Climate4you update December 2009

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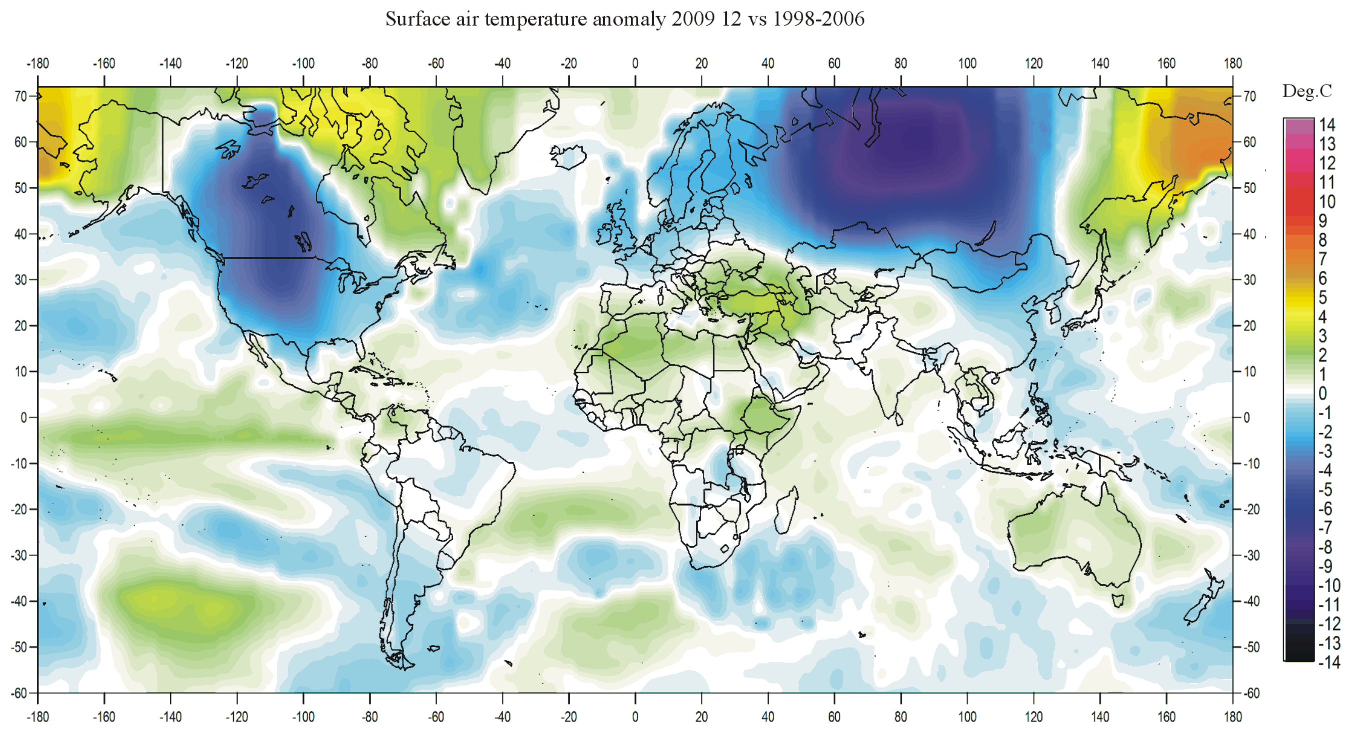
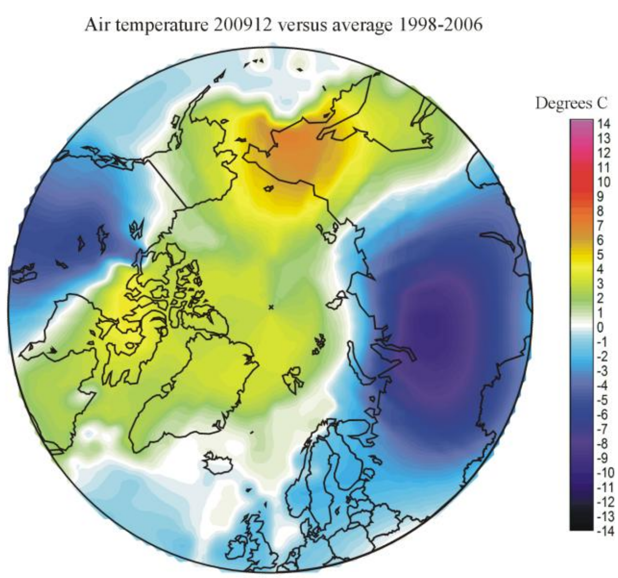
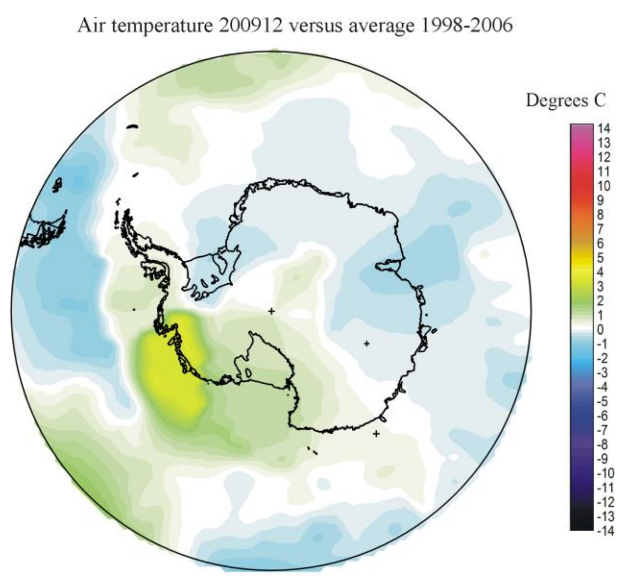
December 2009 global surface air temperature overview







December 2009 surface air temperature compared to the average for December 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 December 2009 global surface air temperature overview

This newsletter contains graphs showing a selection of key meteorological variables for December 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 December 2009 at the moment.

Global surface air temperatures December 2009 was characterised by varied conditions in the Northern Hemisphere, ranging from very cold to very warm conditions, and the Southern Hemisphere showing less varied conditions.

In the Northern Hemisphere extensive, cold areas covered western Siberia-Russia-Europe and a major part of North America. On the other hand, eastern Siberia, Alaska and NE Canada and Greenland at the same time experienced high temperatures. To a large degree, this was controlled by a strong Siberian High Pressure, extending across parts of Europe. By this, Russia and Europe were exposed to cold air masses from the east, while the European Arctic (with Svalbard), Greenland and NE Canada, along with eastern Siberia and Alaska were exposed to the influence of warm air masses from the south.

Conditions near Equator were influenced by the ongoing El Niño in the Pacific Ocean. Also in December 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 high temperatures.

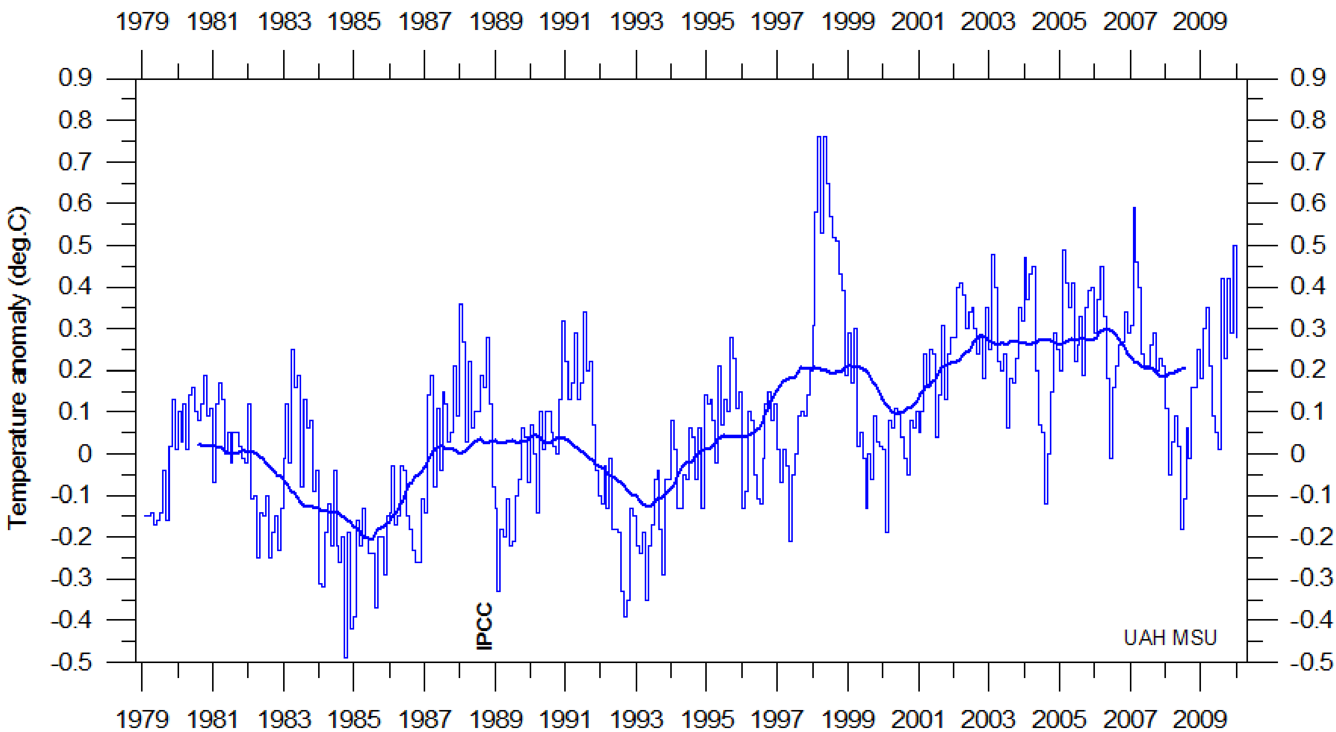
In the Southern Hemisphere Australia experienced relatively warm conditions, while New Zealand, the southern part of Africa and most of South America experienced relatively cold conditions.

In the Arctic, Greenland, NE Canada, Alaska and eastern Siberia were warm, while the major part of the continents bordering to the Arctic Ocean were cold. As mentioned above, this is partly explained by the strong high air pressure over Siberia.

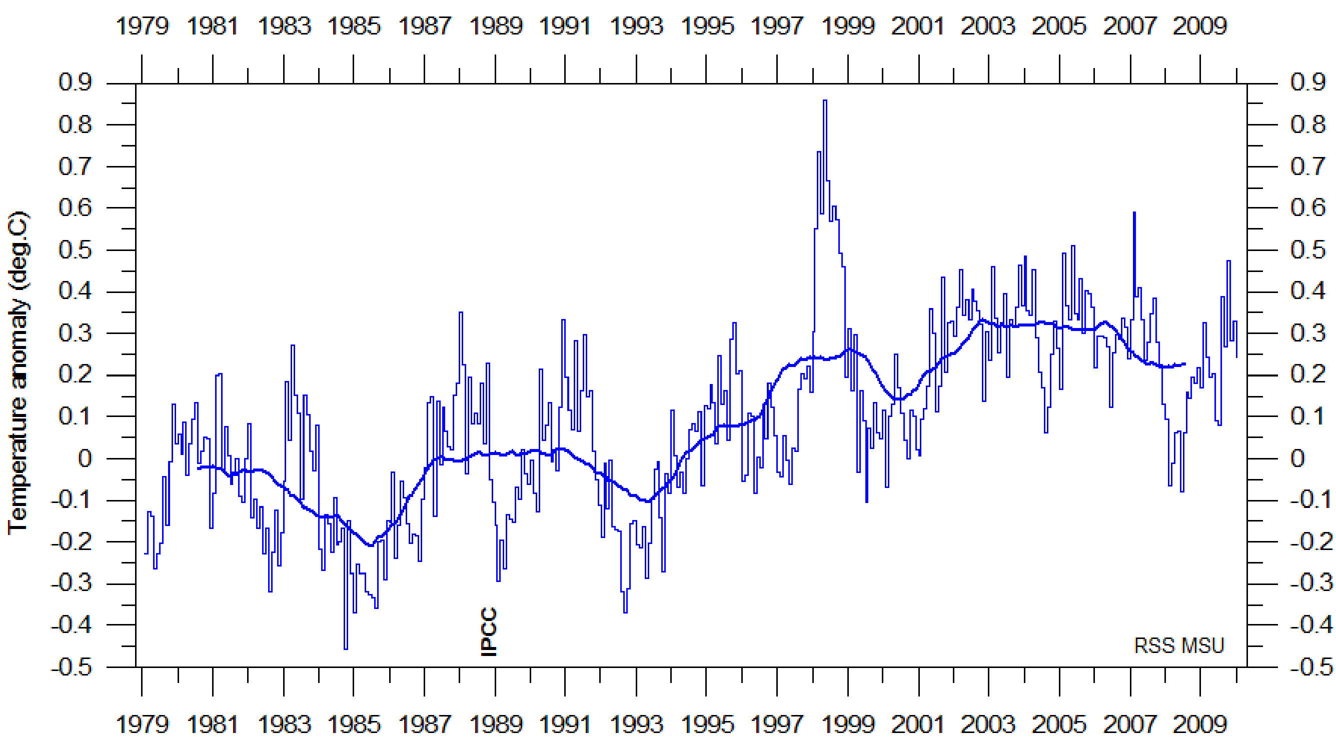
In the Antarctic, conditions were generally relatively cold, however, with parts of West Antarctica being relatively warm.

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

Lower troposphere temperature from satellites, updated to December 2009

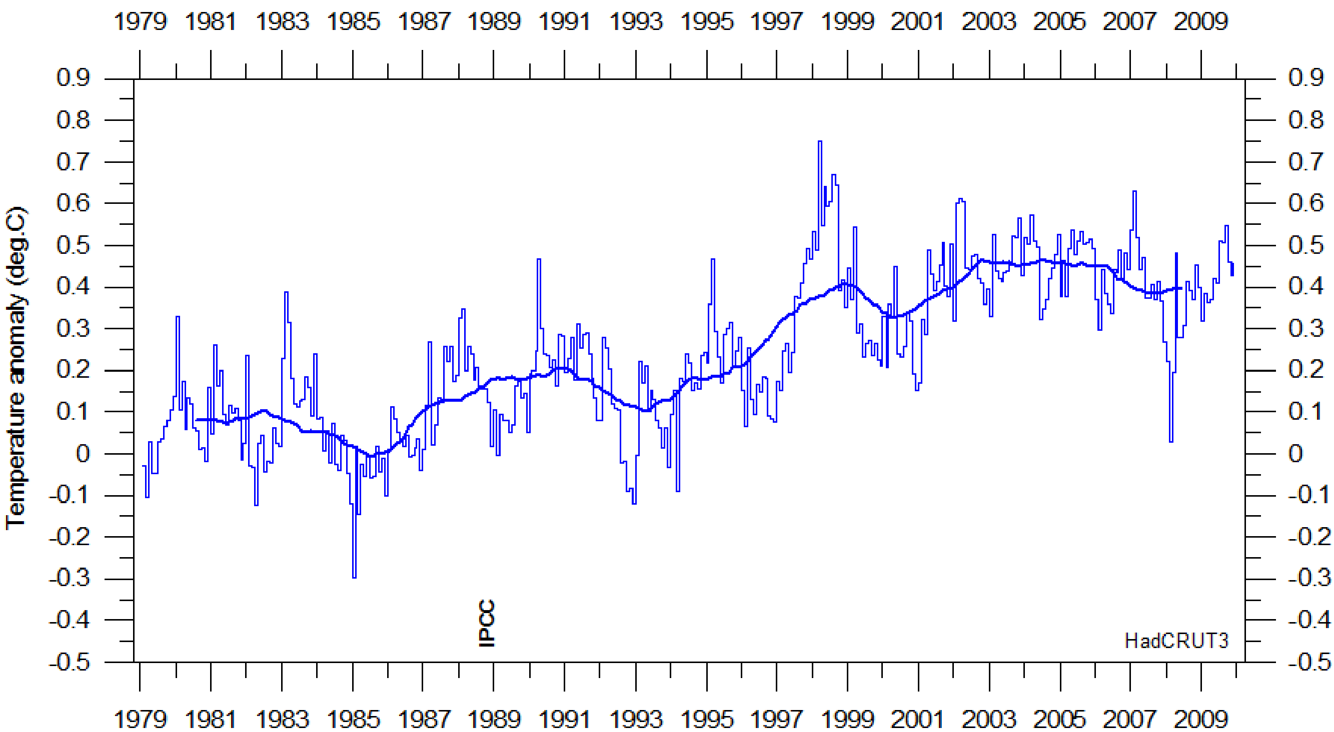


Global monthly average lower troposphere temperature (thin line) since 1979 according to [University of Alabama](#) at Huntsville, USA. The thick line is the simple running 37 month average.

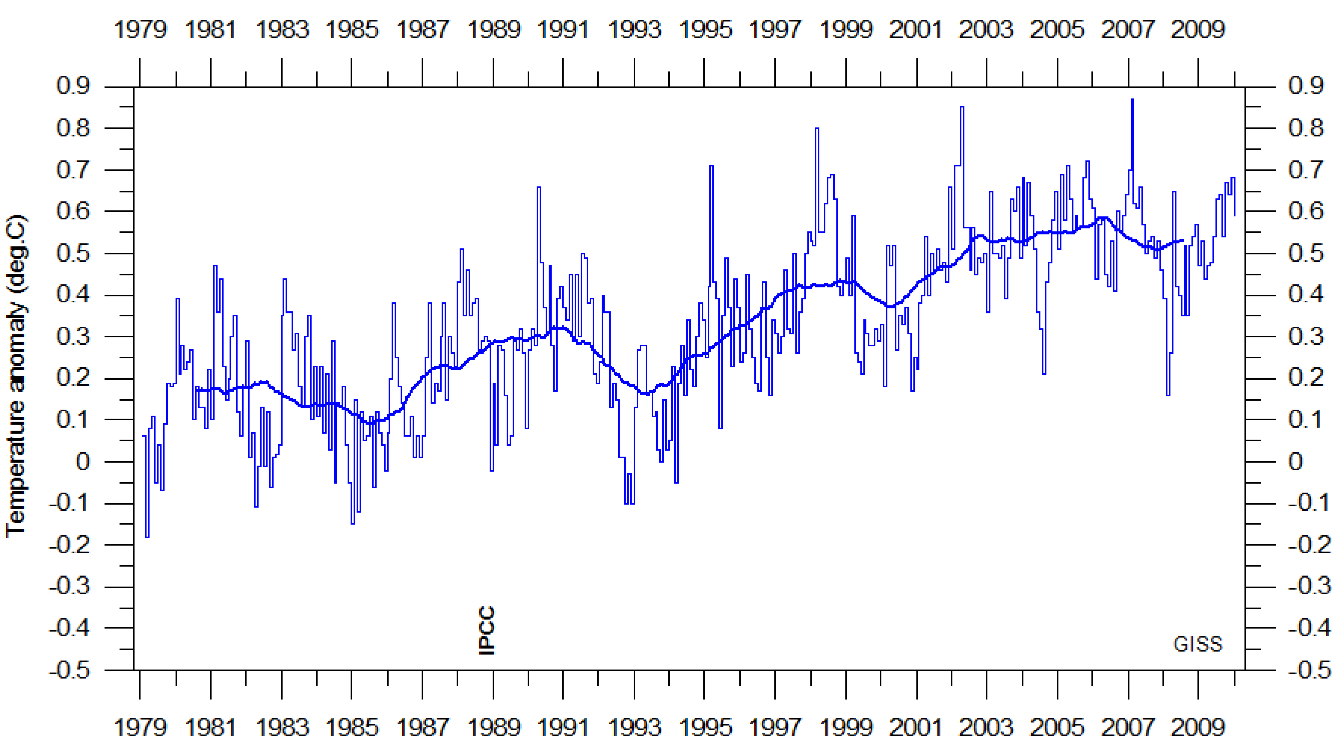


Global monthly average lower troposphere temperature (thin line) since 1979 according to according to [Remote Sensing Systems](#) (RSS), USA. The thick line is the simple running 37 month average.

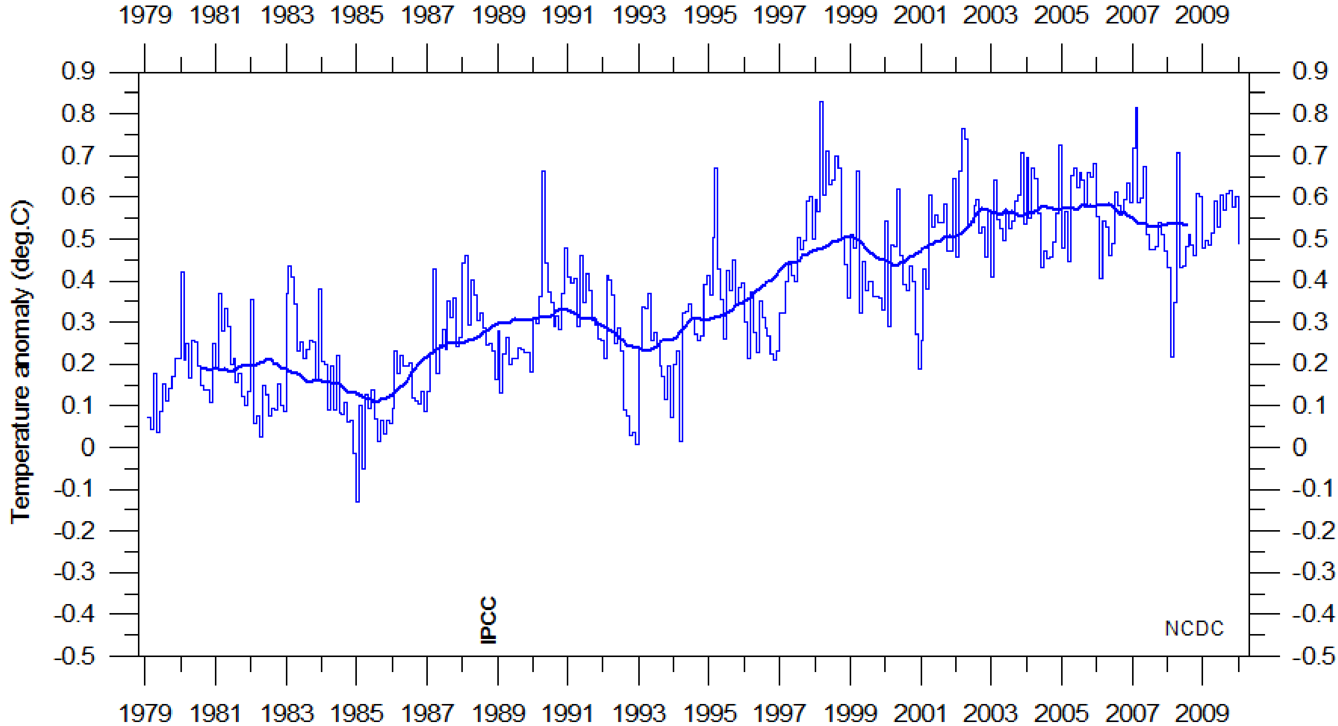
Global surface air temperature, updated to December 2009



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. Please note that this data series has not been updated beyond November 2009.

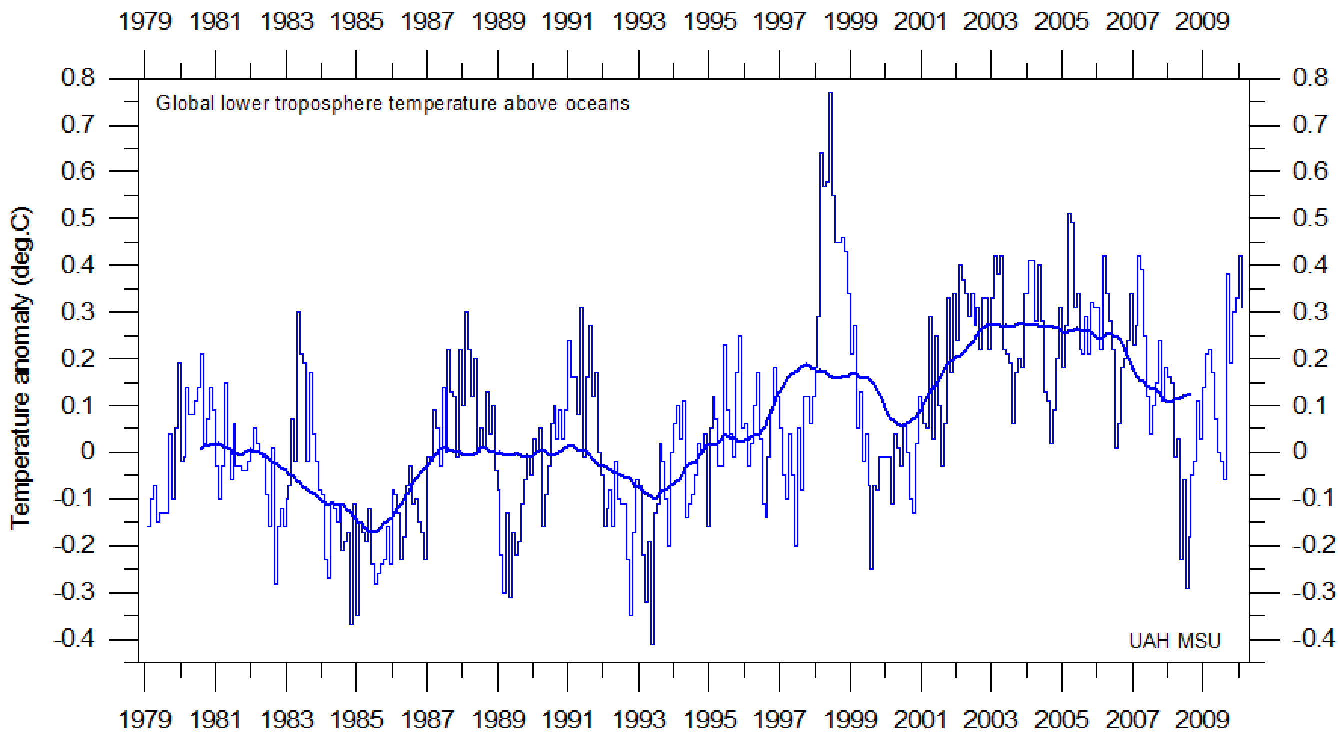


Global monthly average surface air temperature (thin line) since 1979 according to according to the Goddard Institute for Space Studies (GISS), at Columbia University, New York City, USA. The thick line is the simple running 37 month average.

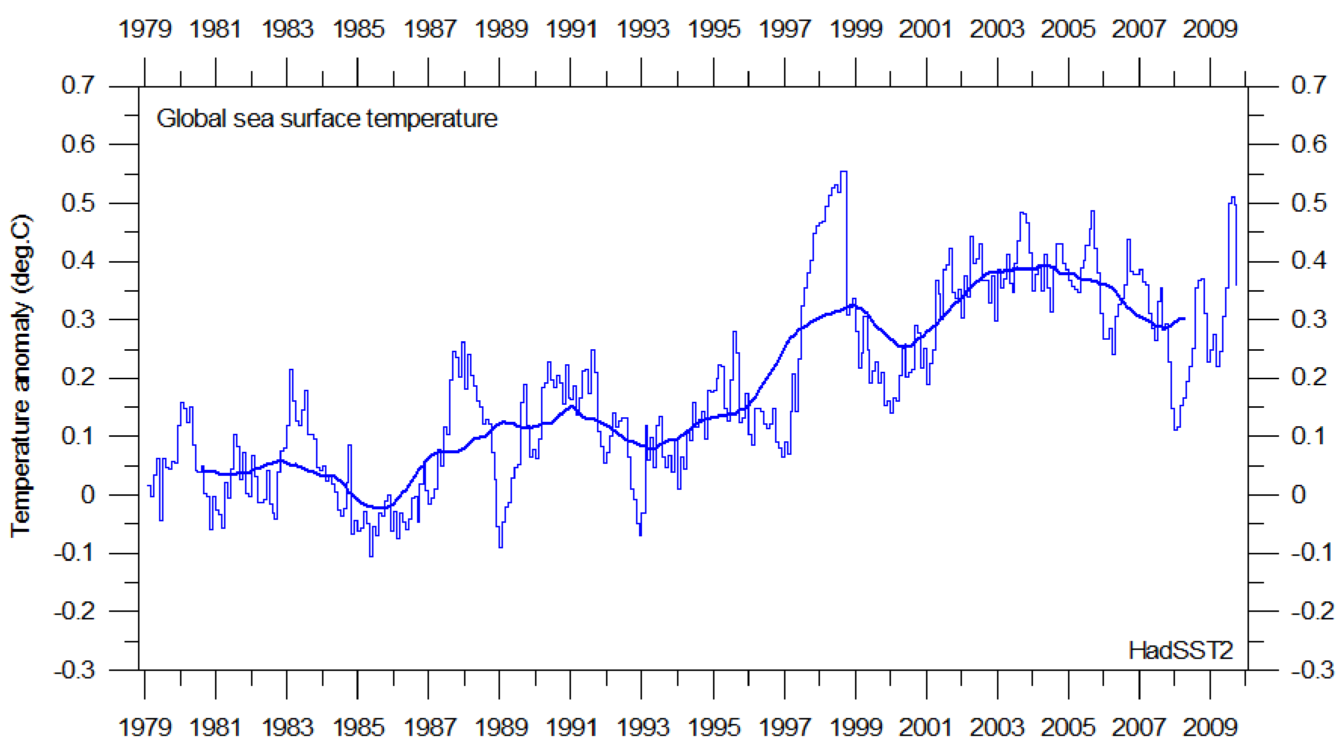


Global monthly average surface air temperature since 1979 according to according to the [National Climatic Data Center](#) (NCDC), USA. The thick line is the simple running 37 month average.

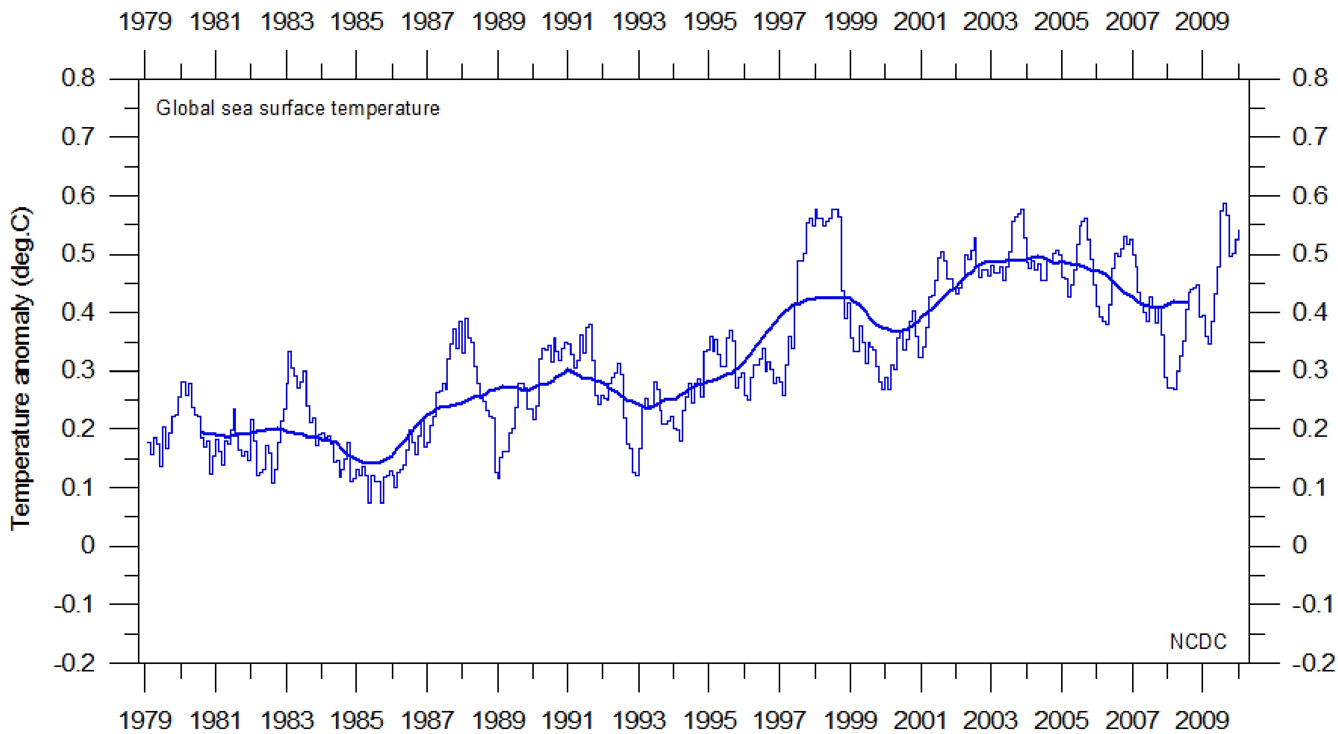
Global sea surface temperature, updated to December 2009



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.

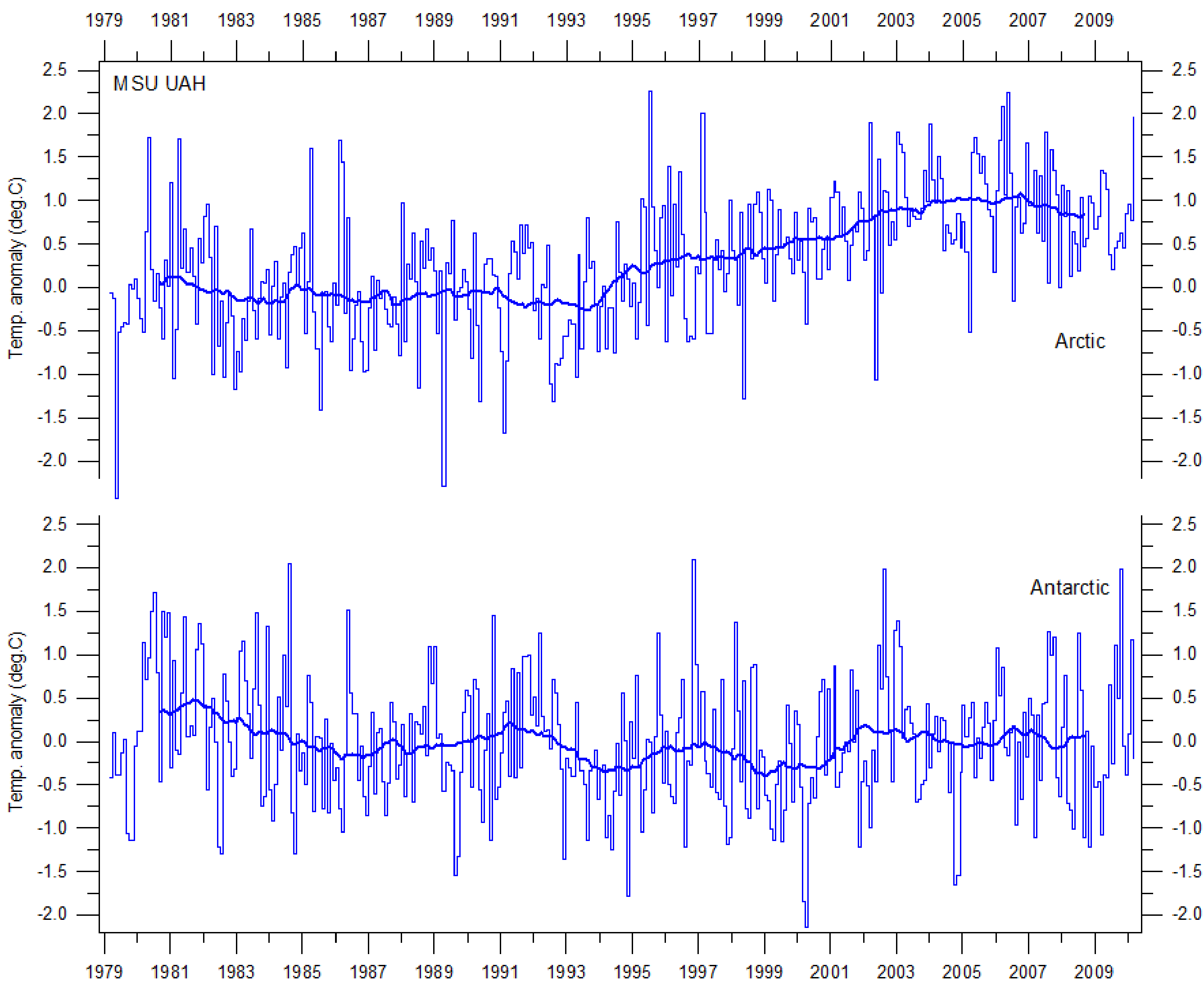


Global monthly average sea surface temperature since 1979 according to University of East Anglia's Climatic Research Unit (CRU), UK. Base period: 1961-1990. The thick line is the simple running 37 month average. Please note that this data series has not been updated beyond September 2009.



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 December 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

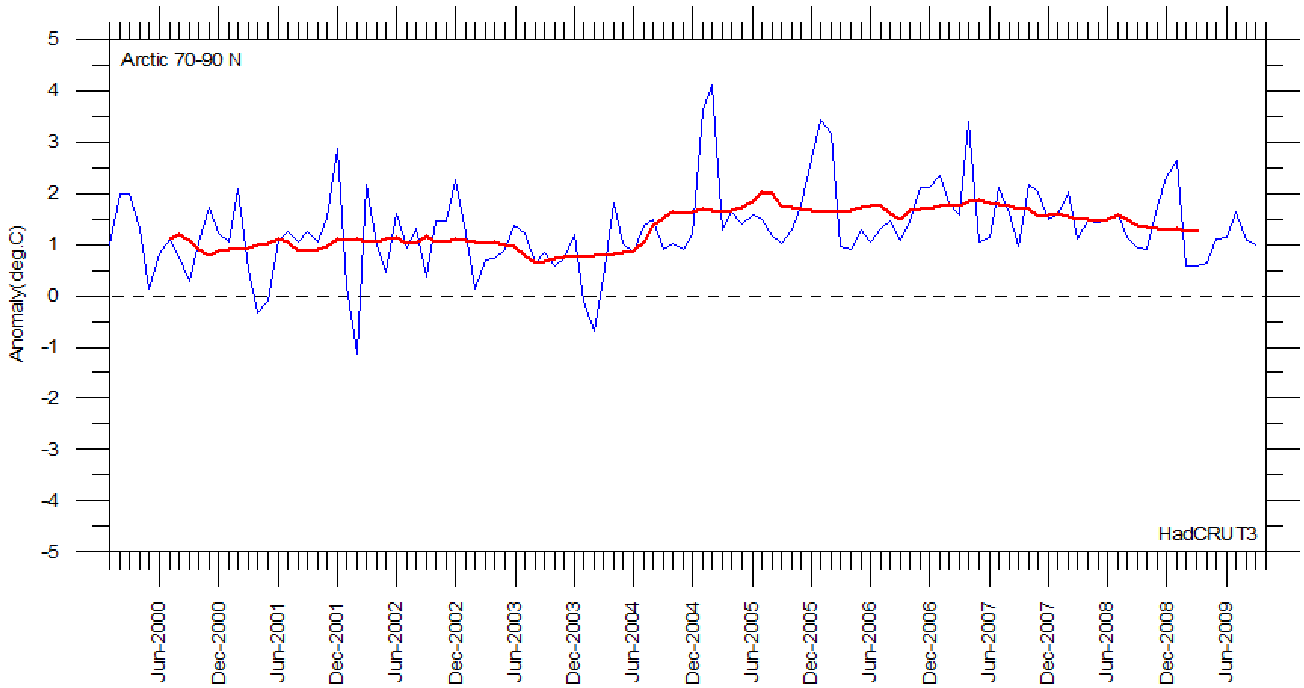


Diagram showing Arctic monthly surface air temperature anomaly 70-90°N since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's [Climatic Research Unit] ([CRU]), UK. Please note that this data series has not been updated beyond September 2009.

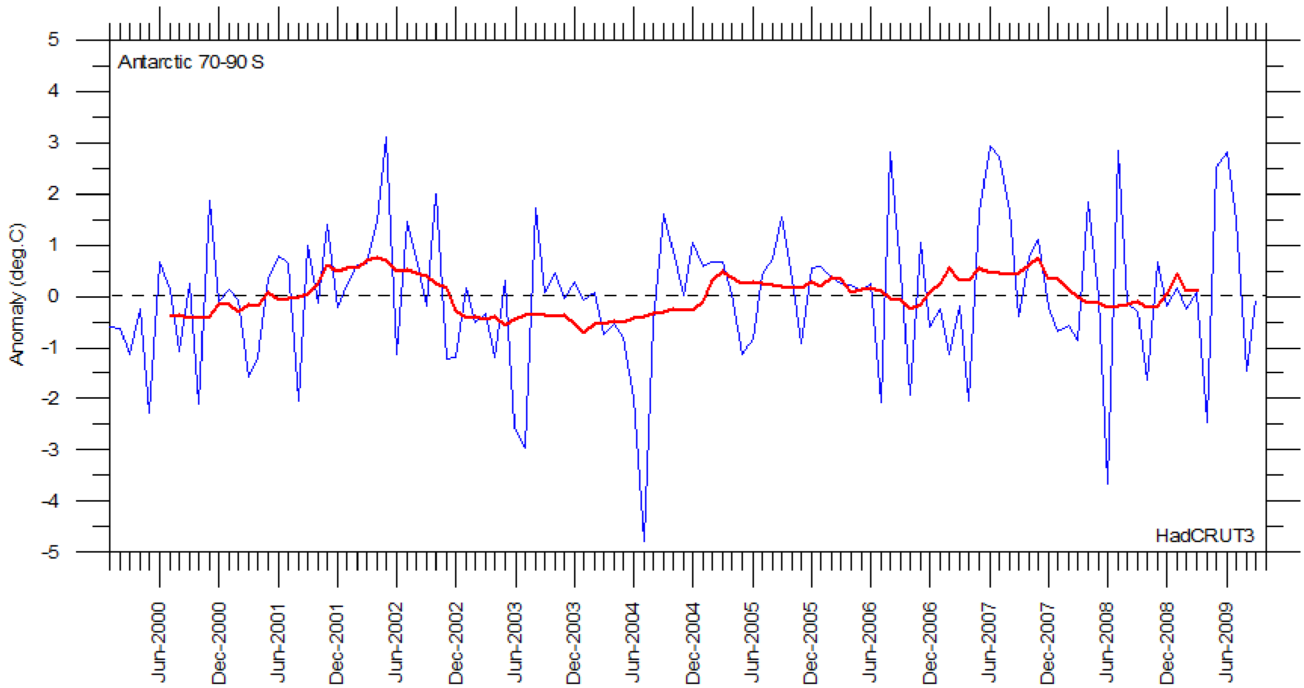


Diagram showing Antarctic monthly surface air temperature anomaly 70-90°S since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's [Climatic Research Unit] ([CRU]), UK. Please note that this data series has not been updated beyond September 2009.

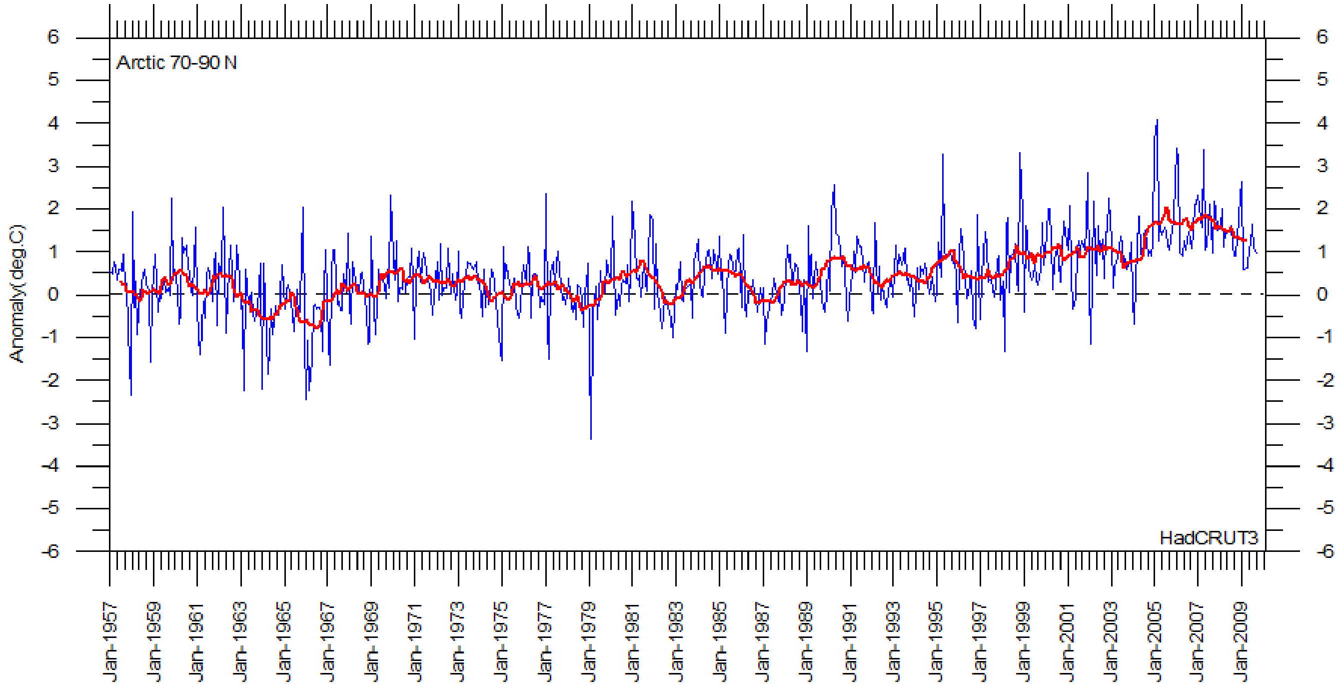


Diagram showing Arctic monthly surface air temperature anomaly 70-90^{o}N since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 has been chosen as starting year, to ensure easy comparison with the maximum length of the realistic Antarctic temperature record shown 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. Please note that this data series has not been updated beyond September 2009.

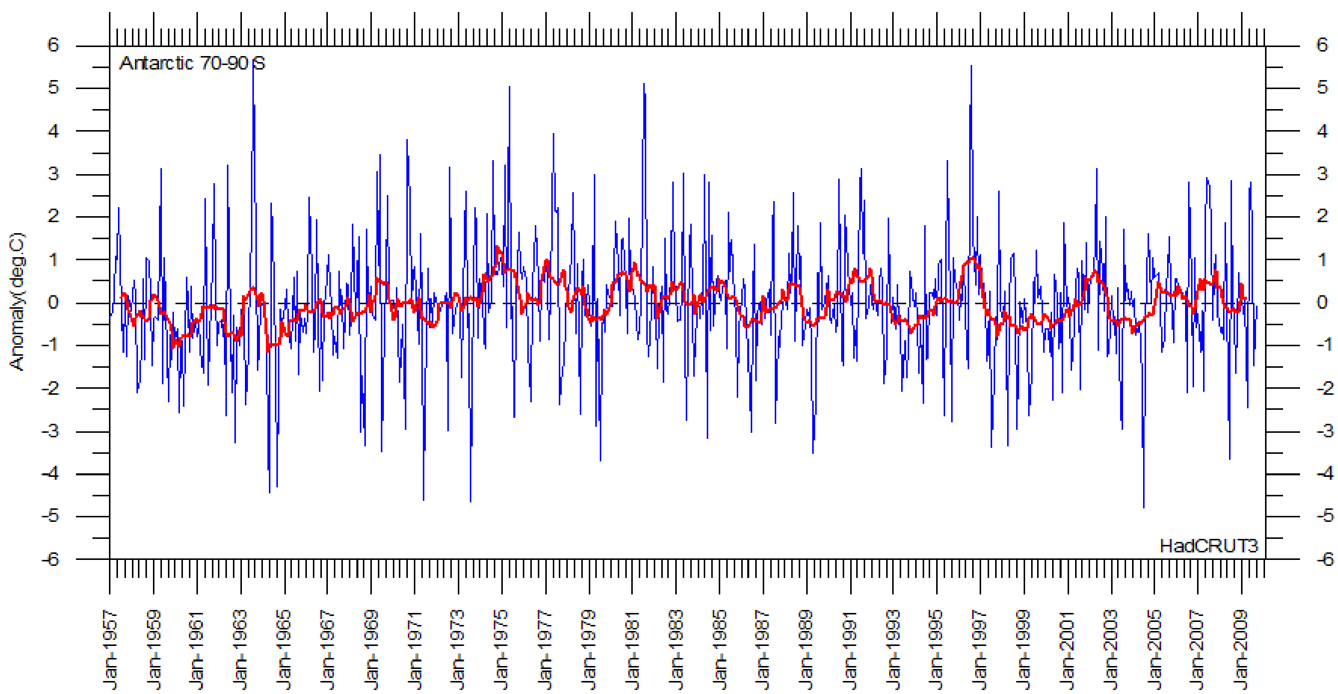


Diagram showing Antarctic monthly surface air temperature anomaly 70-90^{o}S since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 was an international geophysical year, and several meteorological stations were established in the Antarctic because of this. Before 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. Please note that this data series has not been updated beyond September 2009.

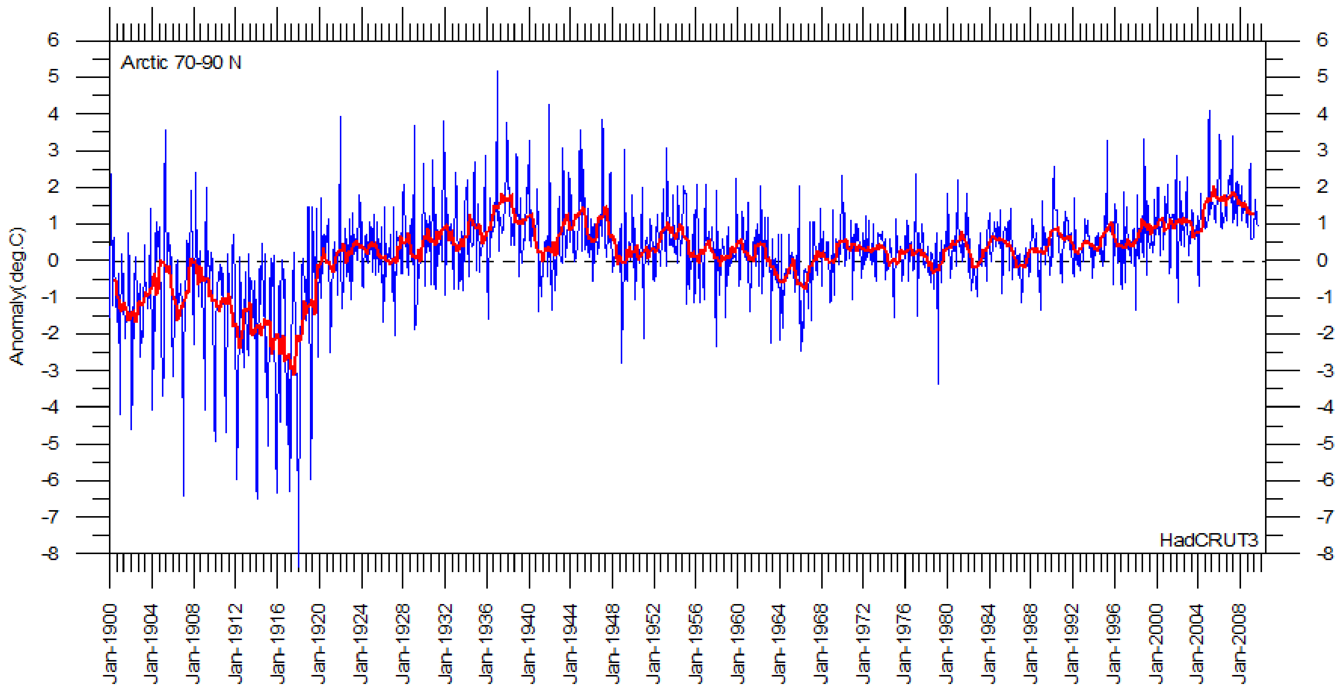
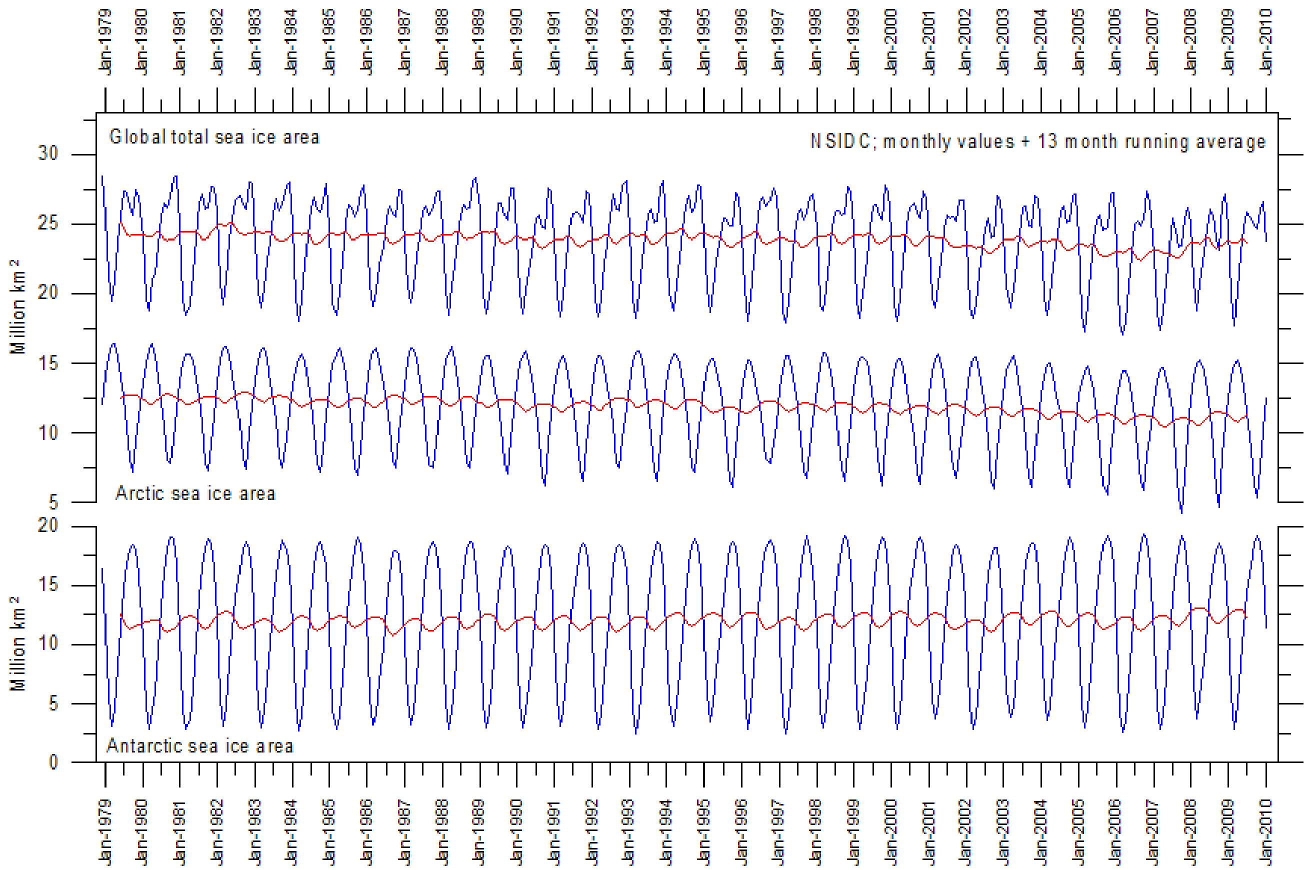


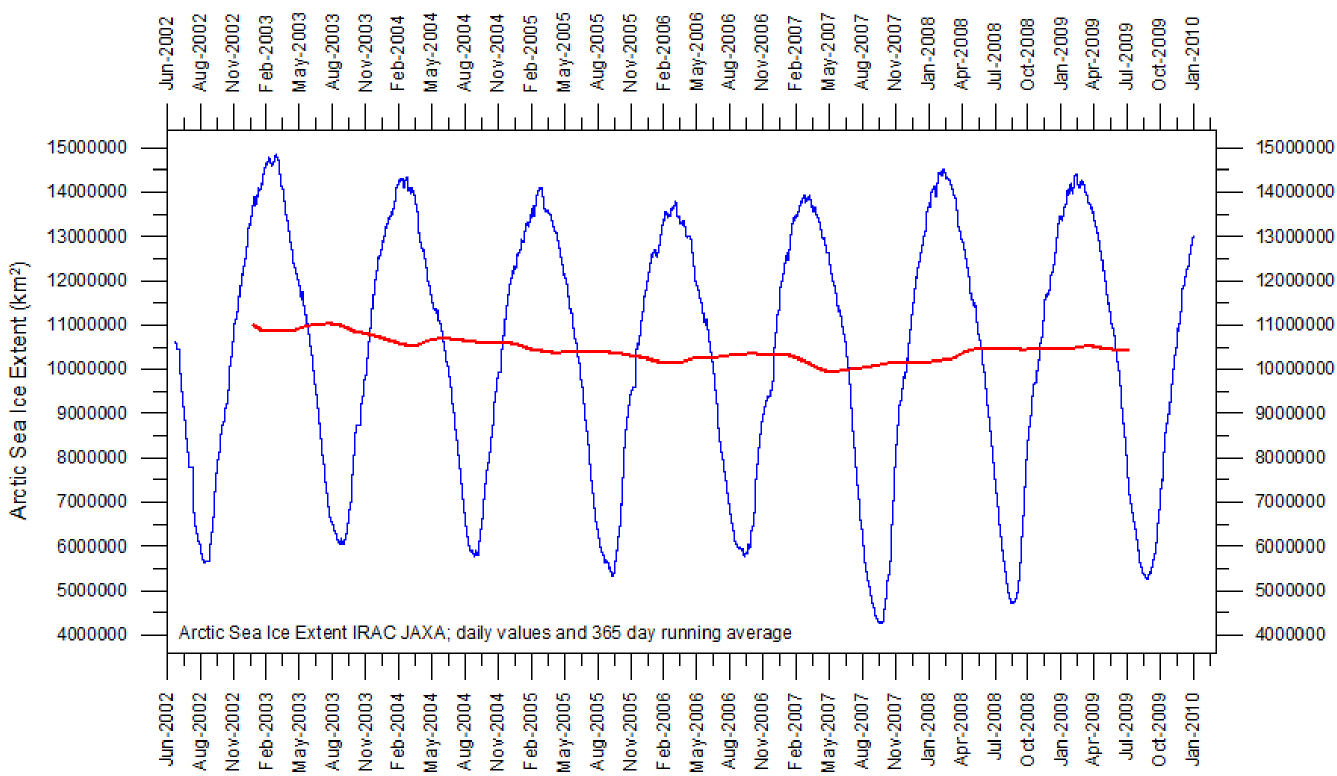
Diagram showing Arctic monthly surface air temperature anomaly 70-90^{o}N since January 1900, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. In general, the range of monthly 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. Please note that this data series has not been updated beyond September 2009.

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 December 2009

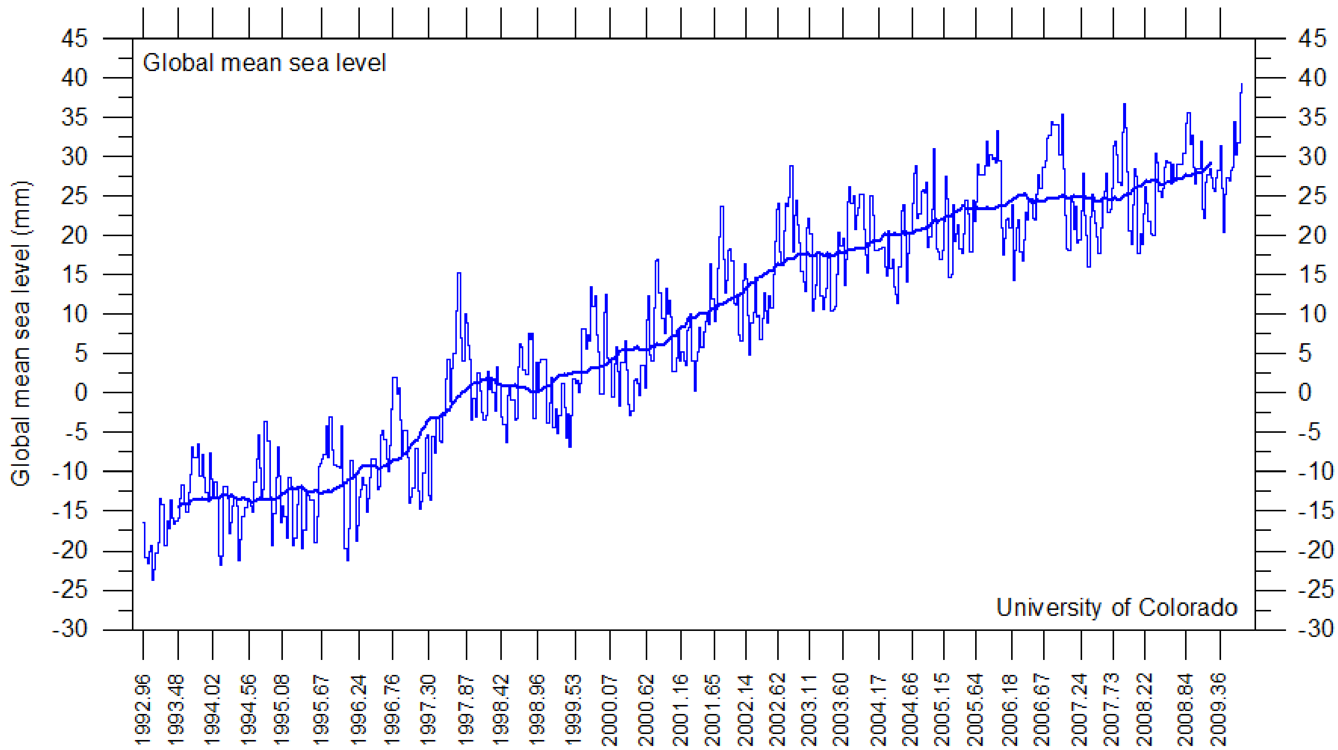


Graphs showing monthly Antarctic, Arctic and global sea ice extent since November 1978, according to the [National Snow and Ice data Center](#) (NSIDC).

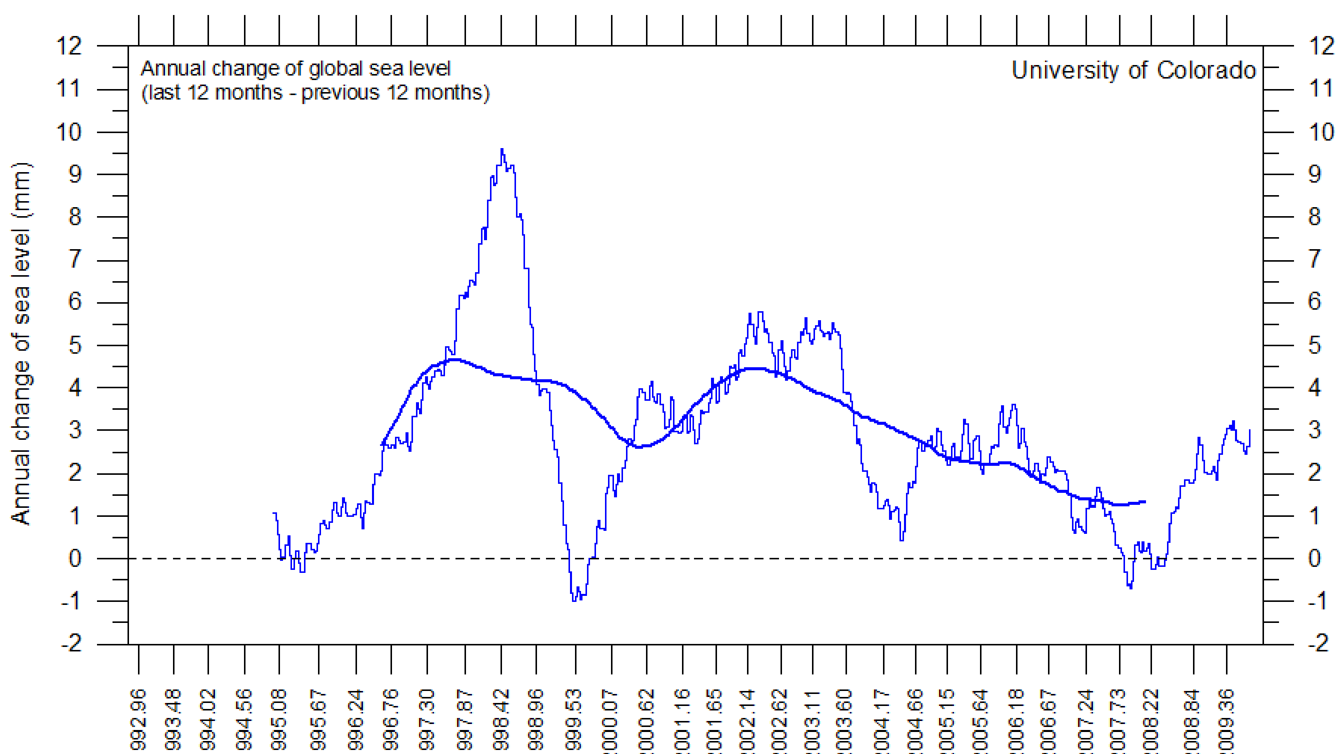


Graph showing daily Arctic sea ice extent since June 2002, to 19/01 2010, by courtesy of [Japan Aerospace Exploration Agency](#) (JAXA).

Global sea level, updated December 2009

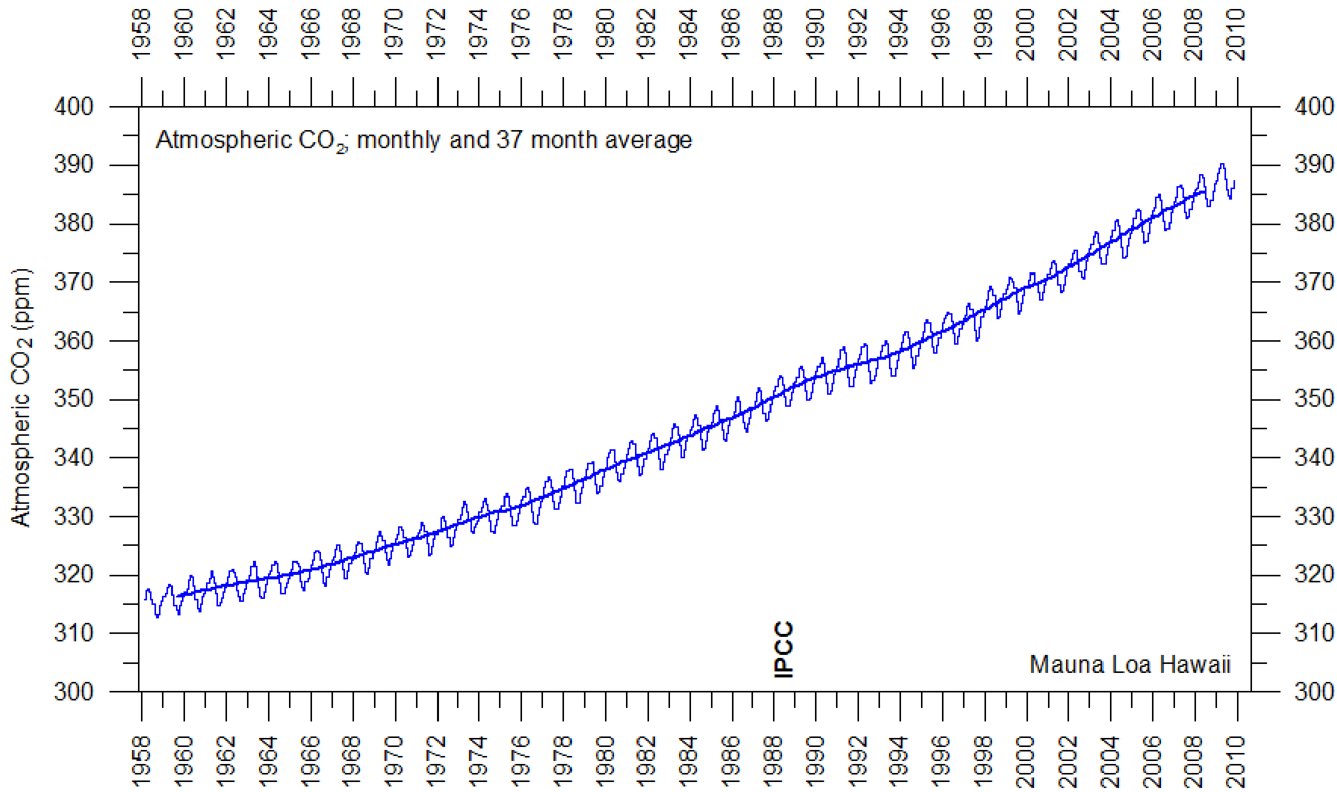


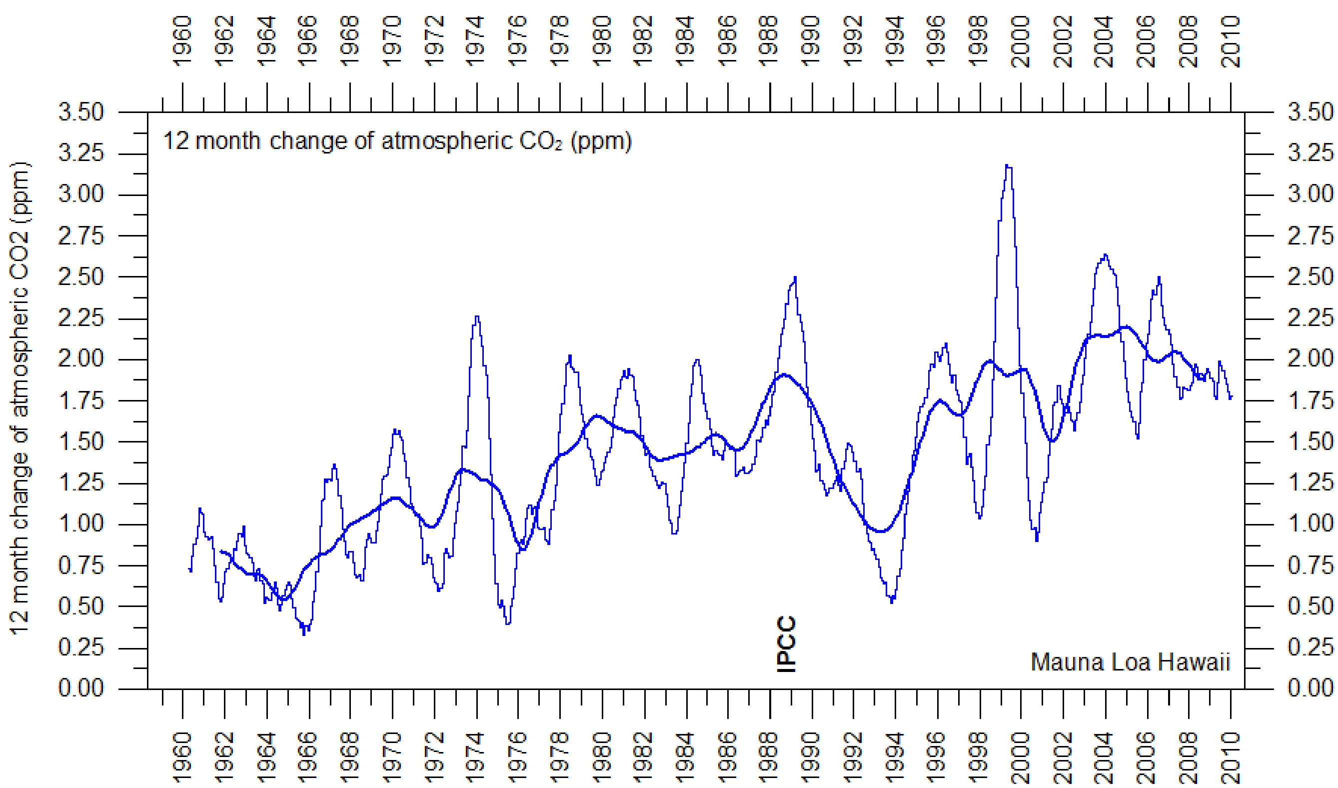
Globa lmonthly sea level since late 1992 according to the Colorado Center for Astrodynamics Research at [University of Colorado at Boulder](), USA. The thick line is the simple running 37 observation average, nearly corresponding to a running 3 yr average. Please note that this data series has not been updated beyond September 2009.



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. Please note that this data series has not been updated beyond September 2009.

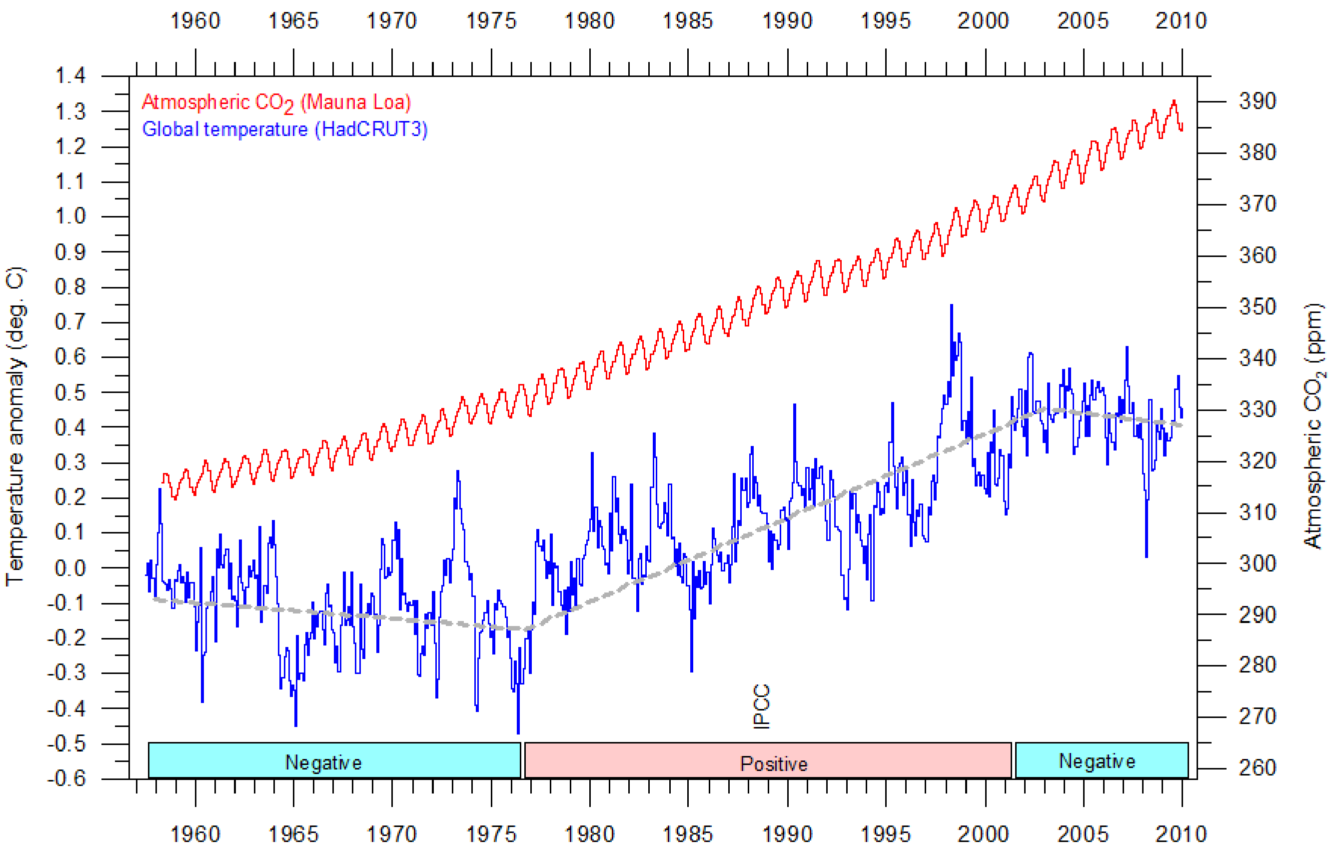
[Atmospheric CO_2, updated to December 2009]()

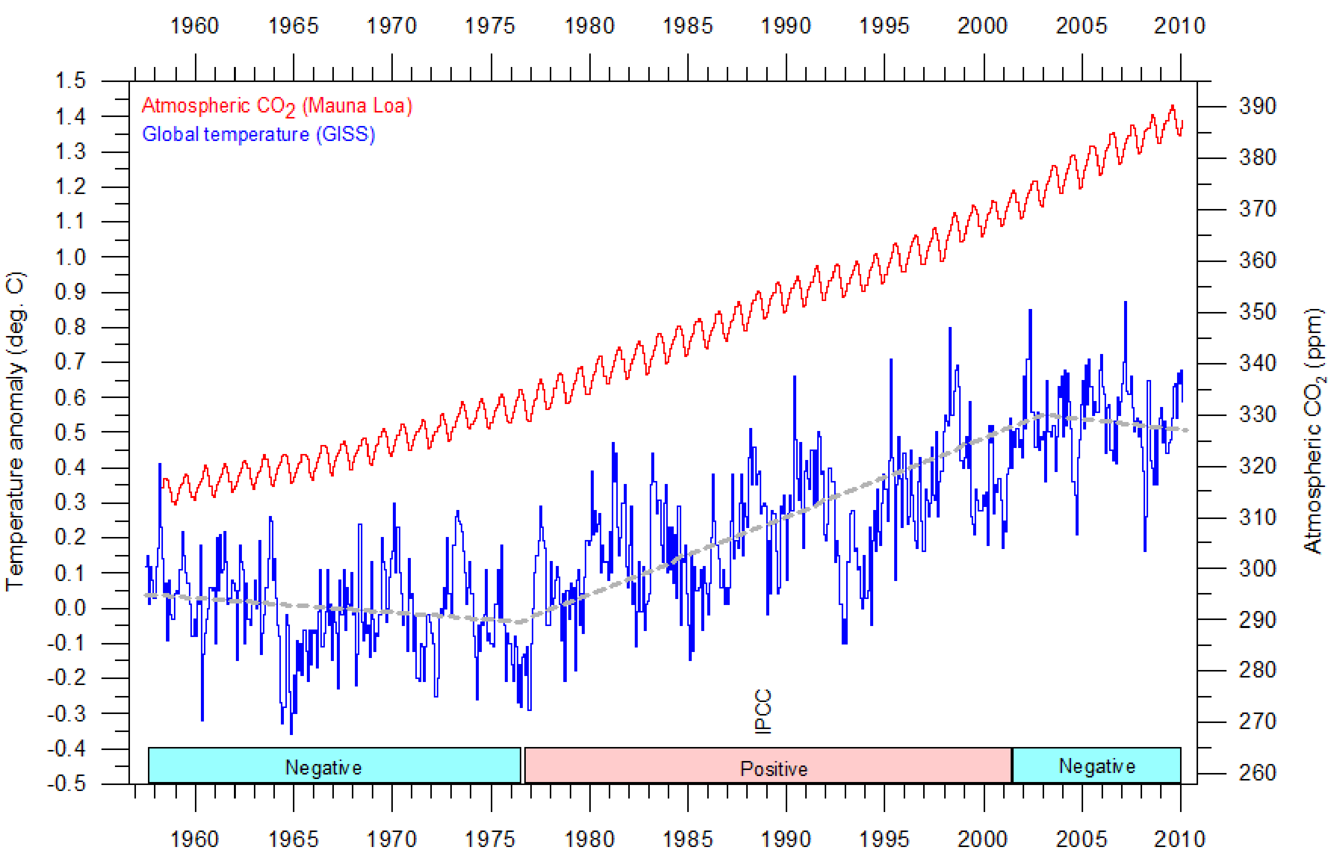


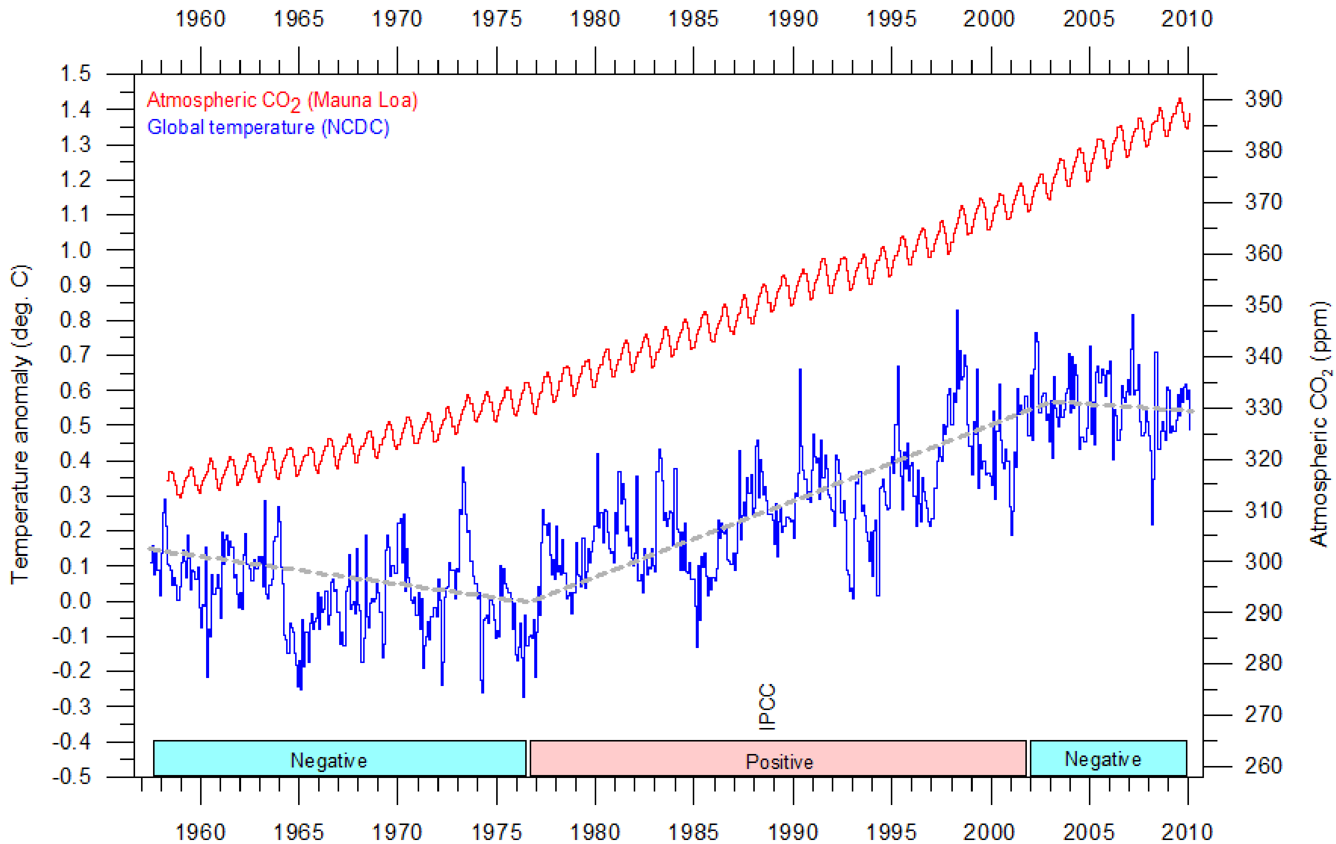


Monthly amount of atmospheric CO_2 (above) and annual growth rate (below; average last 12 months minus average preceding 12 months) of atmospheric CO_2 since 1959, according to data provided by the Mauna Loa Observatory, Hawaii, USA. The thick line is the simple running 37 observation average, nearly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

Global surface air temperature and atmospheric CO_2, updated to December 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. Please note that the HadCRUT3 data series has not been updated beyond November 2009.

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.

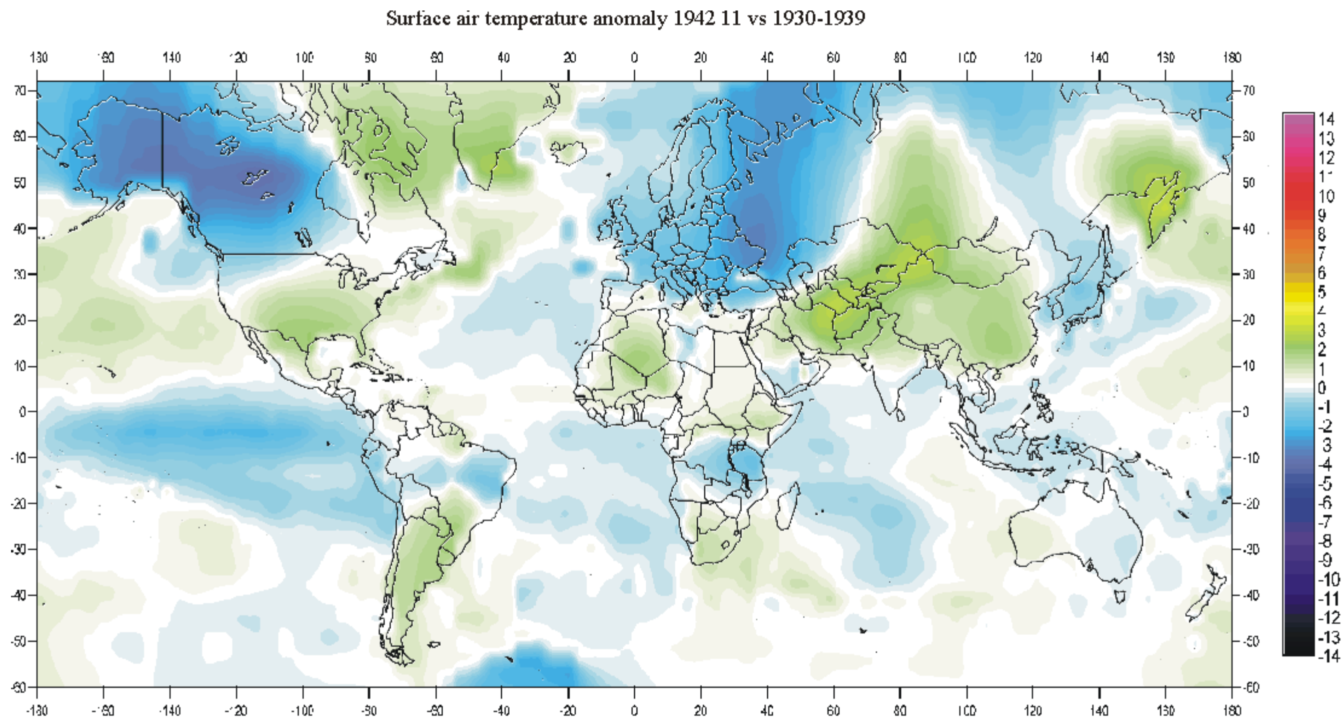
Climate and history; one example among many

1942-1943: Stalingrad, a turning point of the 2nd World War

Map showing the frontline in the Stalingrad area September-October 1942 (left). German soldiers in Stalingrad October 1942 (centre). Front cover of the German newspaper Volkischer Beobachter February 4, 1943, commenting on the surrender of the 6th German Army in Stalingrad (right).

After having reorganized following the setbacks in front of Moscow during the winter 1941-1942, the German Army 28th June 1942 launched Operation Blau (Blue) in southern Russia. Three German armies split the Russian front into fragments on either side of the city Kursk, and General Hoth's eleven Panzer divisions fanned out across hundreds of miles of open rolling corn and steppe grass, towards Voronezh and the Don. Two days later also the southernmost part of the front came alive, and Field Marshal Kleist took the 1st Panzer Army across the Donetz. Soviet forces offered little resistance in the vast empty steppes and retreated eastward in disarray. By the end of July, the Wehrmacht had pushed the Red Army back across the Don River, and was standing shortly west of Stalingrad. On 19th August 1942, the 6th German Army under the command of General Friedrich Paulus reached the outskirts of Stalingrad on the western river bank of Volga, and prepared to take the city by storm.

Russian resistance around Stalingrad was organised by General Zhukov, the man who a year before had organised the frantic Russian defence of Moscow and brought the German assault there to a halt in December 1941. The responsibility of the local defence in Stalingrad was given to another very able military commander, General Chuikov. The German advance into the city of Stalingrad slowed considerably down. In Stalingrad the German Army became fatally entangled in a web of street fighting, imposing on the whole army a static process of attrition which was severer than that suffered by its enemies, and to which it was less suited. By mid November, however, German Soldiers had penetrated all the way to the river bank of Volga at several places, and only small areas within Stalingrad were still held by Soviet forces.

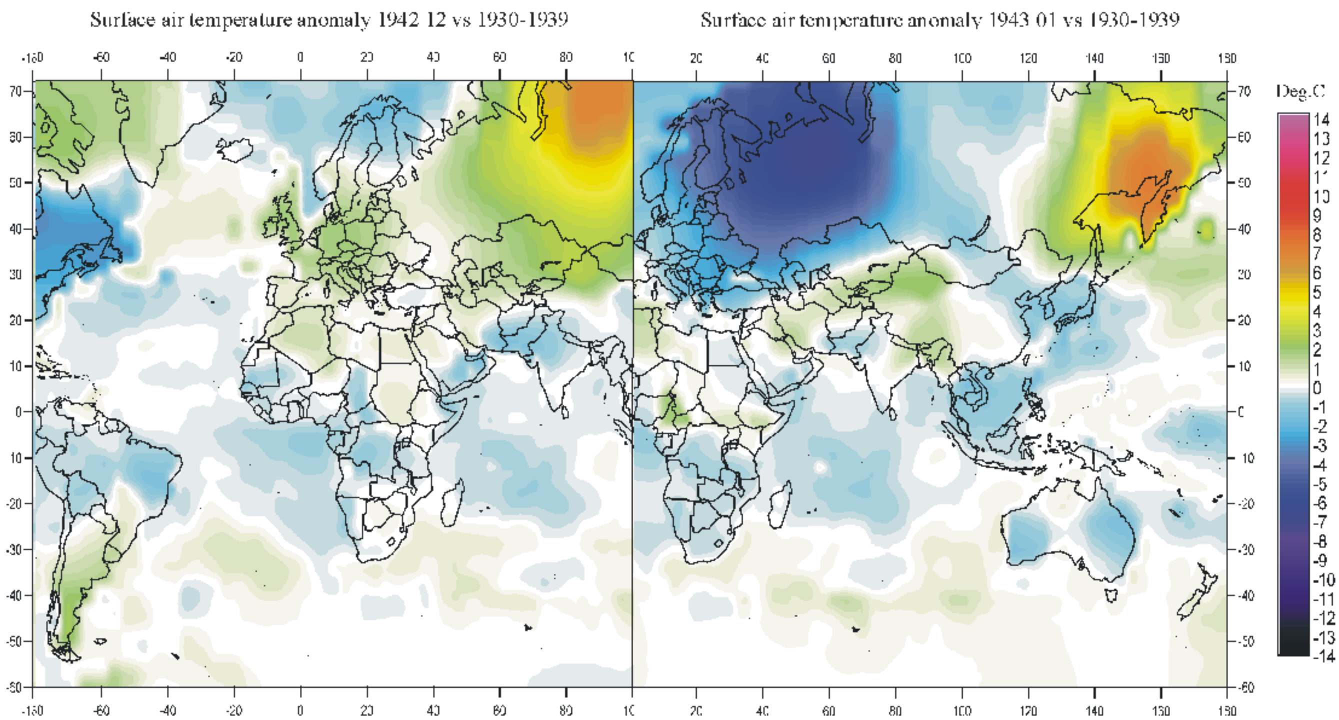


Map showing the deviation of the average surface air temperature November 1942, compared to average conditions 1930-1939. Russia and Europe was exposed to low temperatures compared to the meteorological planning horizon for the German invasion of USSR (1930-1939). Also Alaska and western Canada experienced low temperatures, while USA, eastern Canada and Greenland enjoyed above average temperatures. Data source: NASA Goddard Institute for Space Studies (GISS).

Air temperatures in Russia fell to well below average in November 1942, and most rivers froze up. Since early October General Georgy Zhukov had been planning an offensive on the southern front, with the strategic goal of by way of a pincer operation to isolate the 6th German Army in Stalingrad. The German northern flank was particularly vulnerable, since it was mainly defended by Italian, Hungarian, and Romanian units that suffered from inferior training, equipment, and morale when compared with their German counterparts. This weakness was known and exploited by the Red Army, who preferred to face off against non-German troops whenever it was possible. On the German side, the big river Don was thought to provide a safe protection for their allied troops against crossing of heavy tanks. Because of the low temperatures, however, the ice on the Don was so thick that when the Russian Operation Uranus was launched 19 November, the Russian tanks could cross the river at will. At the same time a thick frost fog covered the battlefield during the first day of the attack, heightening the general panic and confusion of the luckless Italians and Romanians. The Luftwaffe was not up to its previous strength, as substantial units 8 November were removed to counter the American landings in North Africa. Under these circumstances, the Italian and Romanian divisions did not stand a chance of bringing the Soviet offensive to a standstill.

On November 20, a second Soviet offensive was launched to the south of Stalingrad, against points held by the Romanian IV Corps. The Romanian forces, made up primarily of infantry, collapsed almost immediately. The Red Army forces raced west and northwest in a pincer movement. November 23, 1942, the tanks of the Russian 26th Armoured Corps advancing from the northwest captured the big bridge at Kalach west of Stalingrad and joined the Russian infantry that had driven up from the southeast, sealing the ring around Stalingrad. About 260,000 German military personnel were trapped in the pocket. By this they achieved something greater even than the spectacular victory which was promised by the isolation of the German 6th Army. This brilliant stroke marked the complete and final shift in the strategic balance between Soviet and Germany during the 2nd World War.

Instead of ordering an immediate breakout and retreat from Stalingrad, Hitler ordered the 6th Army to remain at Volga. Reichmarshal Hermann Göring assured that the German Luftwaffe would be able to supply the besieged city from the air. The daily needs of the 6th Army totalled about 700 tons (Alexander 2000). Though Göring's staff apparently doubted the ability of the Luftwaffe to do anything like this after the heavy losses sustained in the summer and autumn 1942, their chief assured Hitler that this was entirely feasible. This would allow the Germans in the city to fight on while a relief force was assembled. Next spring these forces would re-establish the connection over land with the 6th Army in Stalingrad. Colonel Fritz Morzik, Luftwaffe air transport chief, said that in the best of circumstances he could fly in 350 tons, instead of the 700 tons required. The entire Luftwaffe, he pointed out, possessed only 750 Junckers Ju 52 cargo aircraft, and there was enormous demand for them elsewhere (Alexander 2000).



Map showing the deviation of the average surface air temperature December 1942 and January 1943, compared to average conditions 1930-1939. In December 1942 Europe, Russia and Siberia enjoyed above average temperatures. In January 1943, however, surface air temperatures in Europe and Russia decreases to well below average temperatures. Only eastern Siberia still enjoyed above average temperatures. Data source: NASA Goddard Institute for Space Studies (GISS).

The German airlift operation rapidly became a disaster. First of all, suitable airplanes for transporting the huge amount of daily supplies were only at hand in a limited number. The planned airlift operation required a force of 225 serviceable Ju 52 transports aircrafts at any time in the Stalingrad region. In fact, there was never more than 80 Junkers operational at a time (Clarck 1995). Instead, a number of Heinkel 111 bombers were ordered to participate in the supply operation. These airplanes, however, were constructed for carrying bombs, not spacious loads of food, clothing and other equipment. The transport of fuels required special containers, which was not at hand, either.

To add to the difficulties, December 1942 in Russia turned out to be rather mild (see diagram above) due to many cyclones travelling across southern Russia. From late November appalling weather conditions spread over the whole of southern Russia with low ceiling, strong winds and snow blizzards. The extensive cloud cover made it difficult for the Soviet air force to find and shoot down the German transport planes. On the other hand, the weather made start- and especially landing conditions almost impossible for the German airplanes. Often landings had to be cancelled because of whiteout conditions. The Heinkels, with their weaker undercarriage, often had to confine their mission to making low-level drops. Many of the Junkers broke up on landing or were destroyed by Russian artillery fire. Instead of the 550 tons promised, the air force supplied fewer than 100 ton a day, and considerably below this by the end of December and during January. The largest amount ever brought into Stalingrad in one twenty-four-hour period was 180 tons, on 14th December. After Christmas the daily average fell to about 60 tons.

Soviet forces set up a well-organised air blockade around Stalingrad, while their ground forces fought to capture the remaining German airfields. In less than two months the Luftwaffe lost 488 transport aircrafts and close to 1,000 highly experienced bomber crew personnel (Overy 2006), while German forces in Stalingrad ran short of food, ammunition and medical supplies.

German Field Marshal Erich von Manstein planned a bold overland rescue, Operation Wintergewitter. A relatively small group of German Panzer divisions gathered south of Stalingrad under the command of General Herman Hoth. On 23 December 1942 his mobile forces had managed to push forward to a position only 60 km from Stalingrad. At this time, however, the critical supply situation for the 6th Army made Hitler to decide against any attempt of breaking out towards Hoth's Panzer divisions. General Paulus was not the leader to disobey such orders. A renewed Soviet offensive further west made any further German rescue attempts impossible.

Almost at the same time as Operation Wintergewitter was given up, air temperatures began to fall rapidly. The Volga froze solid, allowing the Red Army to supply their forces in Stalingrad more easily. The trapped Germans rapidly ran out of heating fuel and medical supplies, and thousands started dying of frostbite, malnutrition and disease.

January 1943 became very cold (see diagram above), with air temperatures sinking to -44^{o}C in the Stalingrad area. Conditions for the surrounded German soldiers rapidly deteriorated even more. By 17 January the German occupied pocket was less than half the original size. On 22 January the Soviet forces were able to penetrate into the western part of the city itself, where one-third of the original German force dug in. 30 January 1943 the bulk of the remaining German forces with just promoted Field Marshal Paulus surrendered. In the northern part of Stalingrad small remaining German forces refused to accept the surrender and battled on until 2 February where they had nothing left with which to fight. According to the German documentary film Stalingrad, over 11,000 German and Axis soldiers refused to lay down their arms at the official surrender. These forces continued to resist until early March 1943, hiding in cellars and sewers of the city. By March, what remained of these forces were only small pockets of resistance that finally surrendered.

The Battle of Stalingrad was finally at an end, and 91,000 German soldiers became prisoners of war. Only 5,000 survived their captivity in labour camps and returned home. The last handful of survivors was repatriated to Germany in 1955.

References

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

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

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