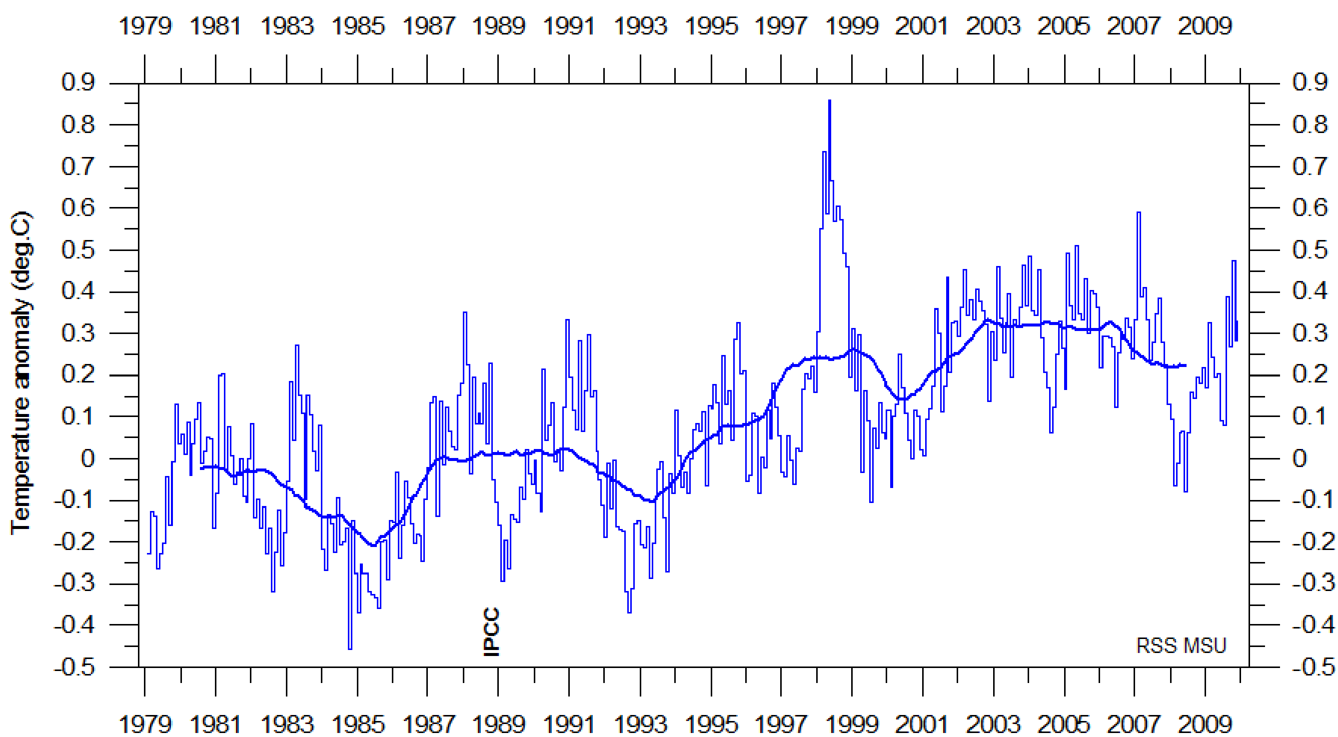
In the Antarctic, conditions were relatively warm, with only the Antarctic Peninsula experiencing relatively low air temperatures.

All diagrams and figures are also available on http://www.climate4you.com/

Lower troposphere temperature from satellites, updated to November 2009

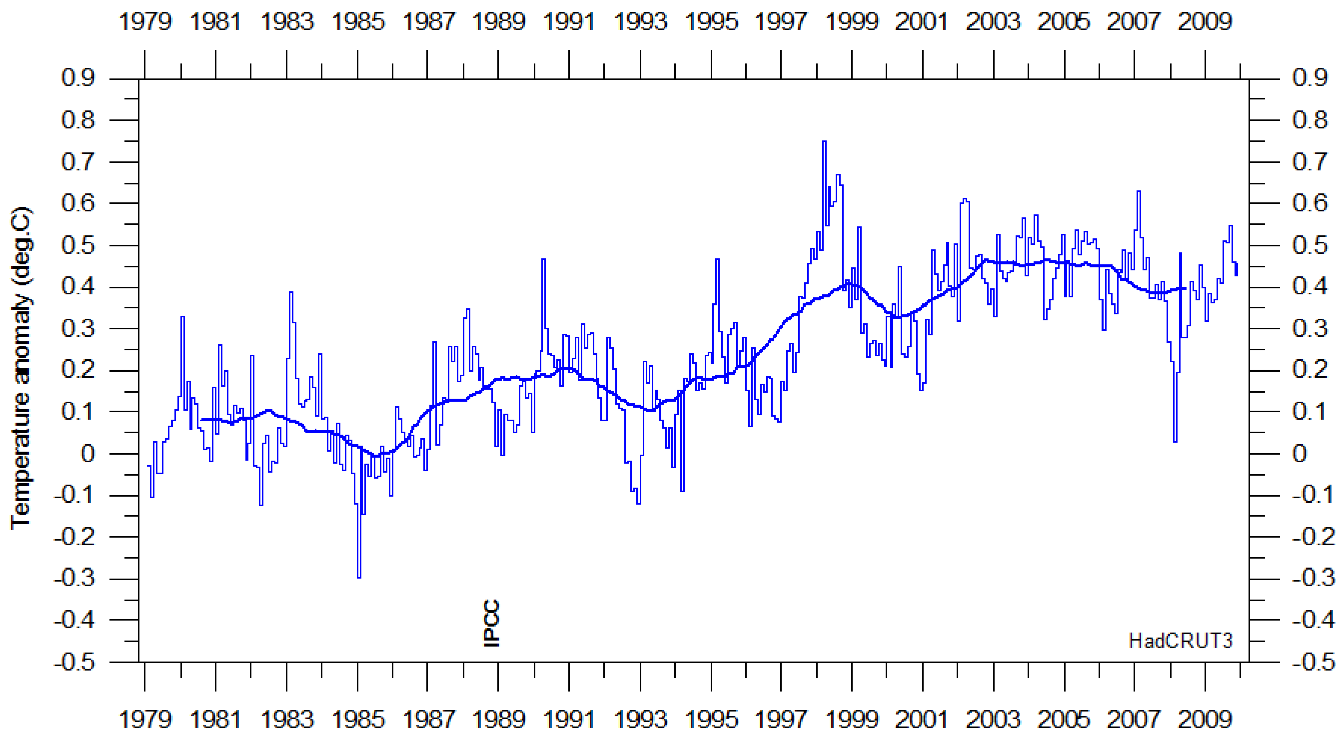


Global monthly average lower troposphere temperature (thin line) since 1979 according to [University of Alabama]() at Huntsville, USA. The thick line is the simple running 37 month average.

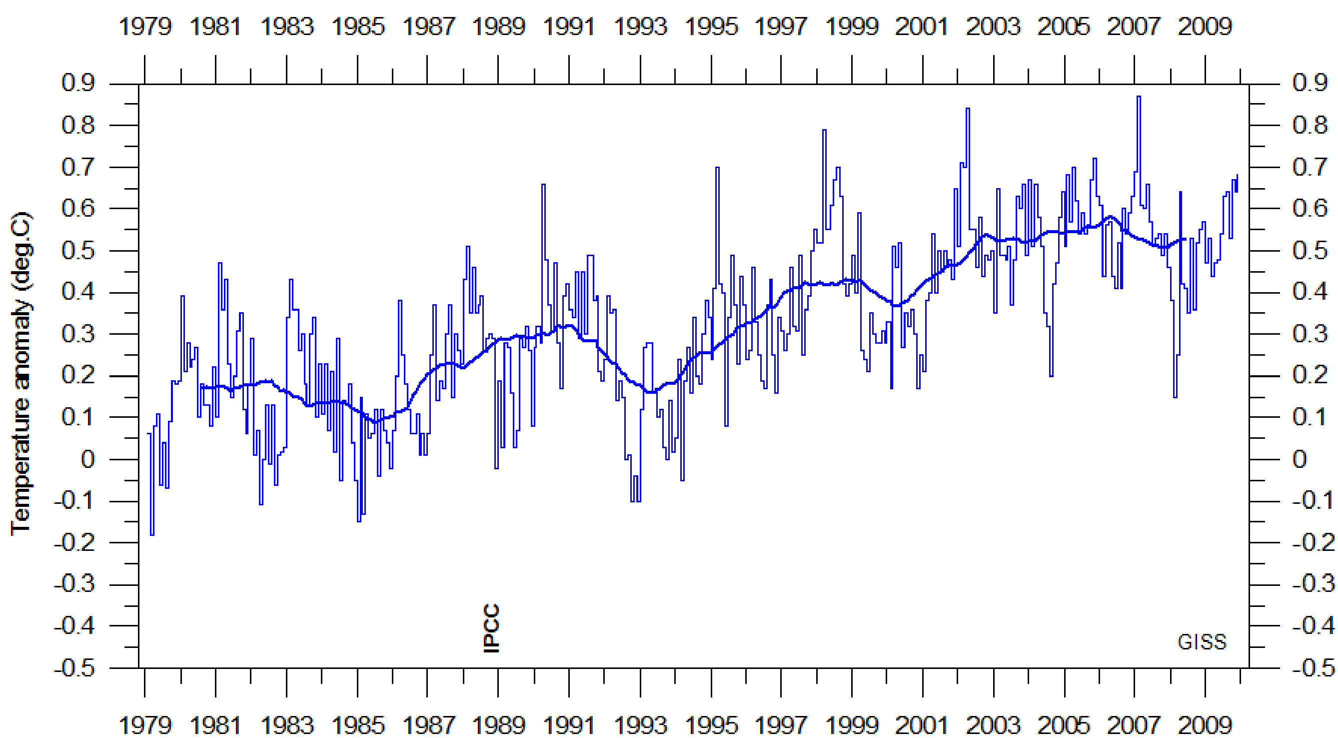


Global monthly average lower troposphere temperature (thin line) since 1979 according to according to [Remote Sensing Systems]() (RSS), USA. The thick line is the simple running 37 month average.

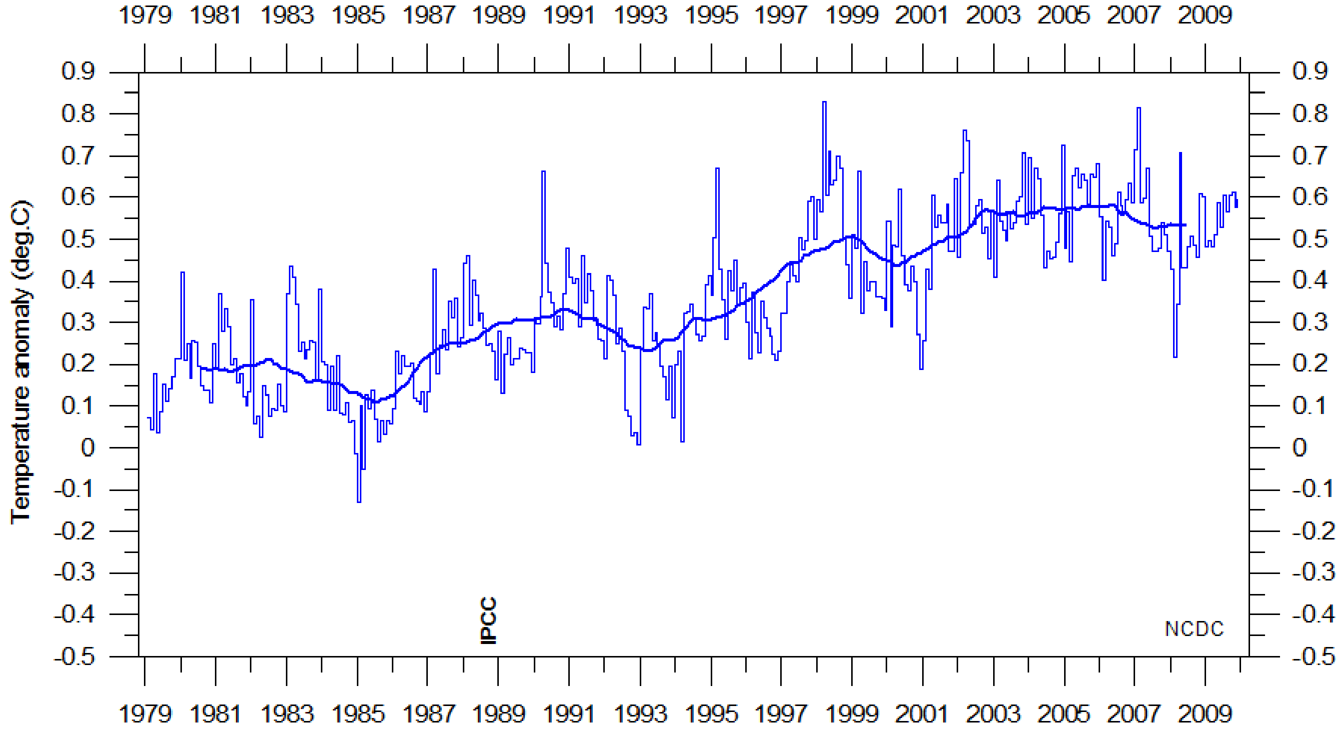
Global surface air temperature, updated to November 2009



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.

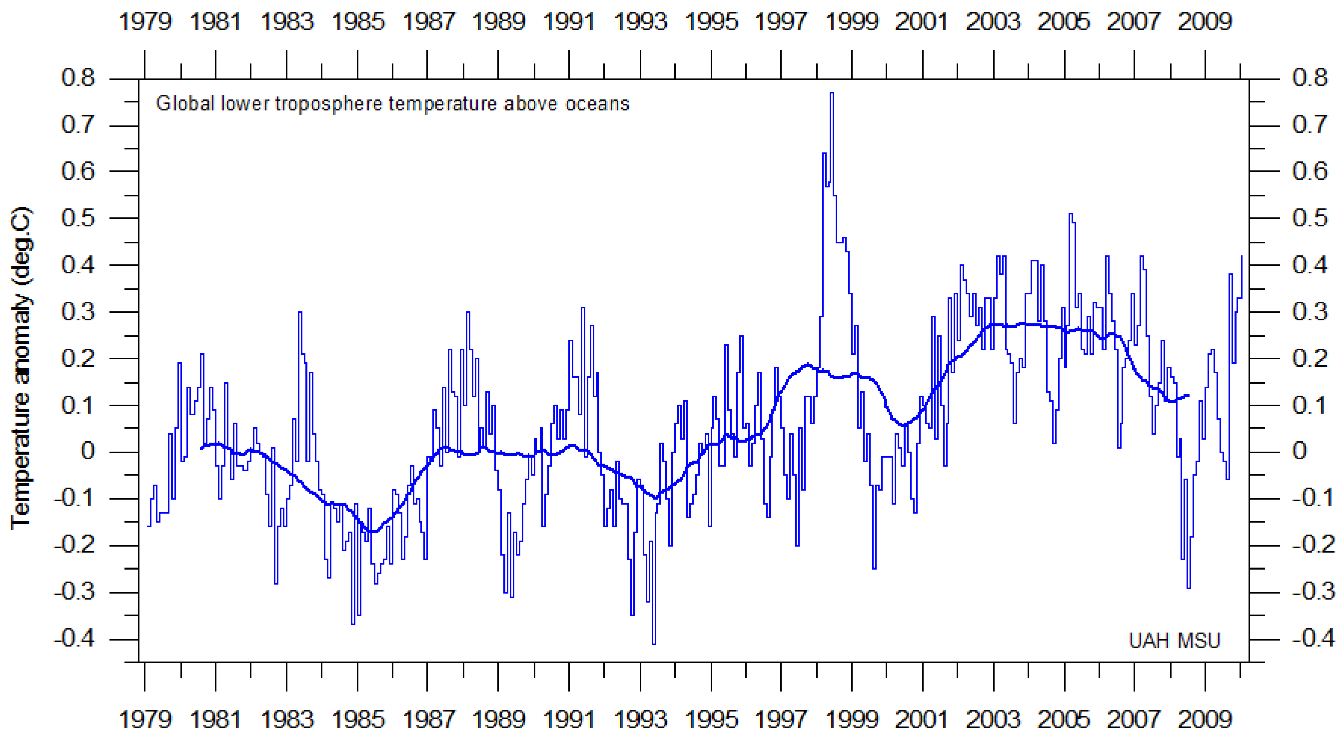


Global monthly average surface air temperature (thin line) since 1979 according to according to the Goddard Institute for Space Studies (GISS), at Columbia University, New York City, USA. The thick line is the simple running 37 month average.

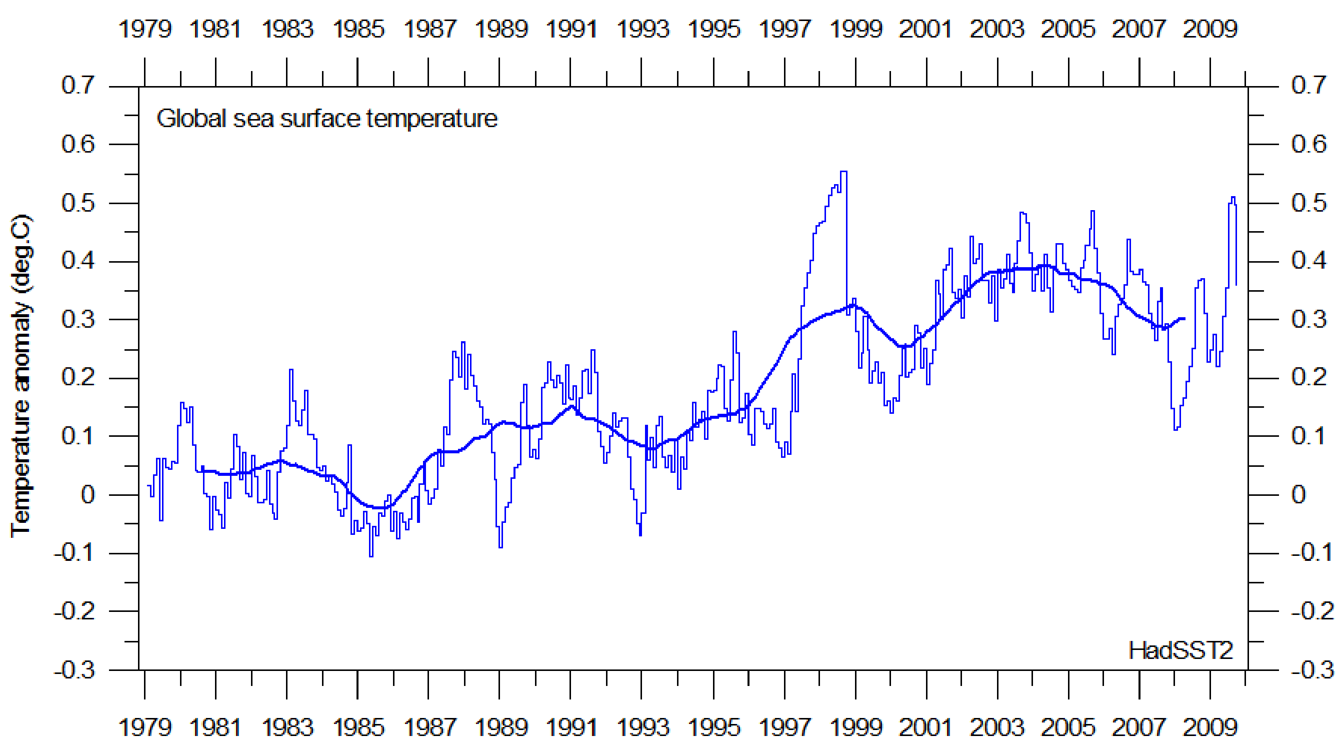


Global monthly average surface air temperature since 1979 according to according to the [National Climatic Data Center](#) (NCDC), USA. The thick line is the simple running 37 month average.

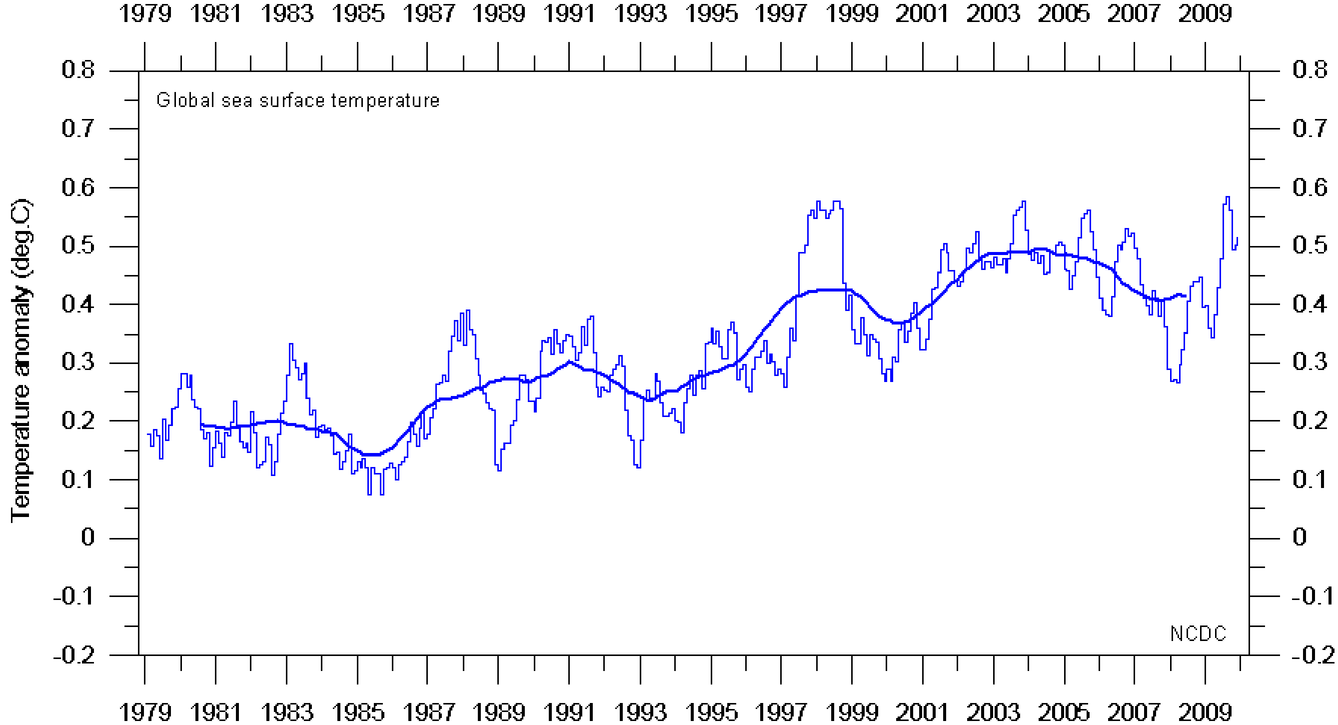
Global sea surface temperature, updated to November 2009



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.

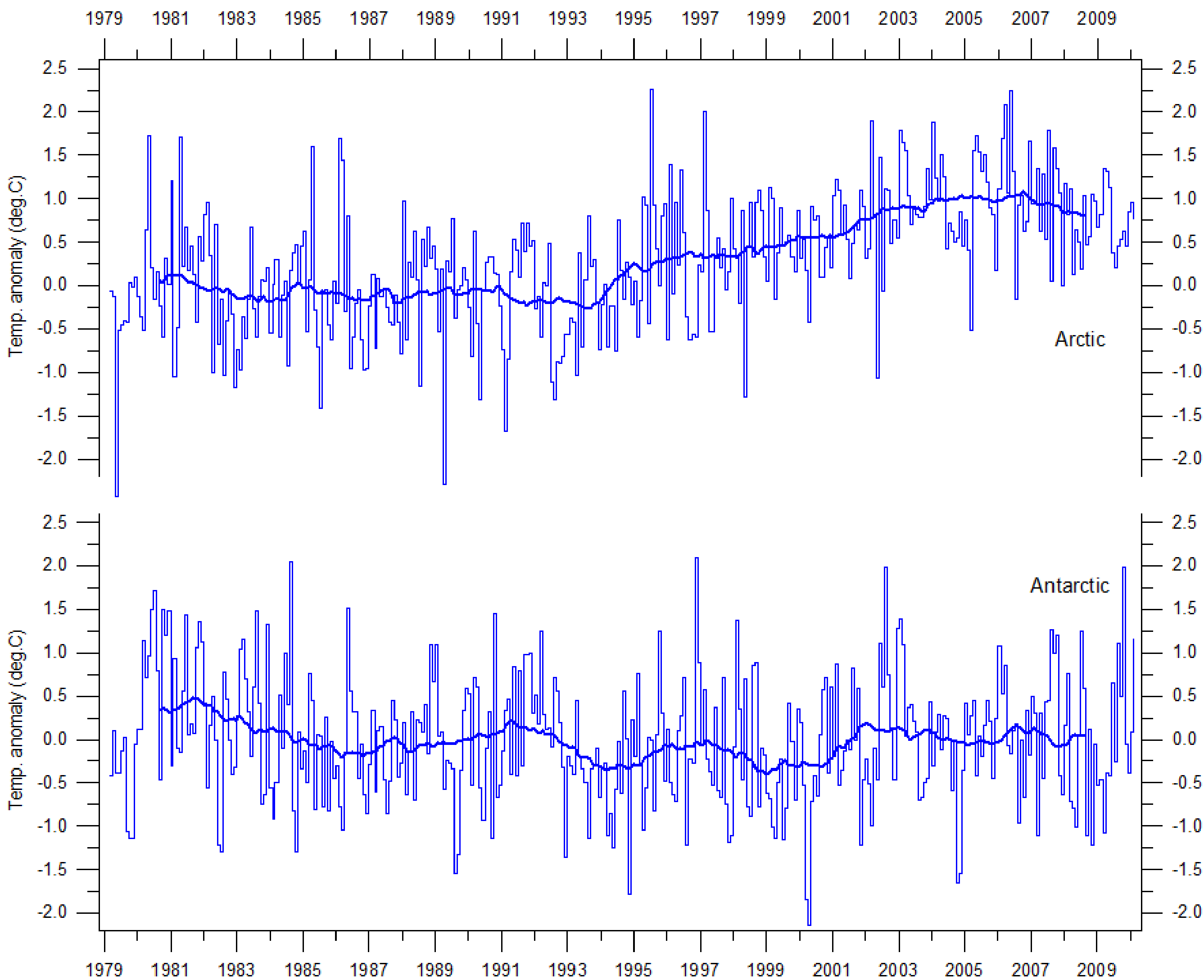


Global monthly average sea surface temperature since 1979 according to University of East Anglia's Climatic Research Unit (CRU), UK. Base period: 1961-1990. The thick line is the simple running 37 month average. Only updated to September 2009.



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 November 2009



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 September 2009

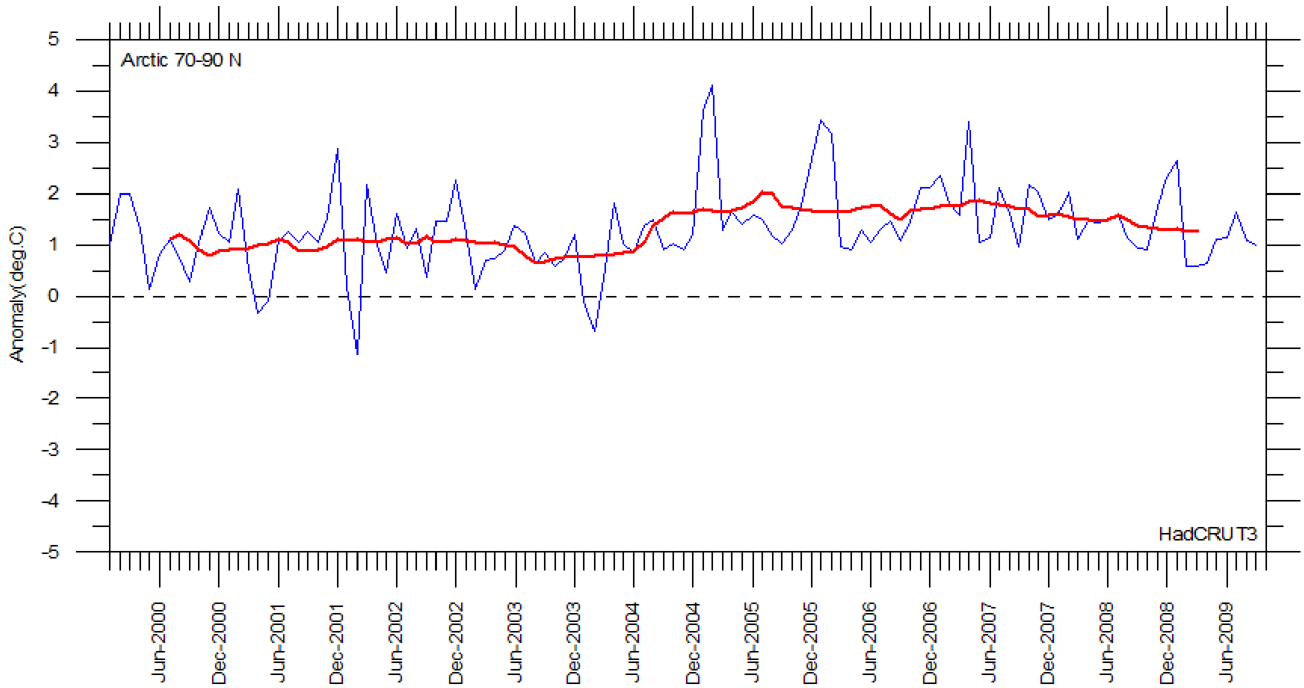


Diagram showing Arctic monthly surface air temperature anomaly 70-90°N since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre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

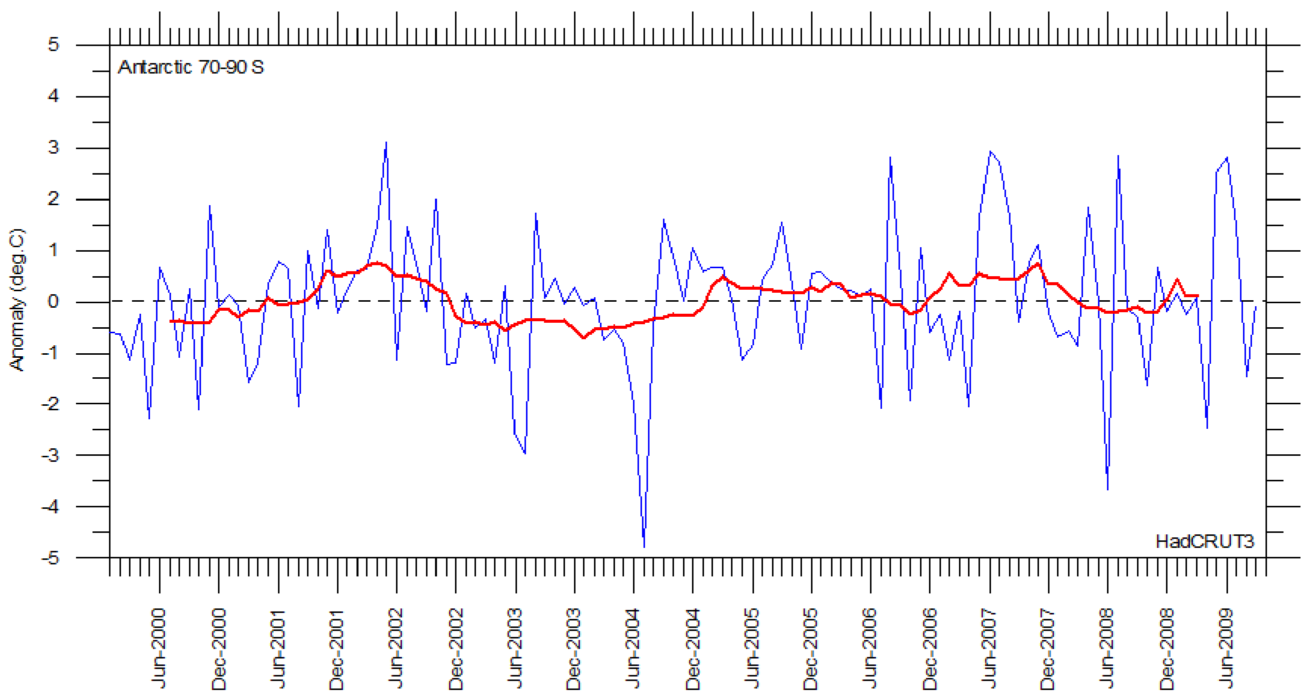


Diagram showing Antarctic monthly surface air temperature anomaly 70-90°S since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley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

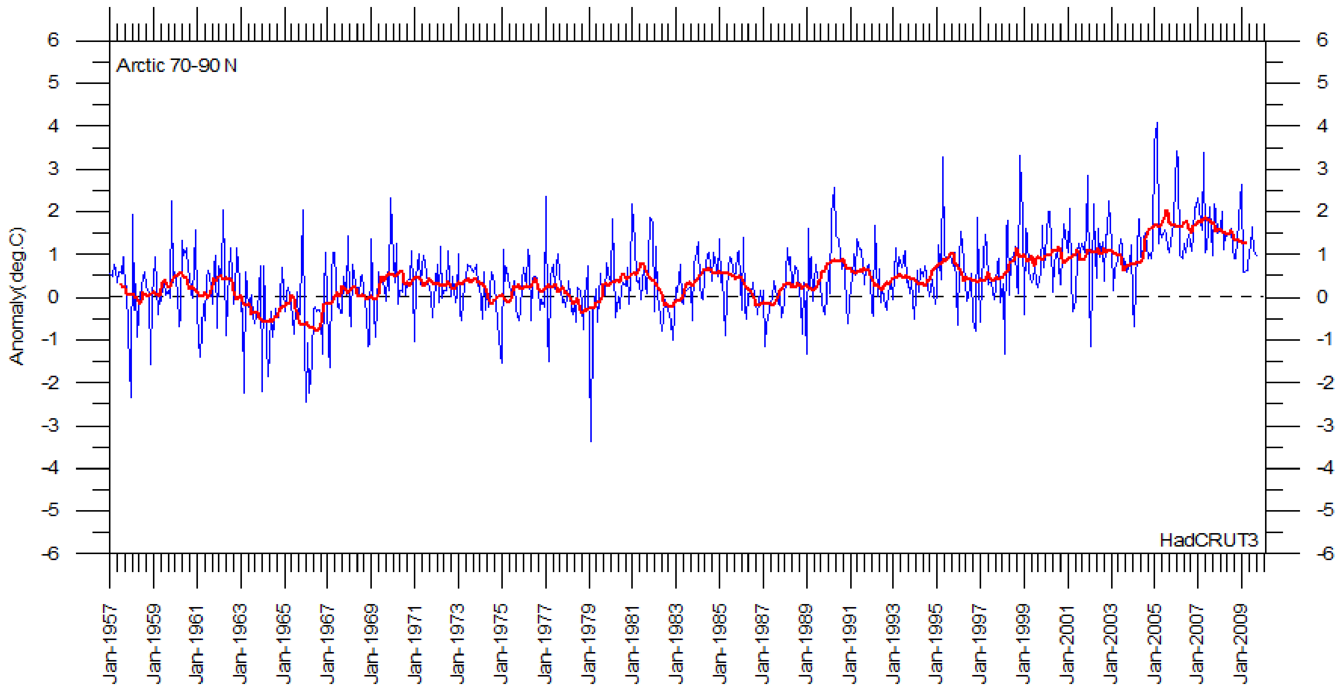


Diagram showing Arctic monthly surface air temperature anomaly 70-90^{o}N since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 has been chosen as starting year, to ensure easy comparison with the maximum length of the realistic Antarctic temperature record shown 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.

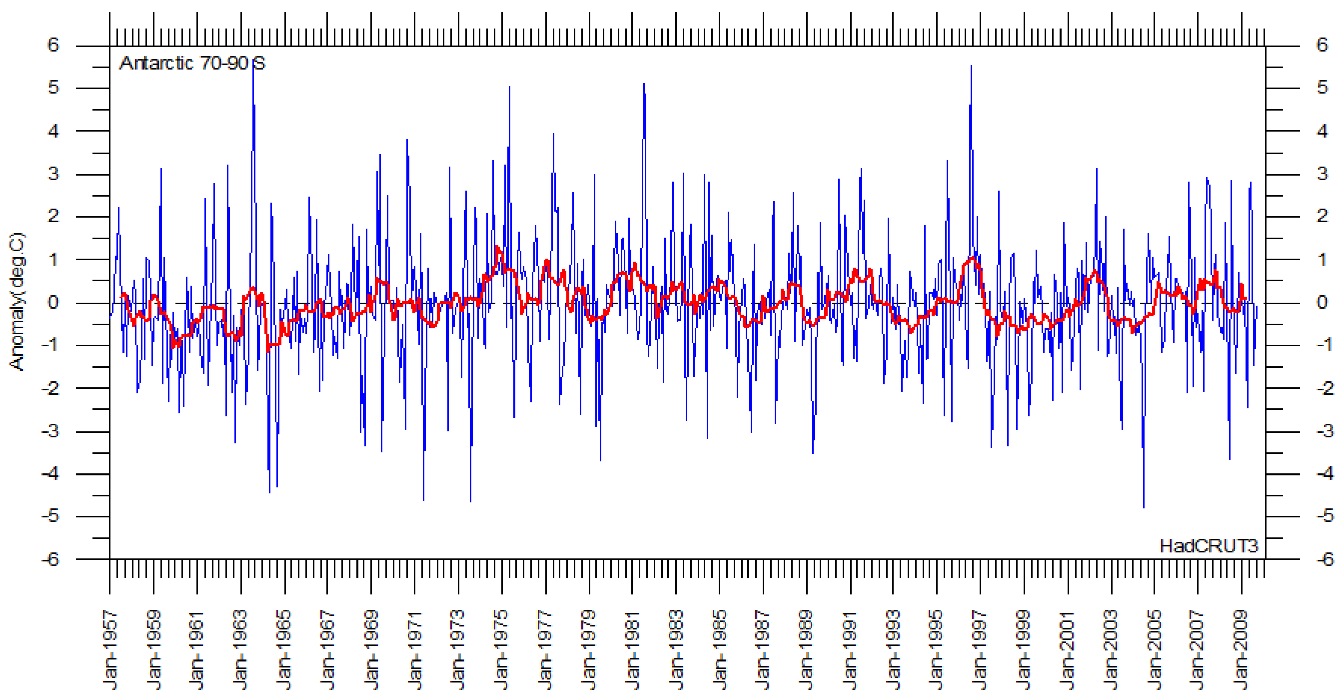


Diagram showing Antarctic monthly surface air temperature anomaly 70-90^{o}S since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 was an international geophysical year, and several meteorological stations were established in the Antarctic because of this. Before 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 Climate Prediction and Research and the University of East Anglia's Climatic Research Unit (CRU), UK.

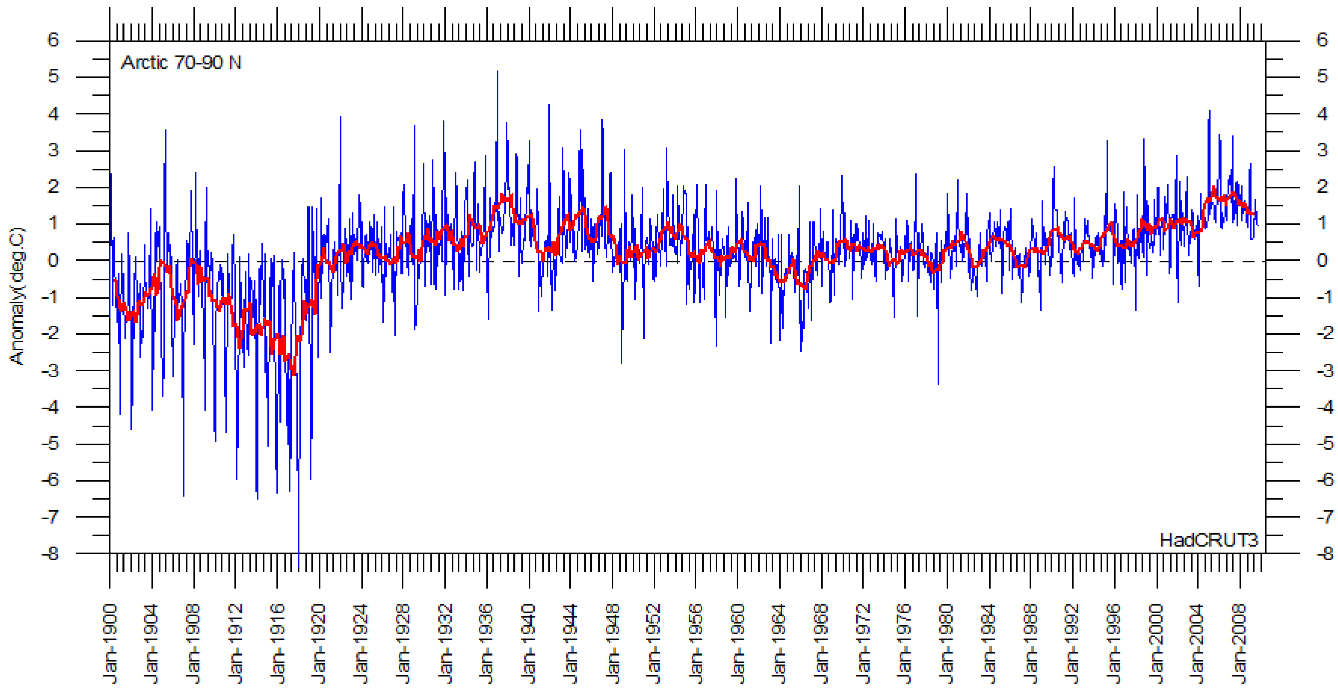
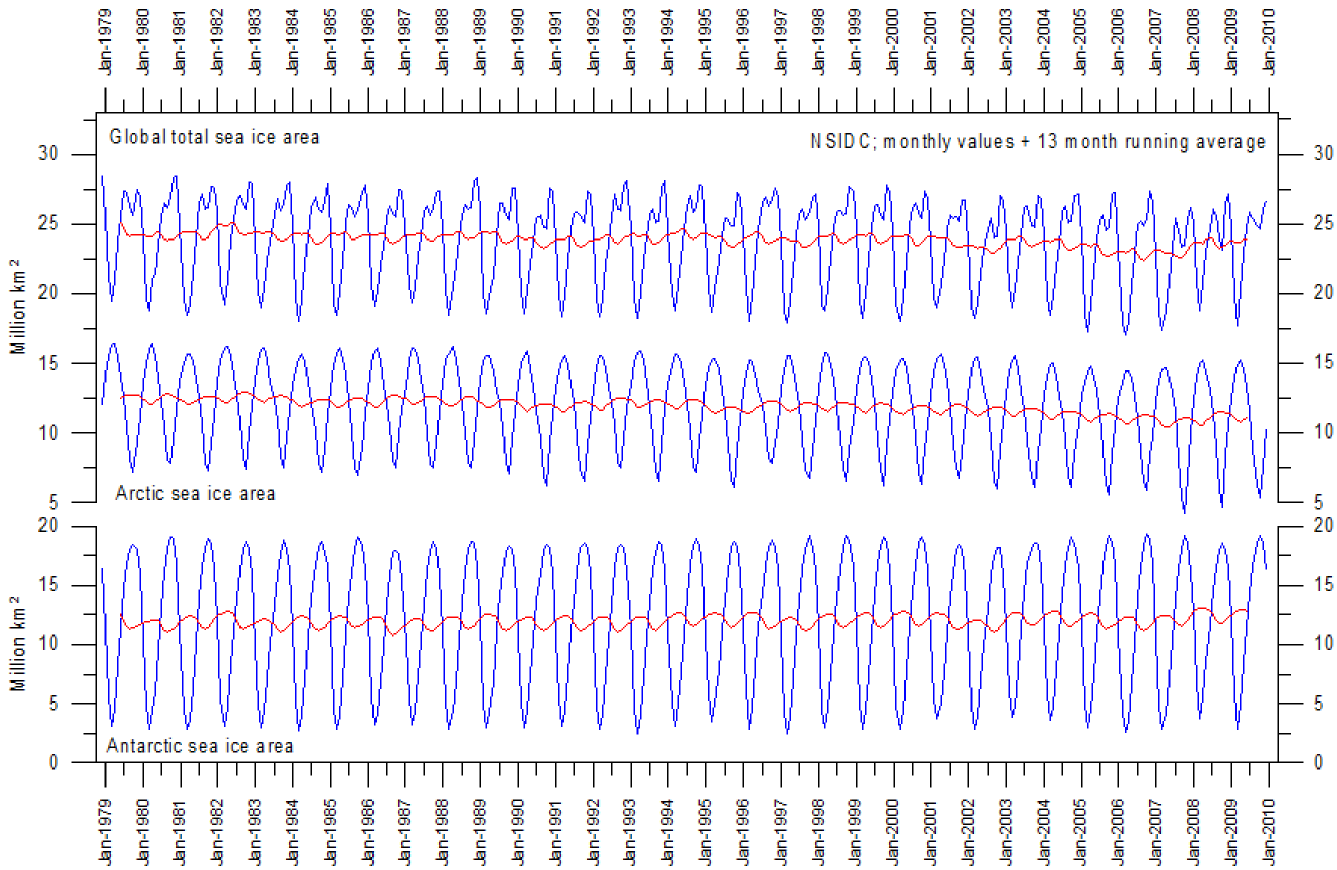


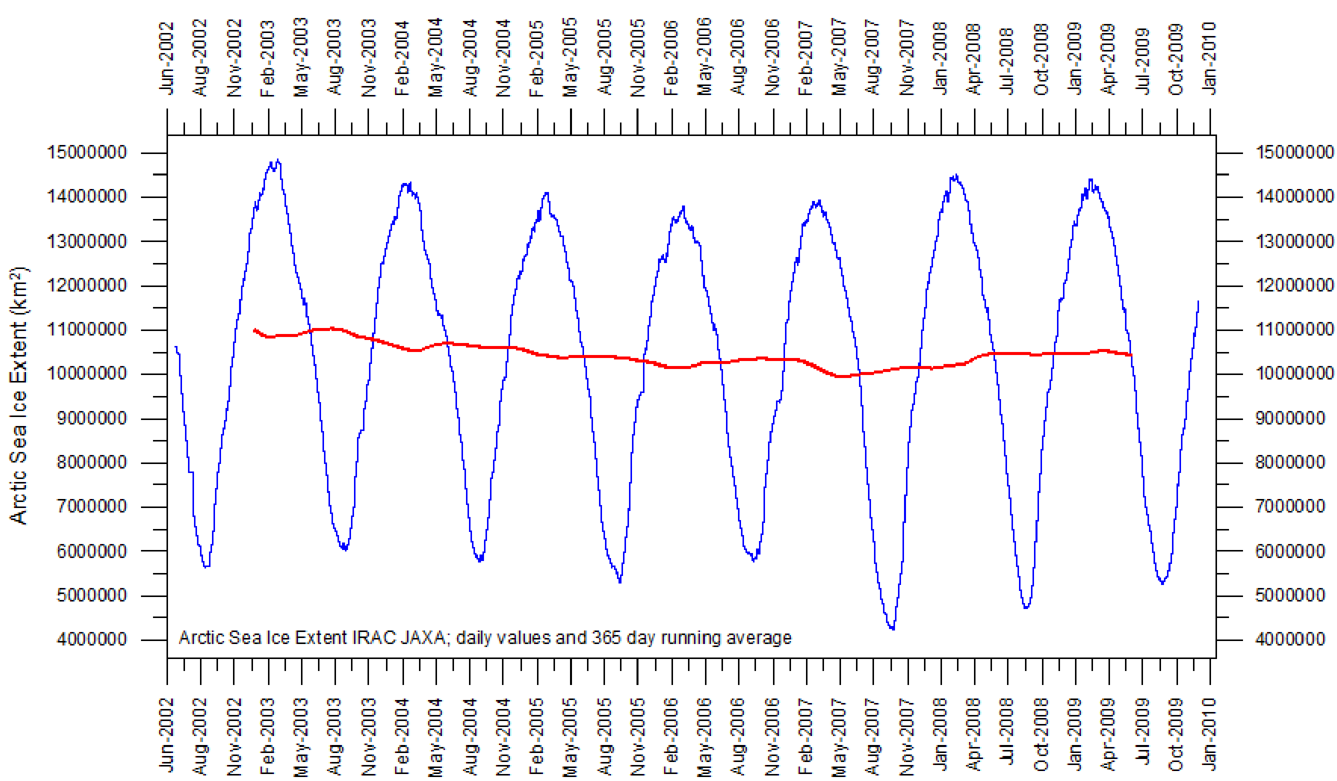
Diagram showing Arctic monthly surface air temperature anomaly 70-90^{o}N since January 1900, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. In general, the range of monthly temperature variations decreases throughout the first 30-50 years of the record, reflecting the increasing number of meteorological stations north of 70^{o}N 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 70^{o}N, compared to the number of stations south of 70^{o}S.

Arctic and Antarctic sea ice, updated to November 2009

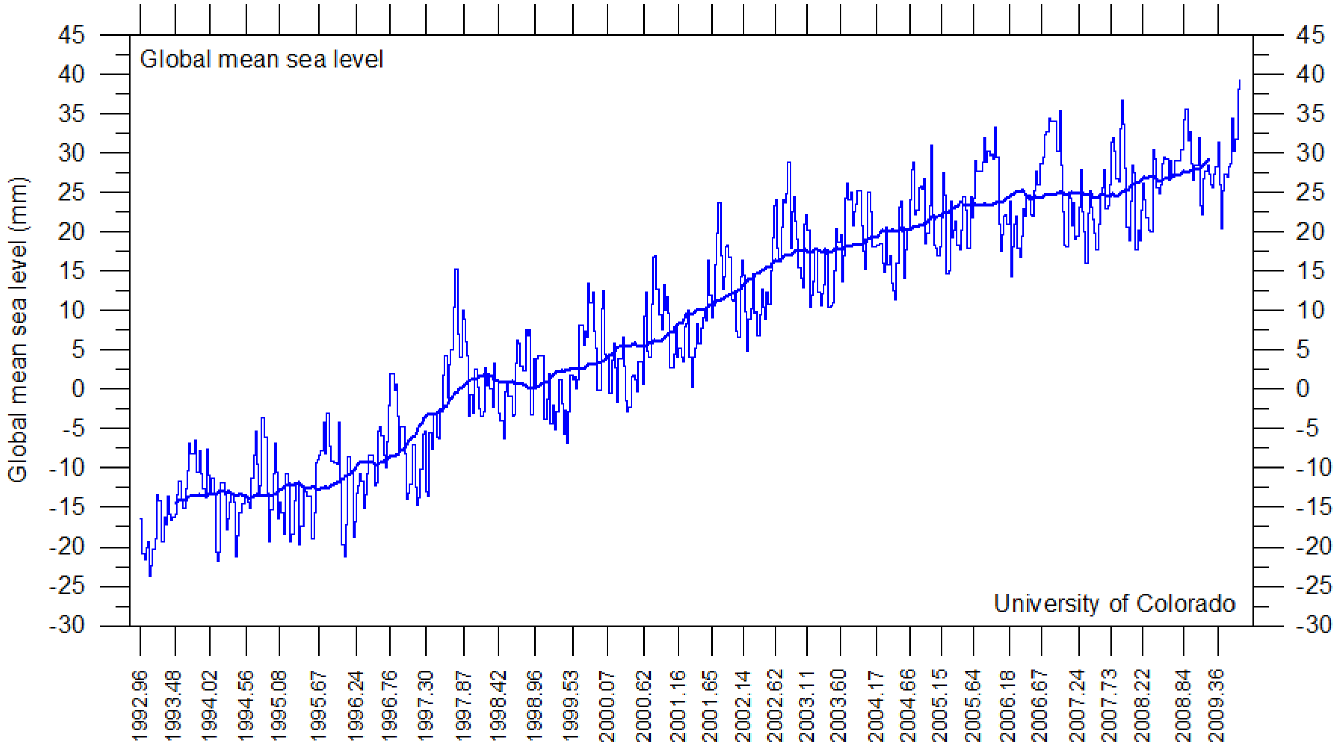


Graphs showing monthly Antarctic, Arctic and global sea ice extent since November 1978, according to the [National Snow and Ice data Center](#) (NSIDC).

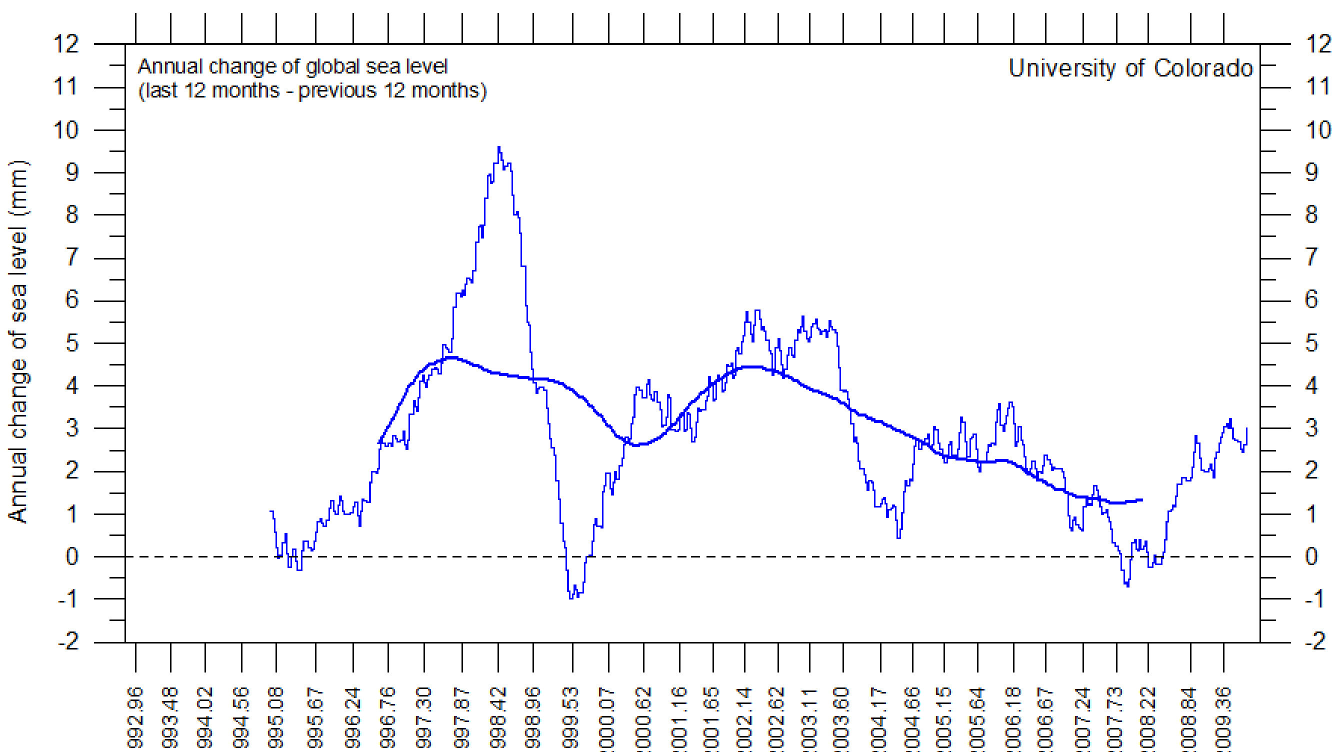


Graph showing daily Arctic sea ice extent since June 2002, to 16/12 2009, by courtesy of [Japan Aerospace Exploration Agency](#) (JAXA).

Global sea level, updated November 2009

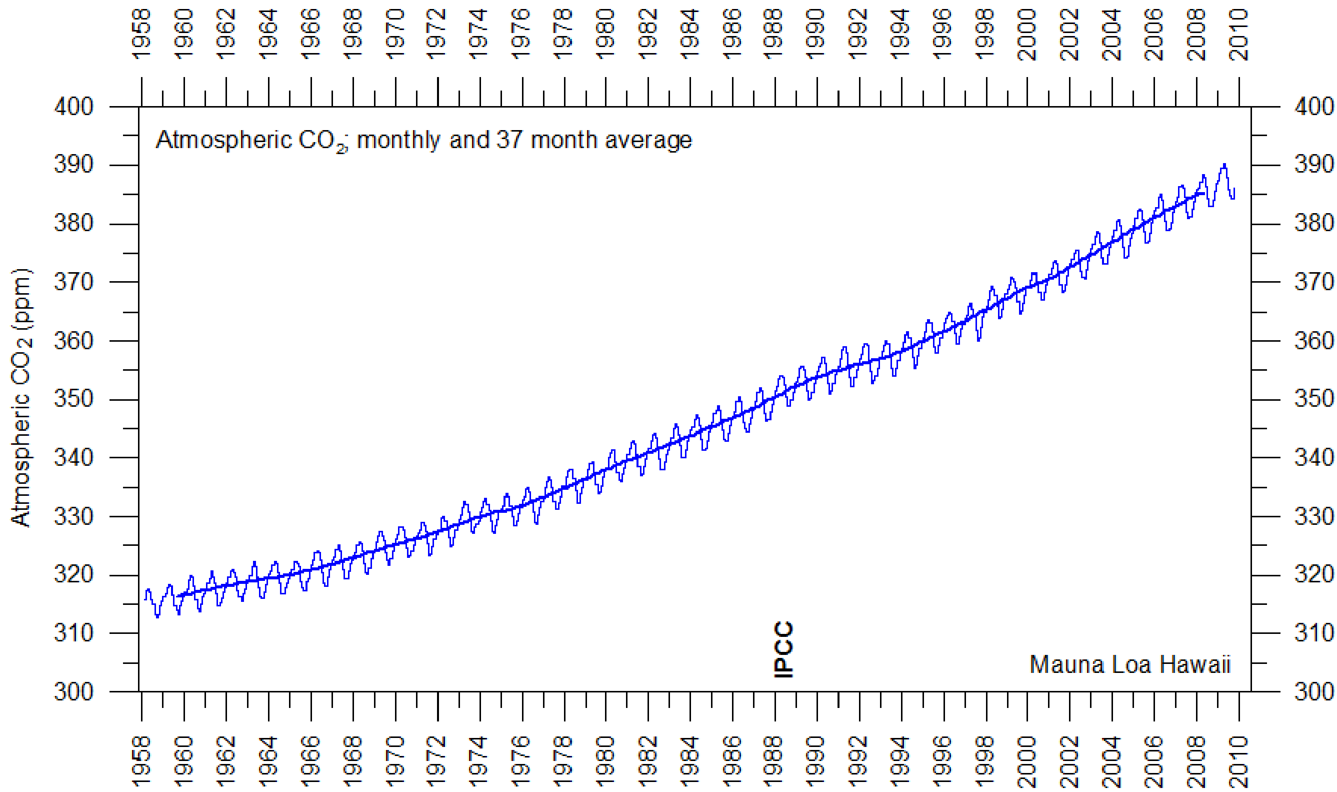


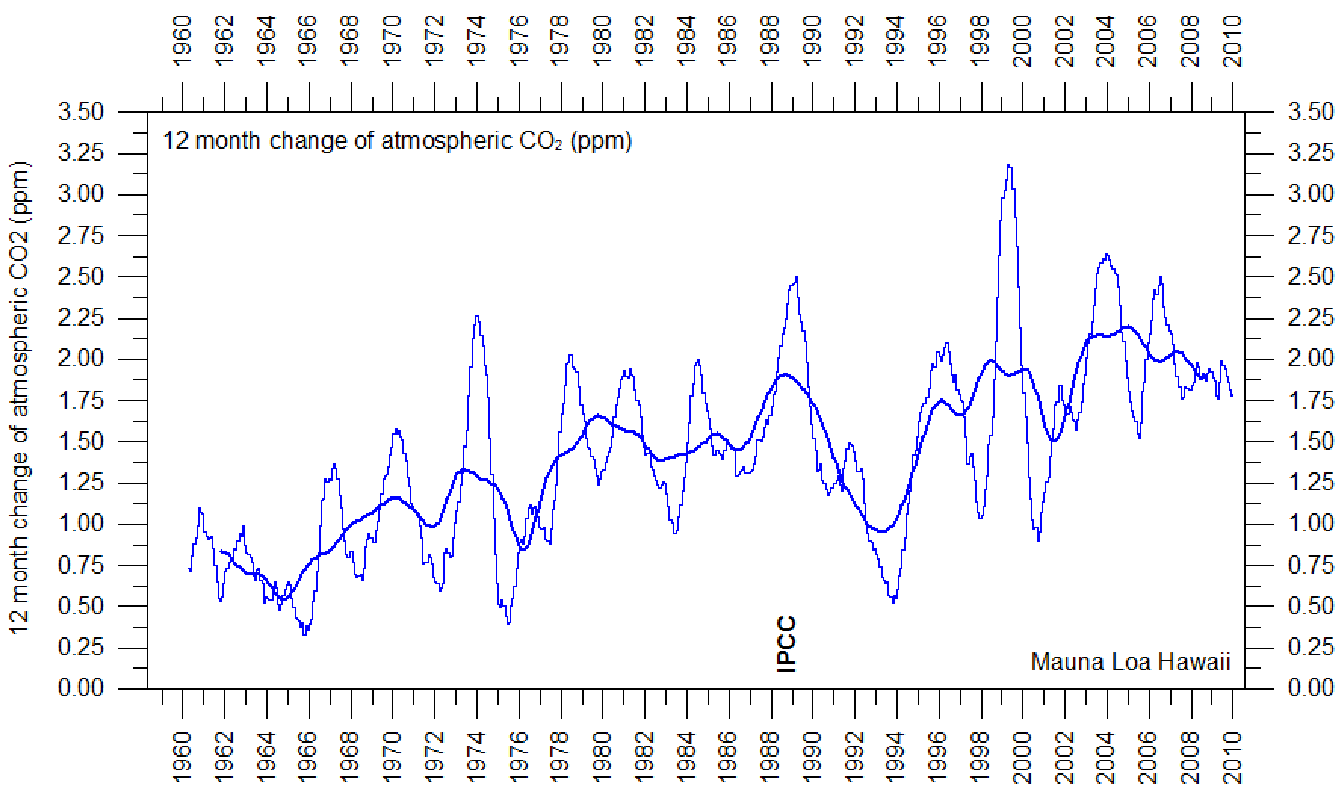
Globa lmonthly sea level since late 1992 according to the Colorado Center for Astrodynamics Research at [University of Colorado at Boulder](), USA. The thick line is the simple running 37 observation average, nearly corresponding to a running 3 yr average.



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.

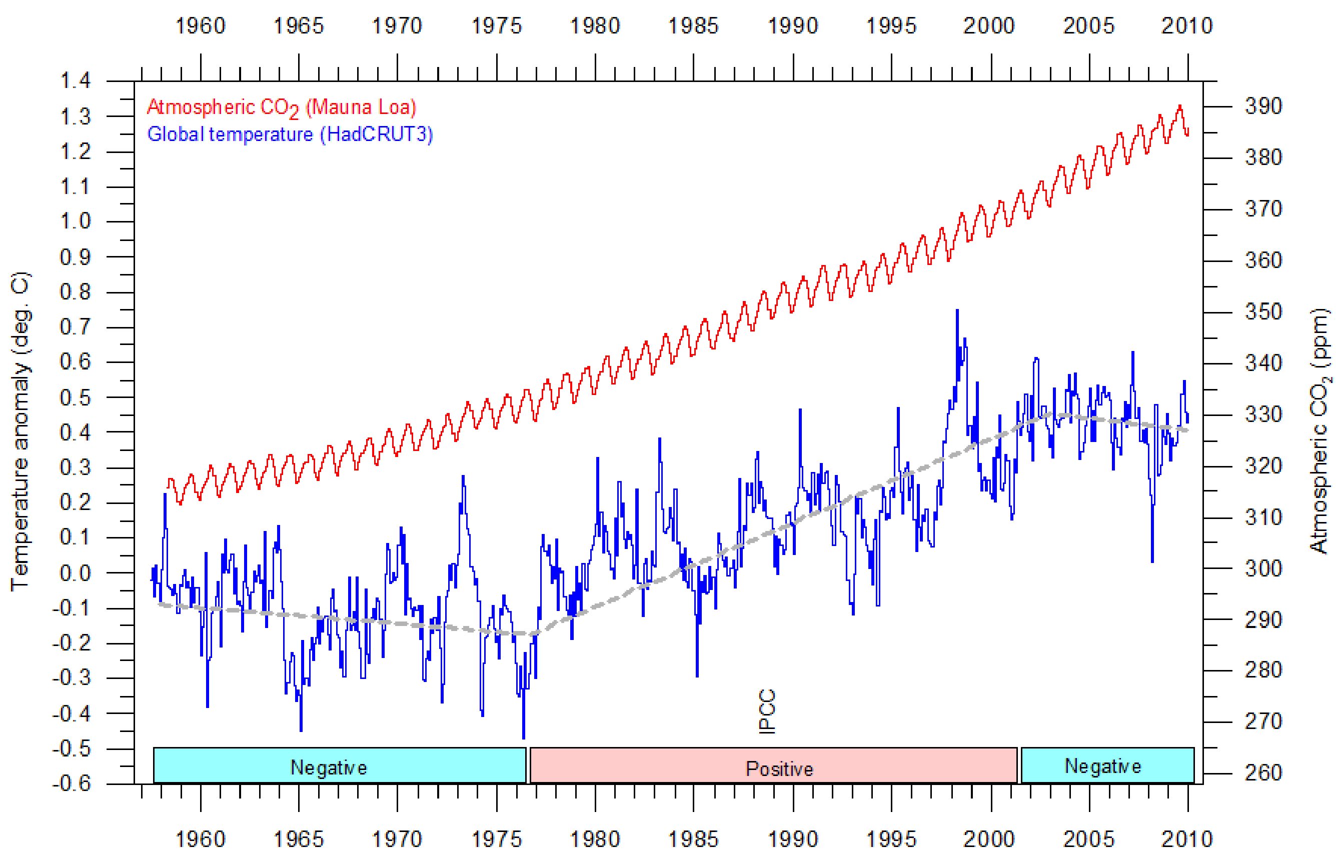
Atmospheric CO_2, updated to November 2009

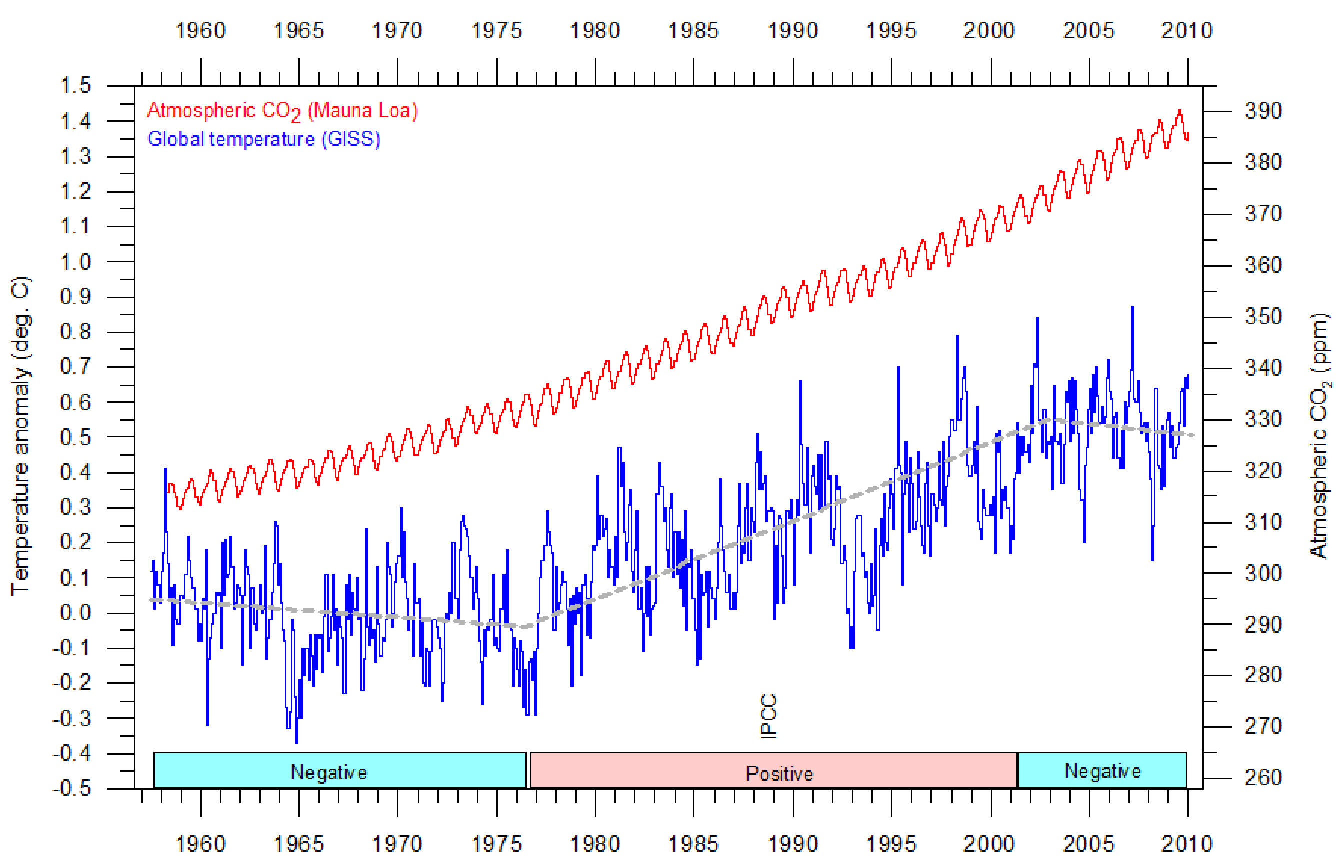


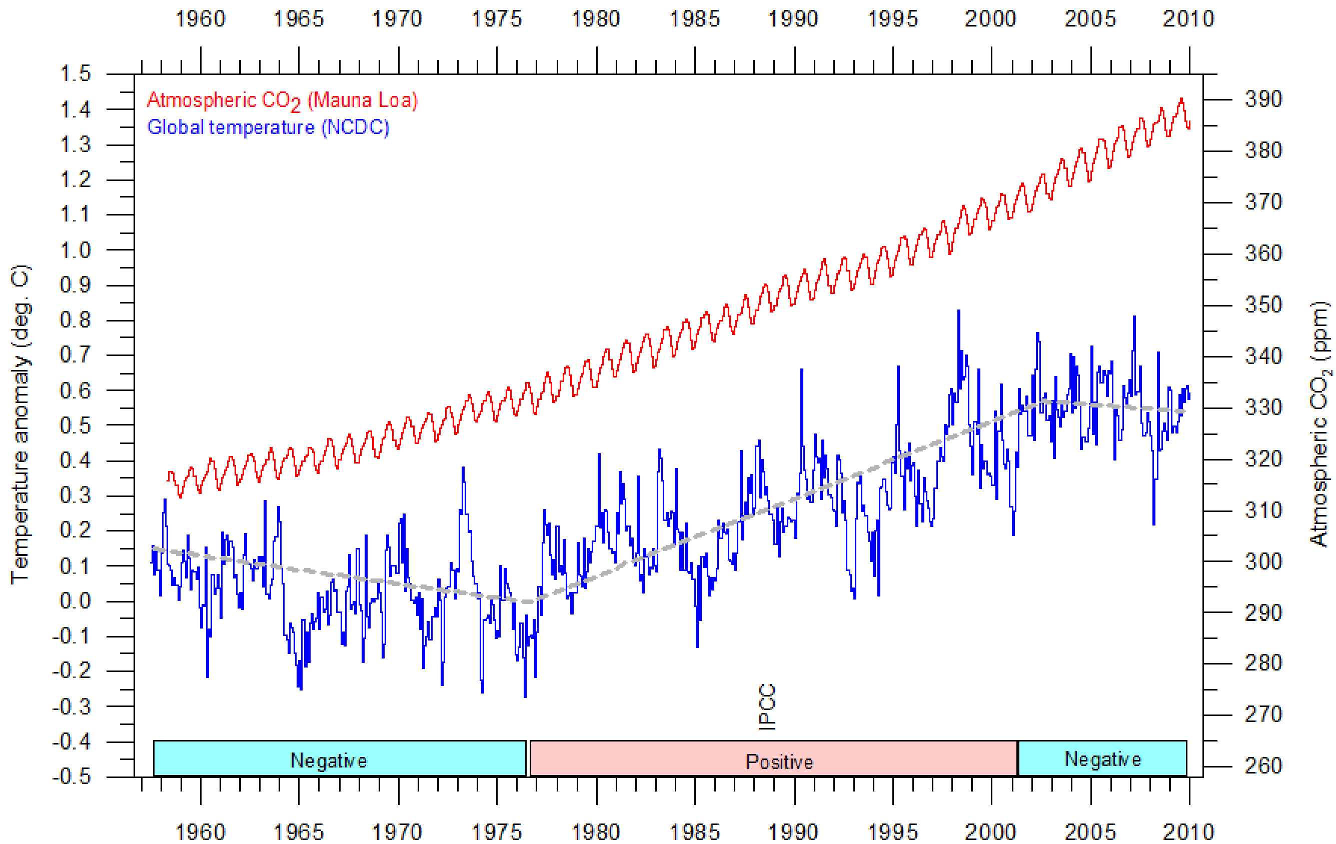


Monthly amount of atmospheric CO_2 (above) and annual growth rate (below; average last 12 months minus average preceding 12 months) of atmospheric CO_2 since 1959, according to data provided by the [Mauna Loa Observatory](), Hawaii, USA. The thick line is the simple running 37 observation average, nearly corresponding to a running 3 yr average.

Global surface air temperature and atmospheric CO_2, updated to November 2009







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.

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 importance of CO2 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.

Climate and history; one example among many

1939-1940: The Finnish-USSR winter war

Frozen Red Army soldiers lying among deserted military vehicles in eastern Finland, December 1939 (left). Finnish machine gun team at Taipale on the Karelian front in southern Finland, January 1940 (center). Finnish areas lost to USSR by the Moscow Peace Treaty March 1940 (right).

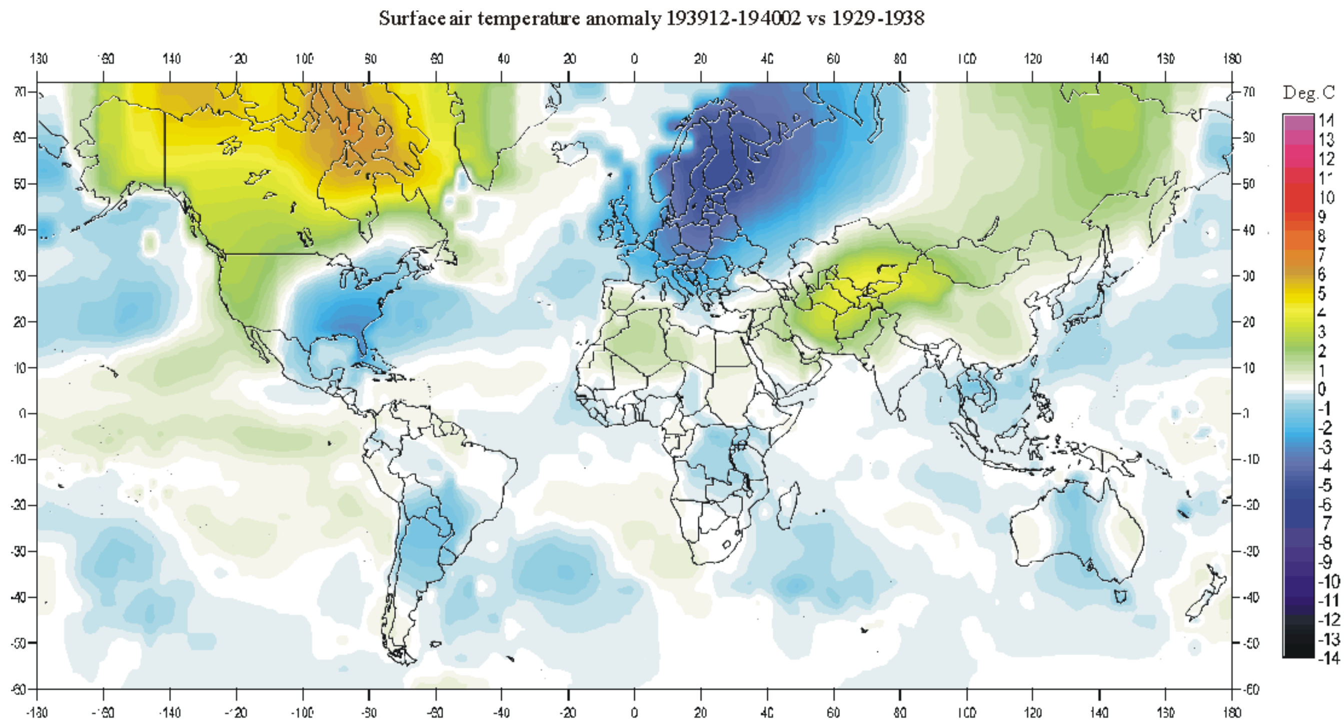
The Finnish-USSR Winter War began when the Soviet Union (USSR) attacked Finland November 30, 1939 , following unsuccessful negations about a territorial swap to move the Finnish-USSR border farther away from the city Leningrad. In the autumn of 1939, the Soviet Union demanded that Finland should agree to move the national border 25 kilometres back from Leningrad. In exchange, the Soviet Union offered Finland a large part of Karelia. The Finnish government, however, refused the Soviet demands.

The Red Army consequently prepared to attack Finland. The Chief of Red Army Artillery, Nikolai Voronov, just back from the rather different climate of Spain, was summoned to Kremlin. In Spain he had been a 'volunteer' under the name 'Voltaire', and his memoirs of the Spanish Civil War is perceptive and sometimes amusing. At the meeting in Kremlin October 1939 he was asked about how many days would be needed to defeat the small Finnish Army, according to his opinion. Voronov replied that he would personally be happy if everything could be resolved within two or three months. Everyone else present at the meeting laughed. The common notion was that between ten and twelve days would be sufficient (Bellamy 2007).

On November 30, 1939, the Red Army attacked with 23 divisions, totalling 450,000 men, bombed Helsinki, and rapidly advanced to the main Finnish defence line, the Mannerheim Line. In addition, several positions in eastern and northern Finland were attacked. The Soviet troops were not equipped with warm winter clothing, but were still wearing summer uniforms (Bellamy 2007). After all, the war was going to be short.

Finland was able to mobilize an army of 180,000 men. These troops turned out to be highly efficient with fast moving groups of ski troops, often lead by commanders with local knowledge of the terrain. In addition, several Finnish commanders developed a small-unit surrounding “motti” tactics, cutting of the columns of USSR army vehicles bound to follow narrow roads in the dense forests. The Finnish tactic was to cut off the Soviet retreat route by blocking the road behind the column. Next the enemy force was divided into smaller units which then were individually destroyed (Trotter 1991).

The winter 1939-40 became unusually cold in Finland with temperatures often dropping to -40°C, much lower than the average for the previous period (see map below). The Finnish army, however, was able to use this meteorological phenomenon to their advantage. The efficient Finnish motti-tactics in combination with the Finnish soldier’s impressive fighting spirit “sisu” frustrated the Red Army commanders. The Red Army was heavily dependent upon the use of vulnerable motorized vehicles, which because of the low temperatures had to be kept running continuously so their engines would not freeze. This procedure rapidly resulted in an increasing number of mechanical breakdowns and a general shortage of fuel on the Soviet side. If badly handled, tanks, trucks and mechanical artillery traction could be as much of a liability as an asset. In addition, many Soviet troops were lost because commanders refused to retreat; commissars disallowed them from doing so and often threatened to execute commanders that disobeyed.



Map showing the deviation of the average surface air temperature December 1939-February 1940, compared to average conditions 1929-1938. Western Russia and Europe was exposed to very low temperatures during the winter 1939-1940, compared to the previous 10 years (1929-1938). The Finnish-USSR winter war was fought in the very centre of maximum cooling. At the same time, the winter in easternmost Siberia, Alaska and Canada was warmer than the previous 10-yr average. Data source: NASA Goddard Institute for Space Studies *(GISS).*

Soviet losses on the fronts became tremendously large, and the country's international standing suffered substantially. In the end, the general fighting ability of the Red Army was put into question, a fact that presumably contributed to Adolf Hitler’s decision to launch Operation Barbarossa in June 1941.

Finland was able to defend itself successfully until February 1940. By then, however, it became clear that the Finnish forces were becoming exhausted, and the Red Army had managed to penetrate the main Finnish line of defence, the Mannerheim Line, at several places (Trotter 1991). German representatives therefore suggested that Finland should negotiate with the USSR. Soviet casualties had been high, and the situation was a source of major political embarrassment for the Soviet regime. A draft of peace terms was presented to Finland on February 12.

In March 1940 the Moscow Peace Treaty was signed, ceding about 9% of Finland's territory and about 20% of its industrial capacity to the Soviet Union. Hostilities were ended on March 13, 1940.

At the end Voronov, the Red Army Chief of Artillery, was right: the 1939-1940 Soviet-Finnish war lasted not ten or twelve days, but instead 105 days. The Red Army's lack of preparation for fighting in the winter was partly due to the grossly optimistic estimates of how long the campaign would take, and that was a lesson well learned. The troops were ill-prepared for operations in forests and for coping with freezing weather, wrote Marchal Voronov. In addition, because of the very low temperatures, the semiautomatic mechanisms in the guns failed (Bellamy 2007). New types of lubricants had to be developed immediately. The errors made by the Red Army took time to correct, but solutions were in place a year and a half later. In December 1941 is was soldiers of the German Wehrmacht who would freeze in summer uniforms, along with their fuel and lubricants, as the Red Army moved forward in guilted jackets, fur and snow camouflage, with equipment that worked at tens of degrees Celsius below zero.

References

Bellamy, C. 2007. Absolute War. Soviet Russia in the Second World War. Pan Books, Pan Macmillan Ltd., London, 814 pp.

Trotter, W.R. 1991. A Frozen Hell: The Russo-Finnish Winter War of 1939-40. Workman Publishing Company, New York, 354 pp.

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

New book about climate and climate change (Det ustyrlige klima; in Nordic language) published 30. November 2009.

More information on: www.bibliotek.trykkefrihed.dk and www.climate4you.com/DetUstyrligeKlima.htm

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

17 December 2009.