Climate4you update March 2009

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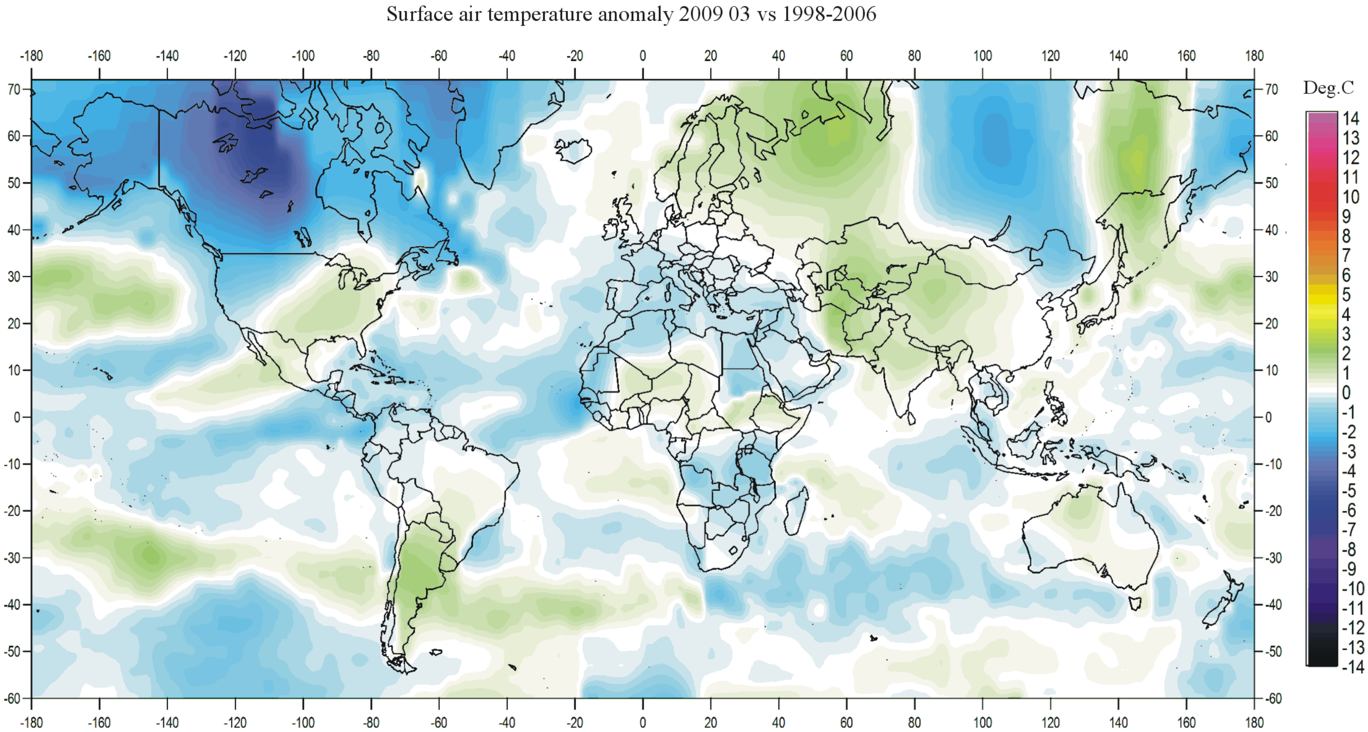
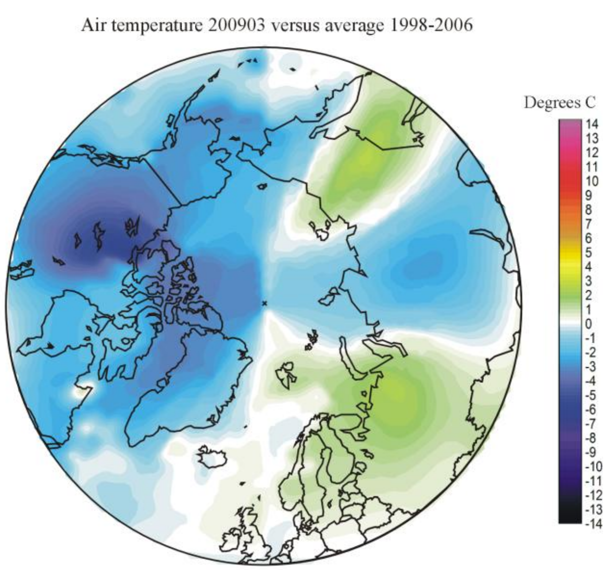
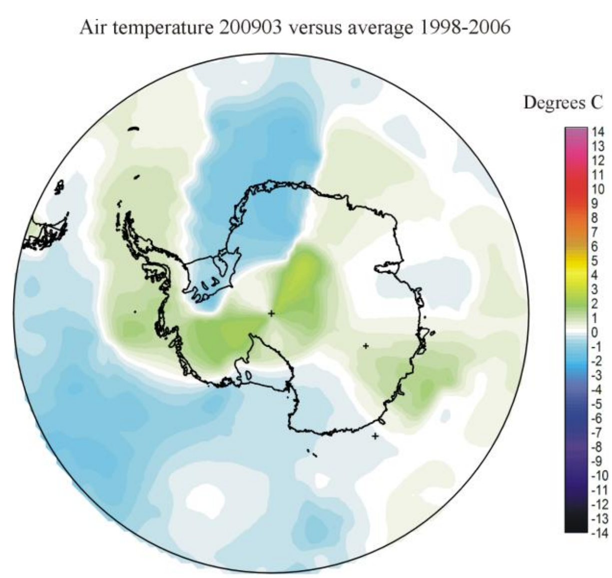
March 2009 global surface air temperature overview

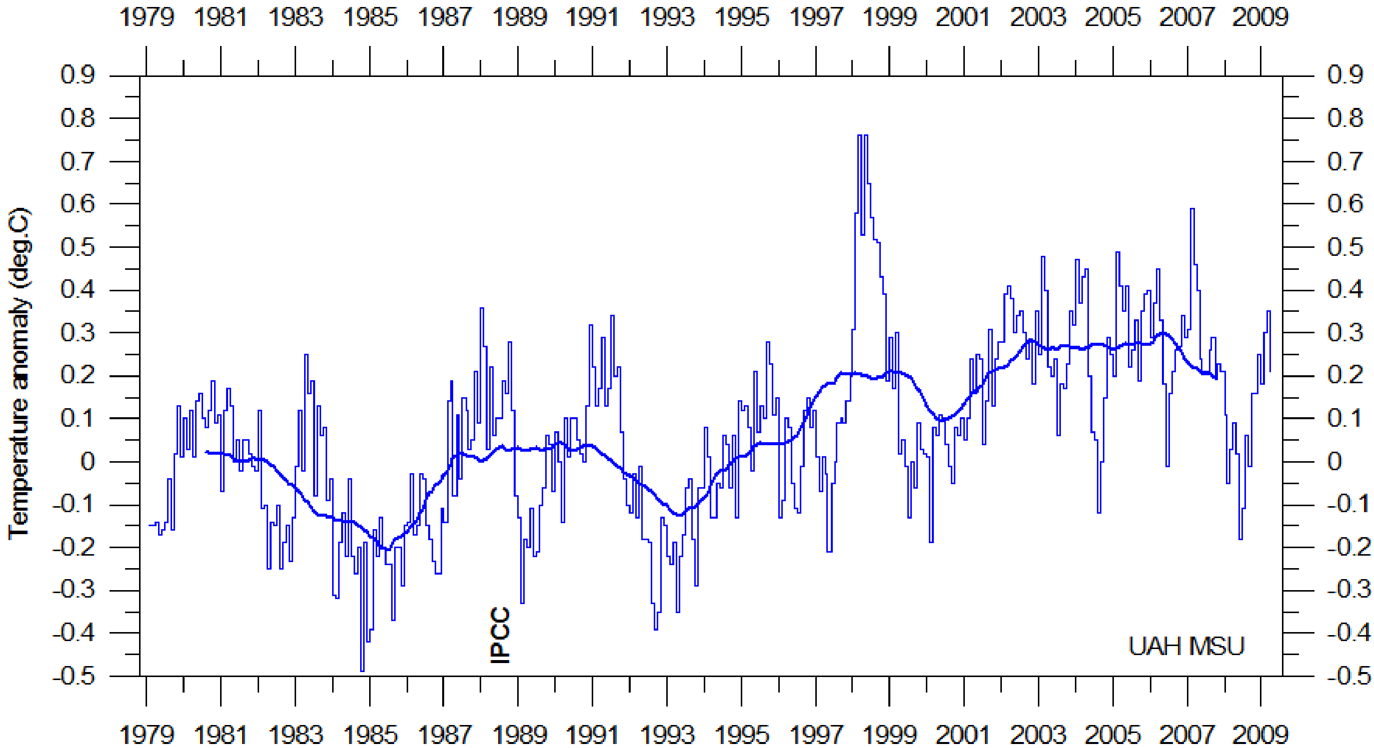




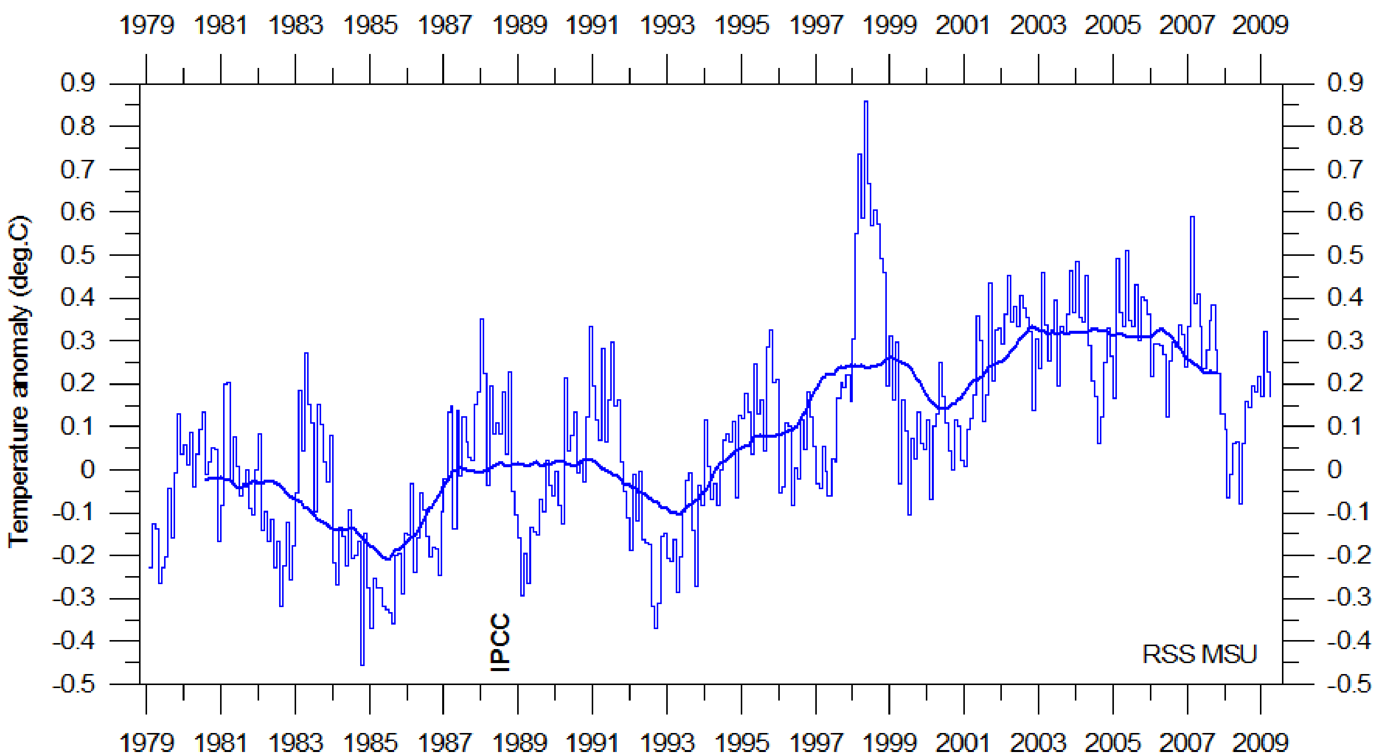


March 2009 surface air temperature compared to the average for March 1998-2006. Green.yellow-red colours indicate areas with higher temperature than the 1998-2006 average, while blue colours indicate lower than average temperatures. Data source: Goddard Institute for Space Studies (GISS)

Lower troposphere temperature from satellites, updated to March 2009

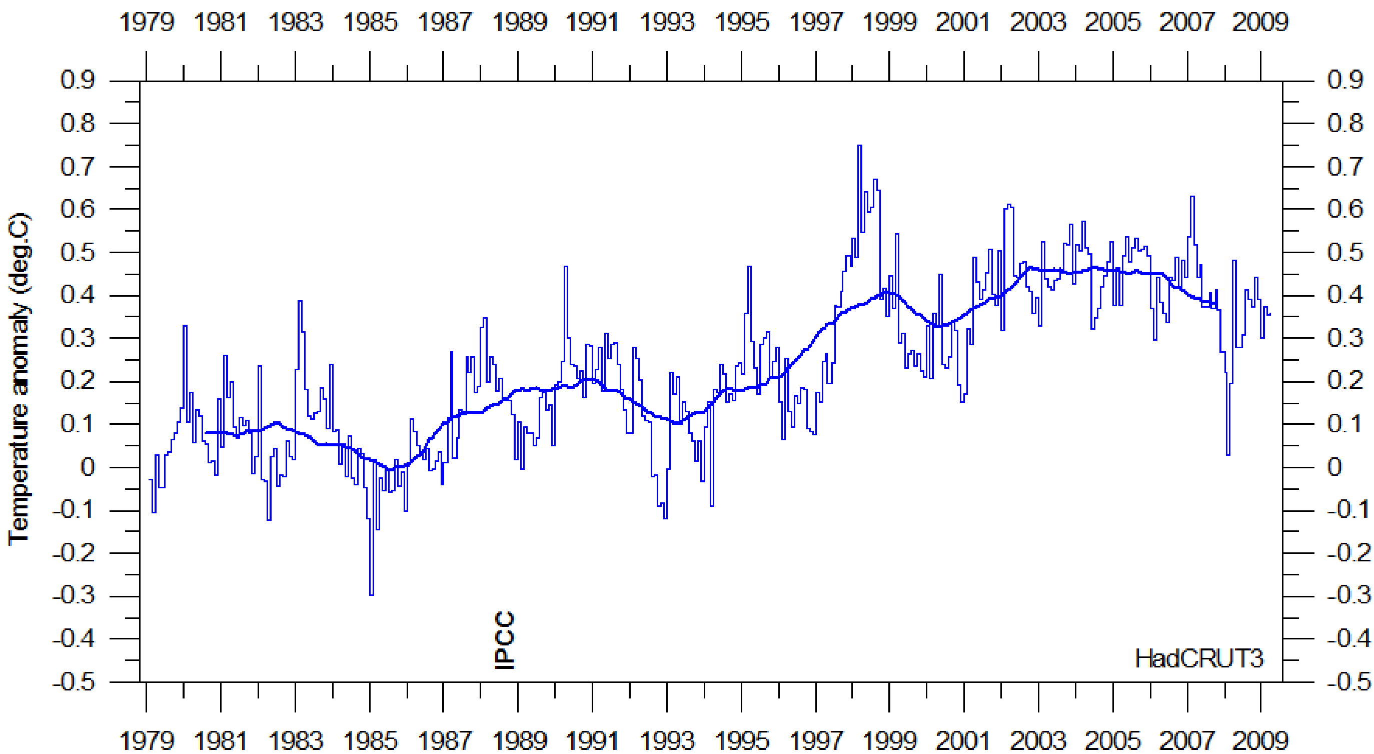


Global monthly average lower troposphere temperature (thin line) since 1979 according to University of Alabama at Huntsville, USA. The thick line is the simple running 37 month average.

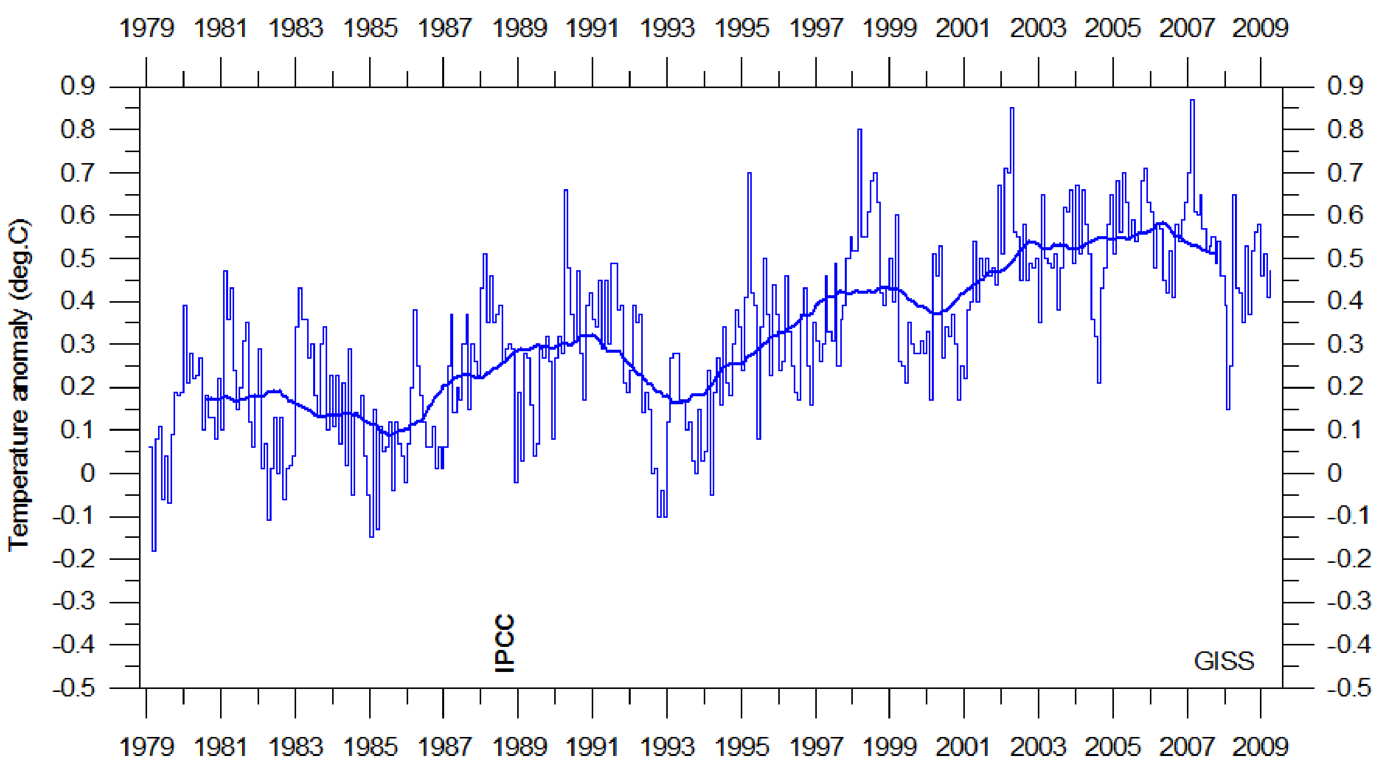


Global monthly average lower troposphere temperature (thin line) since 1979 according to according to Remote Sensing Systems (RSS), USA. The thick line is the simple running 37 month average.

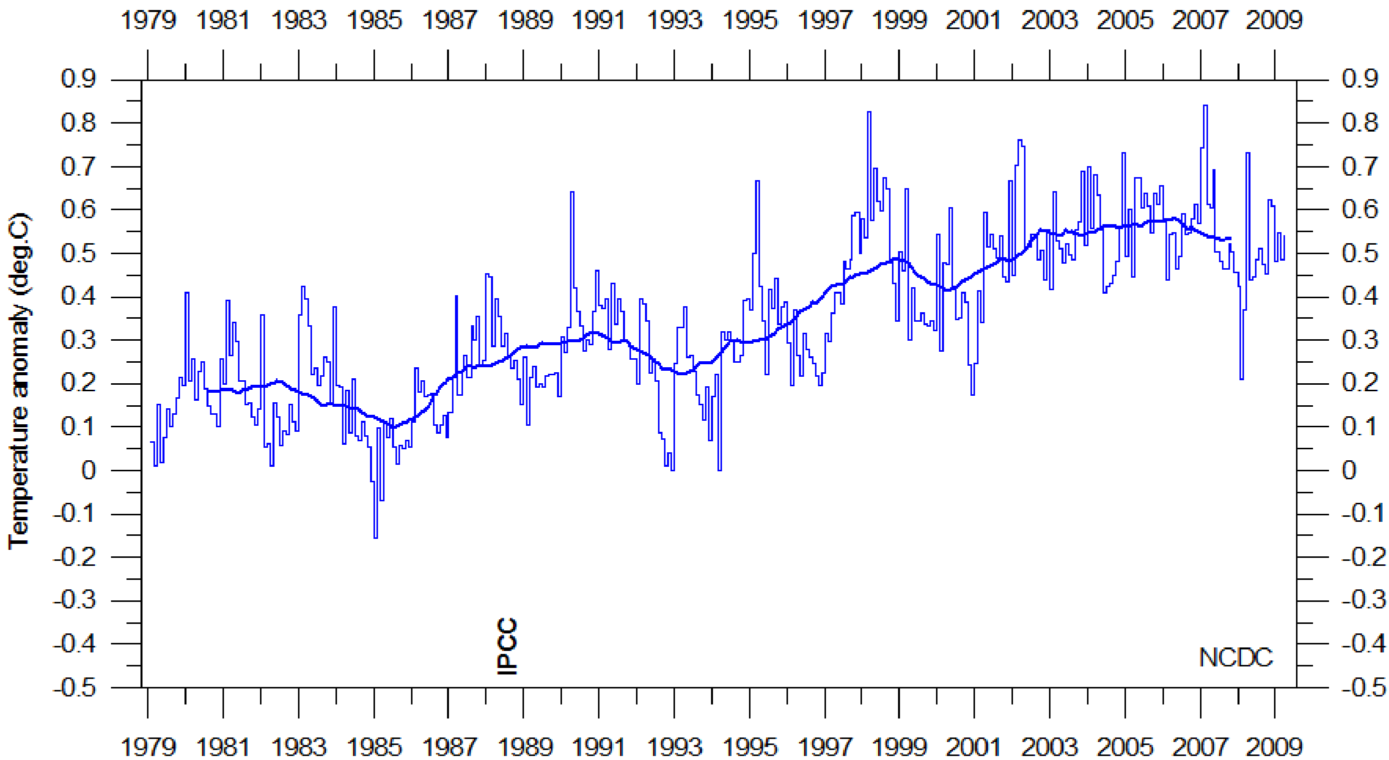
[Global surface air temperature, updated to March 2009]



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.

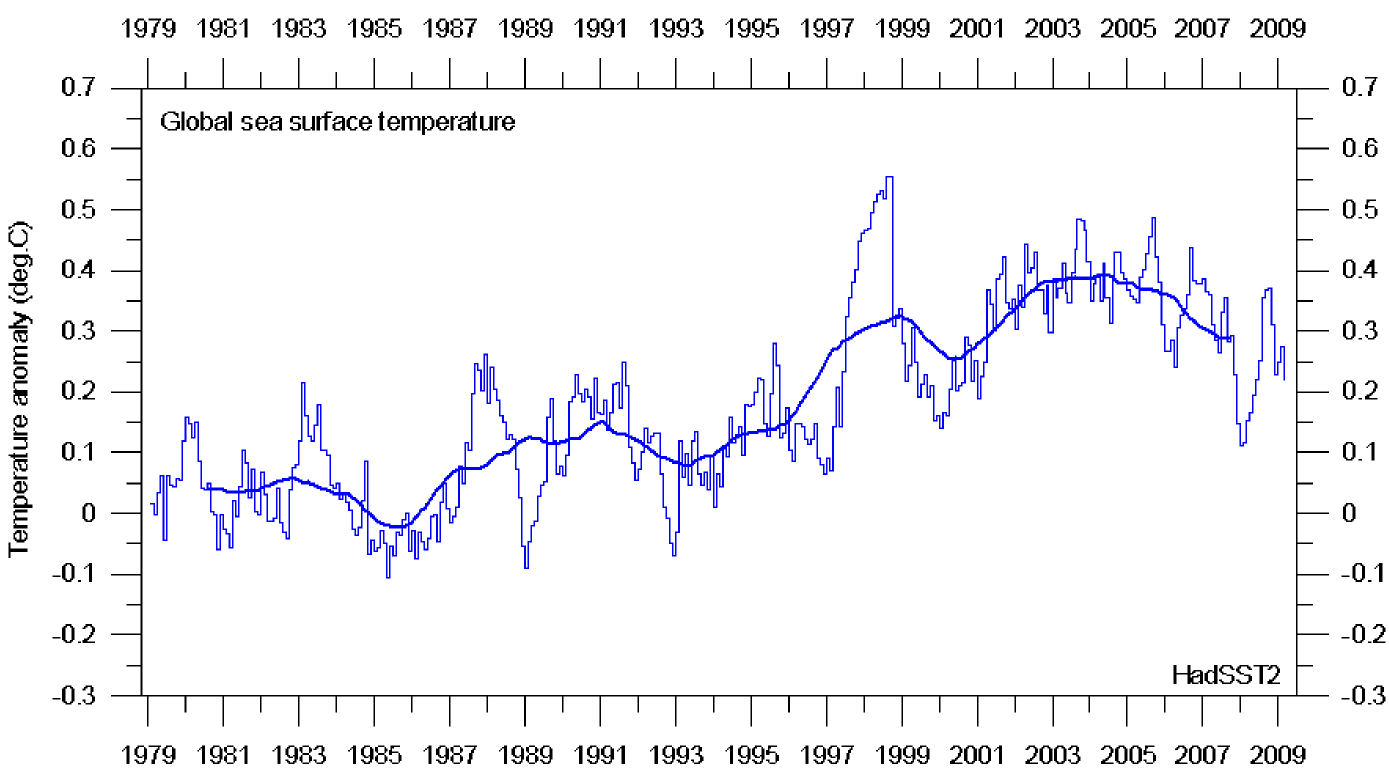


Global monthly average surface air temperature (thin line) since 1979 according to according to the [Goddard Institute for Space Studies] (GISS), at Columbia University, New York City, USA. The thick line is the simple running 37 month average.



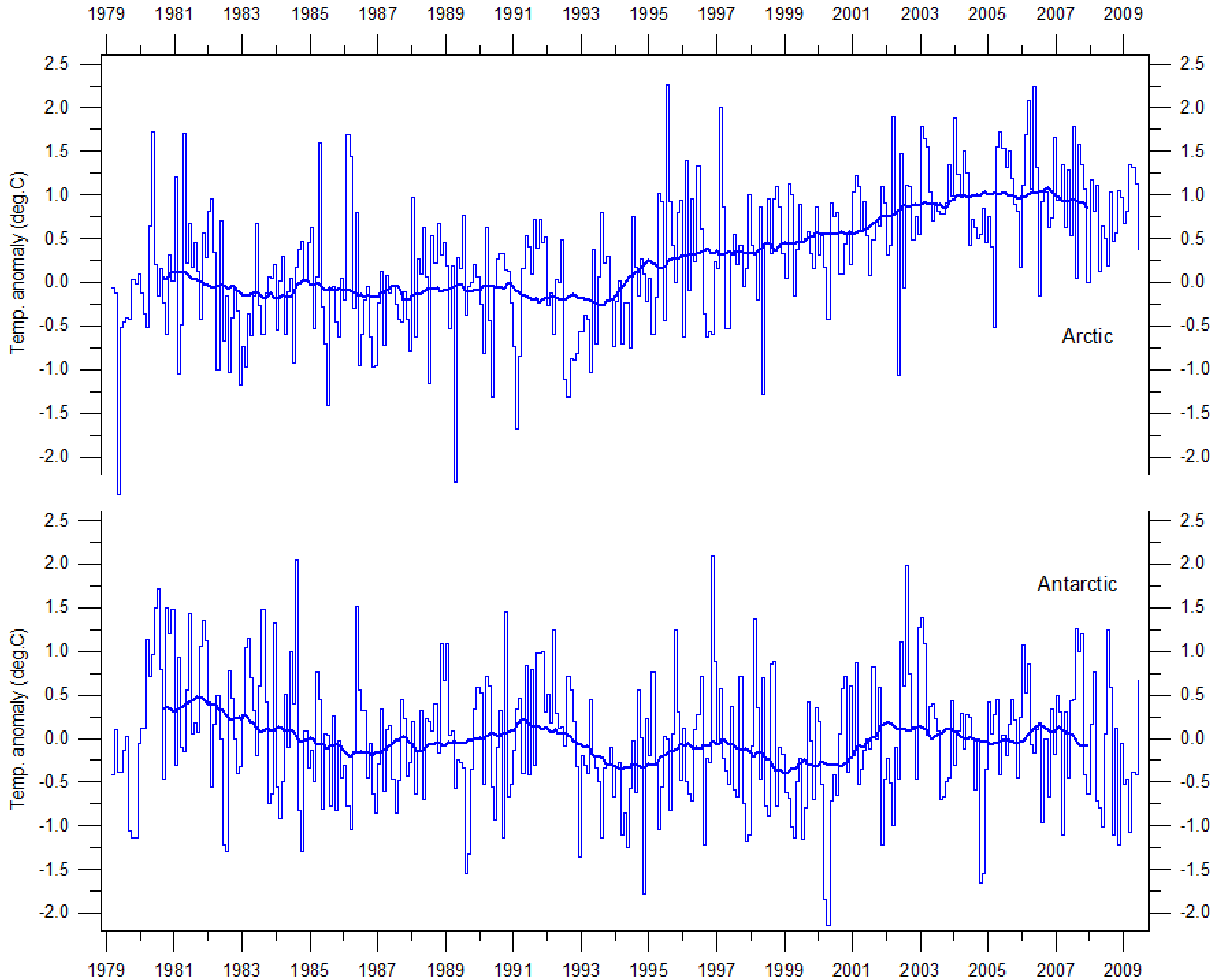
Global monthly average surface air temperature since 1979 according to according to the National Climatic Data Center (NCDC), USA. The thick line is the simple running 37 month average.

Global sea surface temperature, updated to March 2009



Global monthly average sea surface temperature since 1979 according to University of East Anglia's Climatic Research Unit (CRU), UK. The thick line is the simple running 37 month average.

Arctic and Antarctic lower troposphere temperature, updated to March 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 March 2009

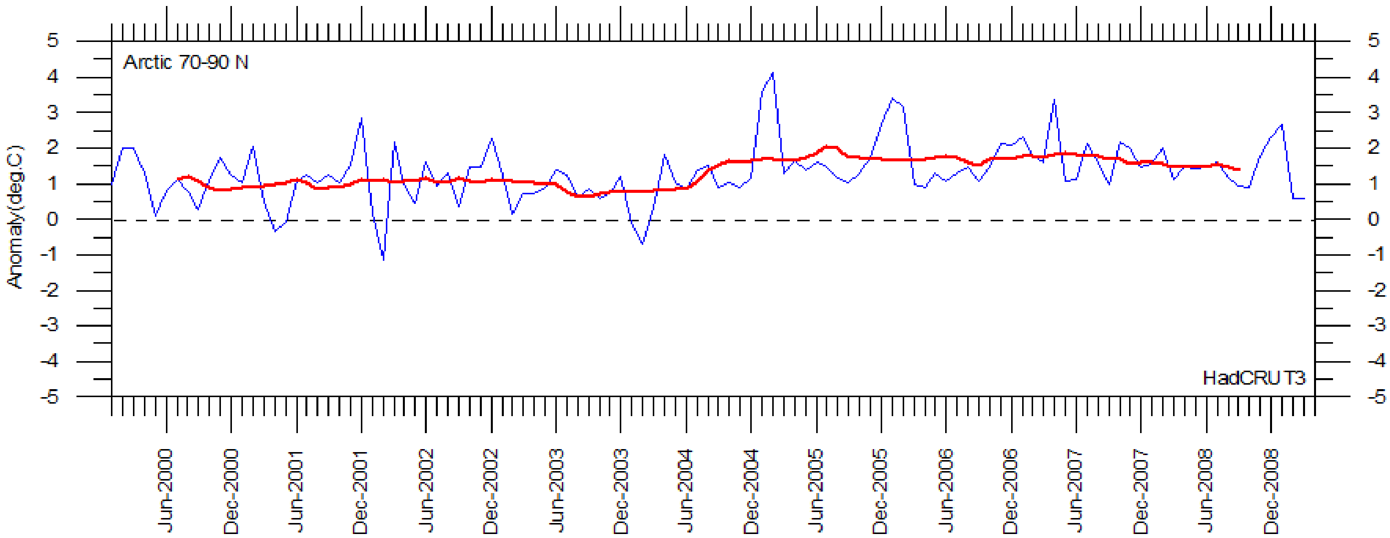


Diagram showing Arctic monthly surface air temperature anomaly 70-90°N since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre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

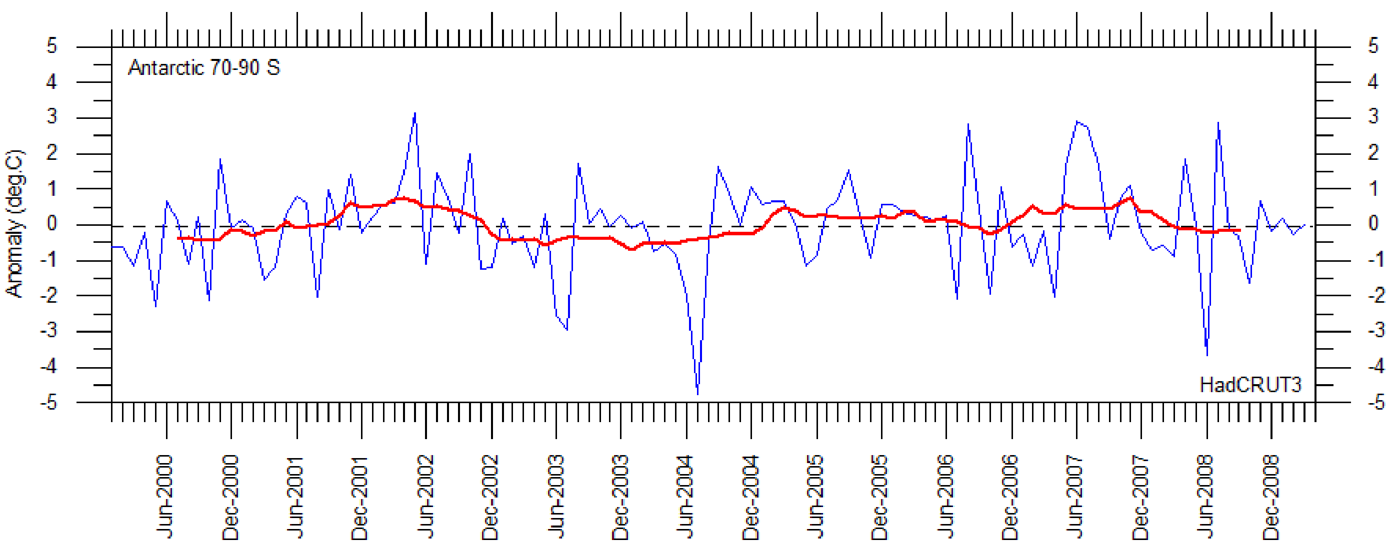


Diagram showing Antarctic monthly surface air temperature anomaly 70-90°S since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley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

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°N, compared to the number of stations south of 70°S.

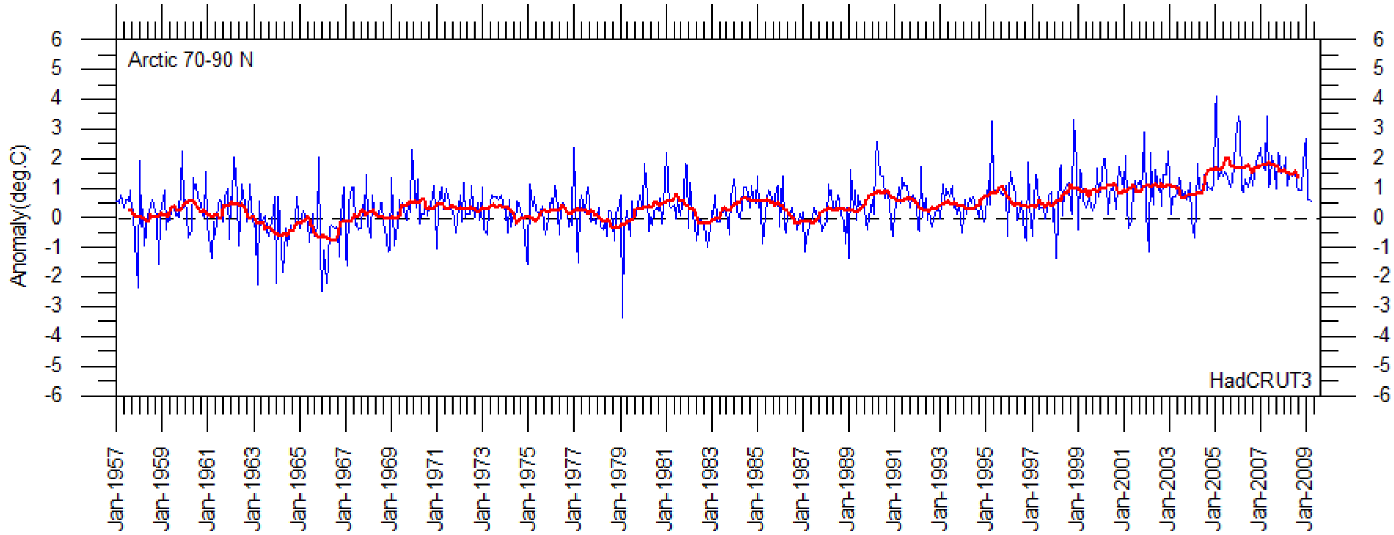


Diagram showing Arctic monthly surface air temperature anomaly 70-90°N since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 has been chosen as starting year, to ensure easy comparison with the maximum length of the realistic Antarctic temperature record shown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

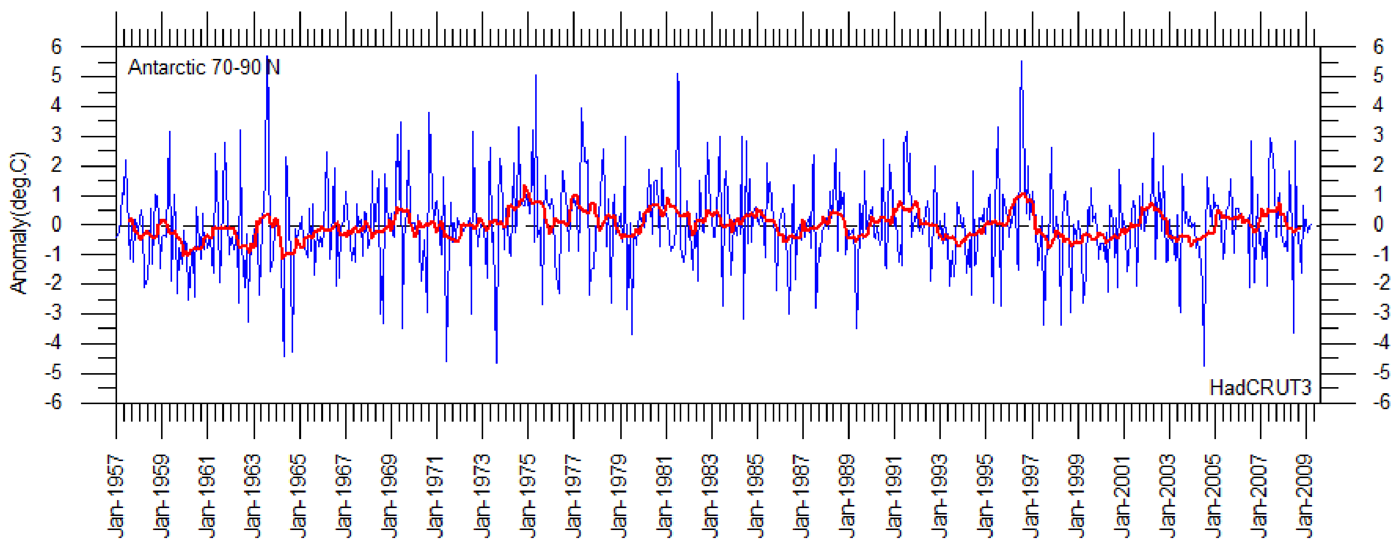
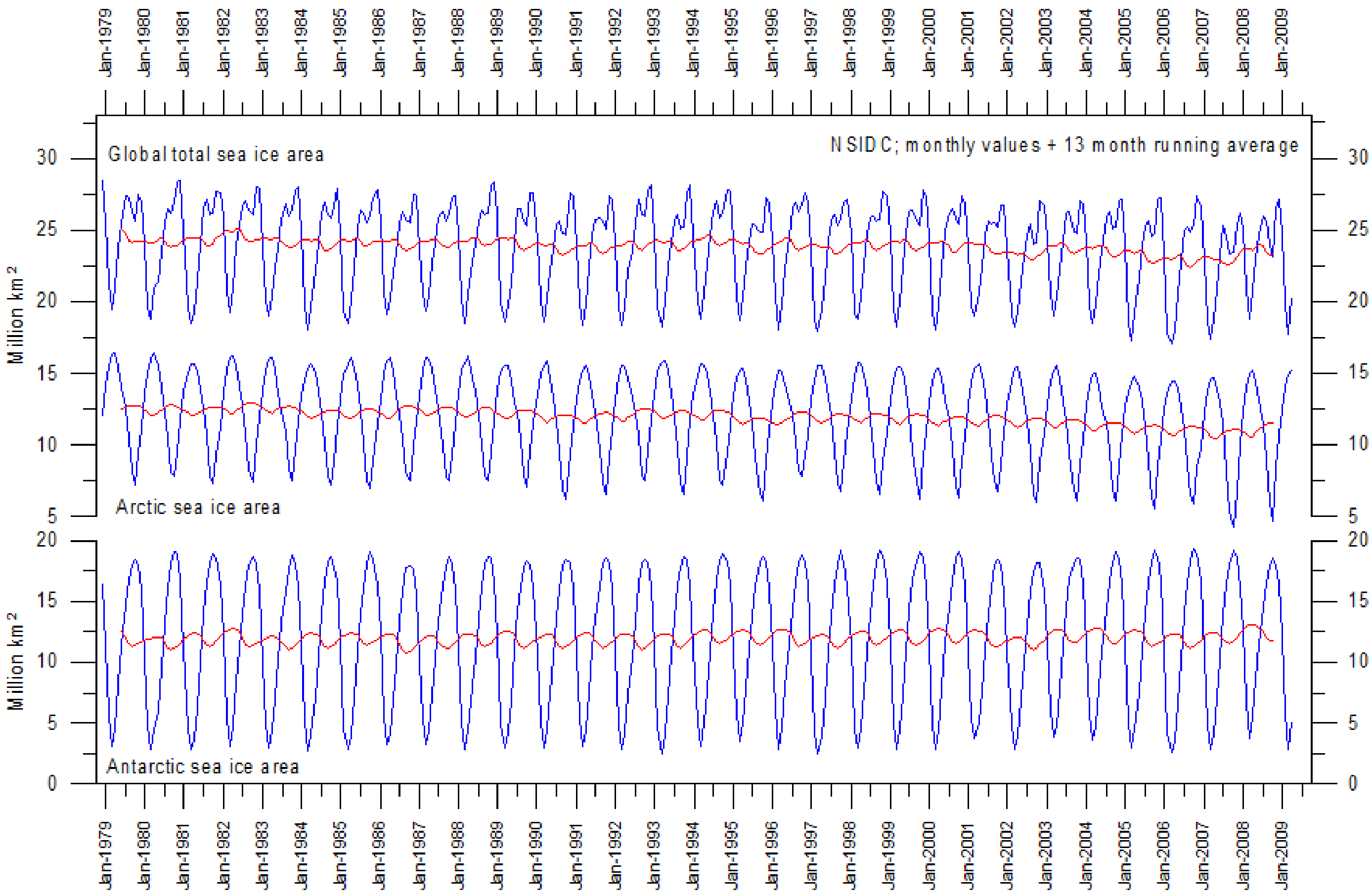


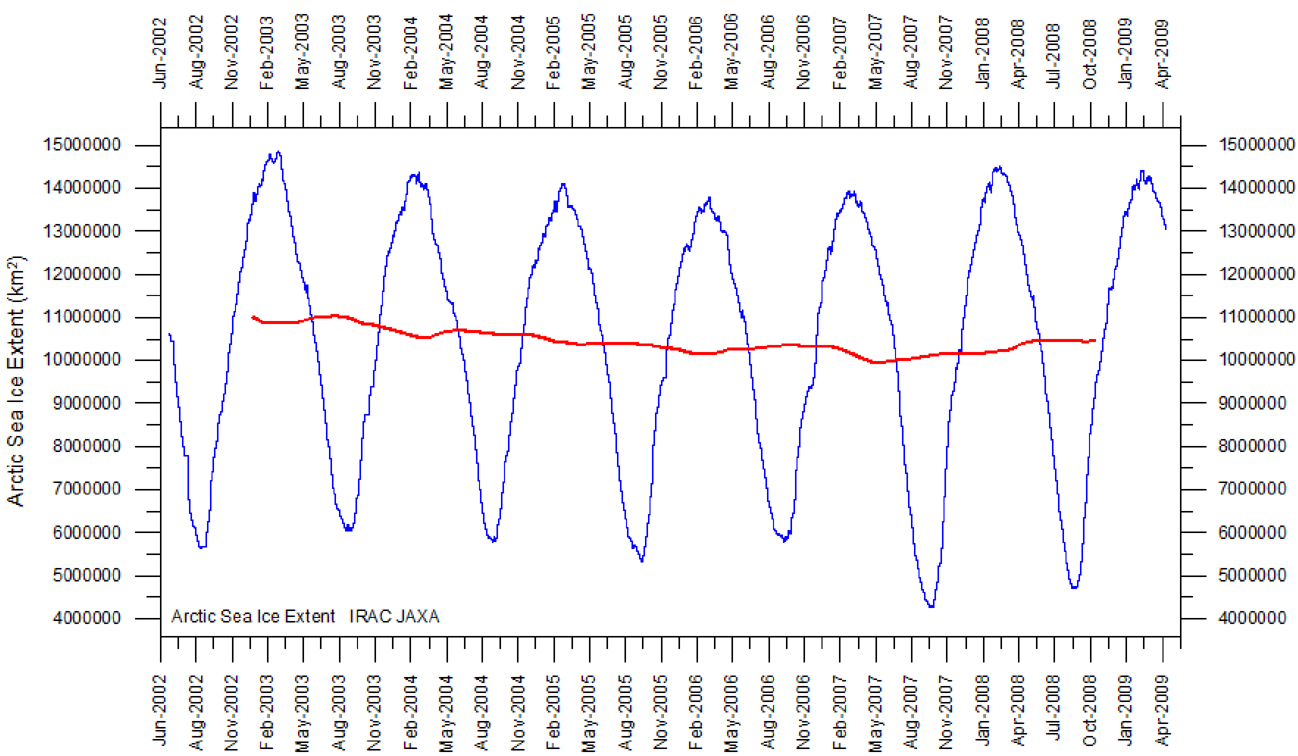
Diagram showing Antarctic monthly surface air temperature anomaly 70-90°S since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 was an international geophysical year, and several meteorological stations were established in the Antarctic because of this. Before 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.

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°N, compared to the number of stations south of 70°S.

[Arctic and Antarctic sea ice, updated to March 2009]

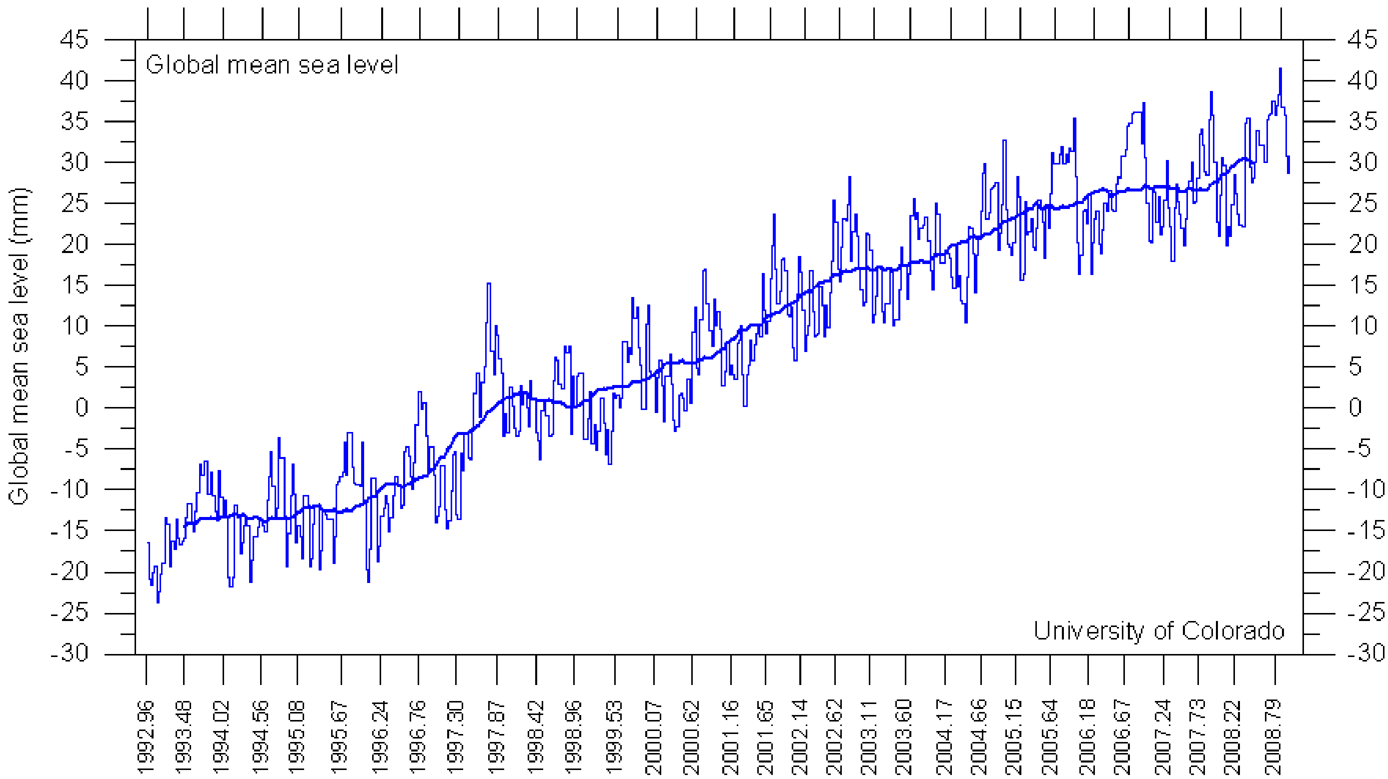


Graphs showing monthly Antarctic, Arctic and global sea ice extent since November 1978, according to the [National Snow and Ice data Center] (NSIDC).

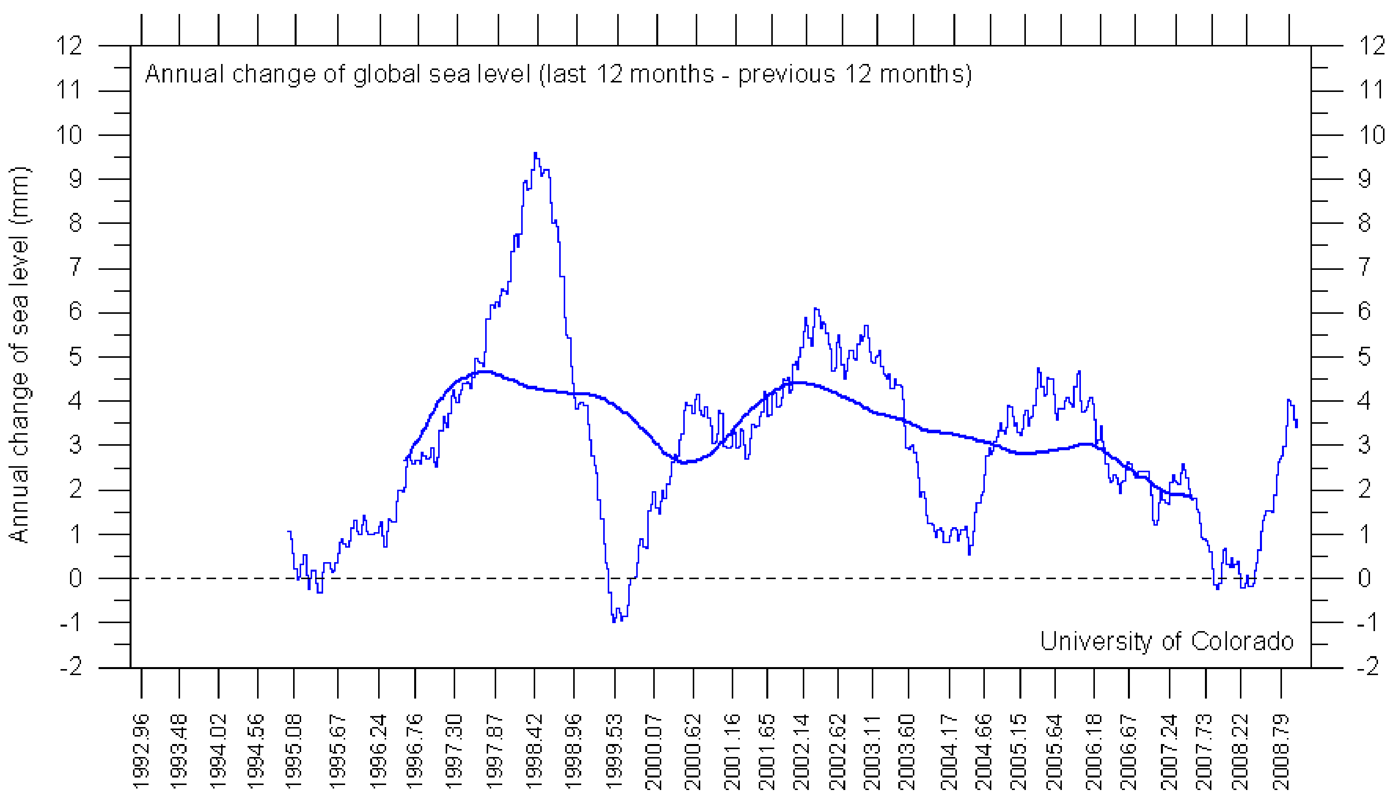


Graph showing daily Arctic sea ice extent since June 2002, by courtesy of [Japan Aerospace Exploration Agency] (JAXA).

Global sea level, updated to March 2009

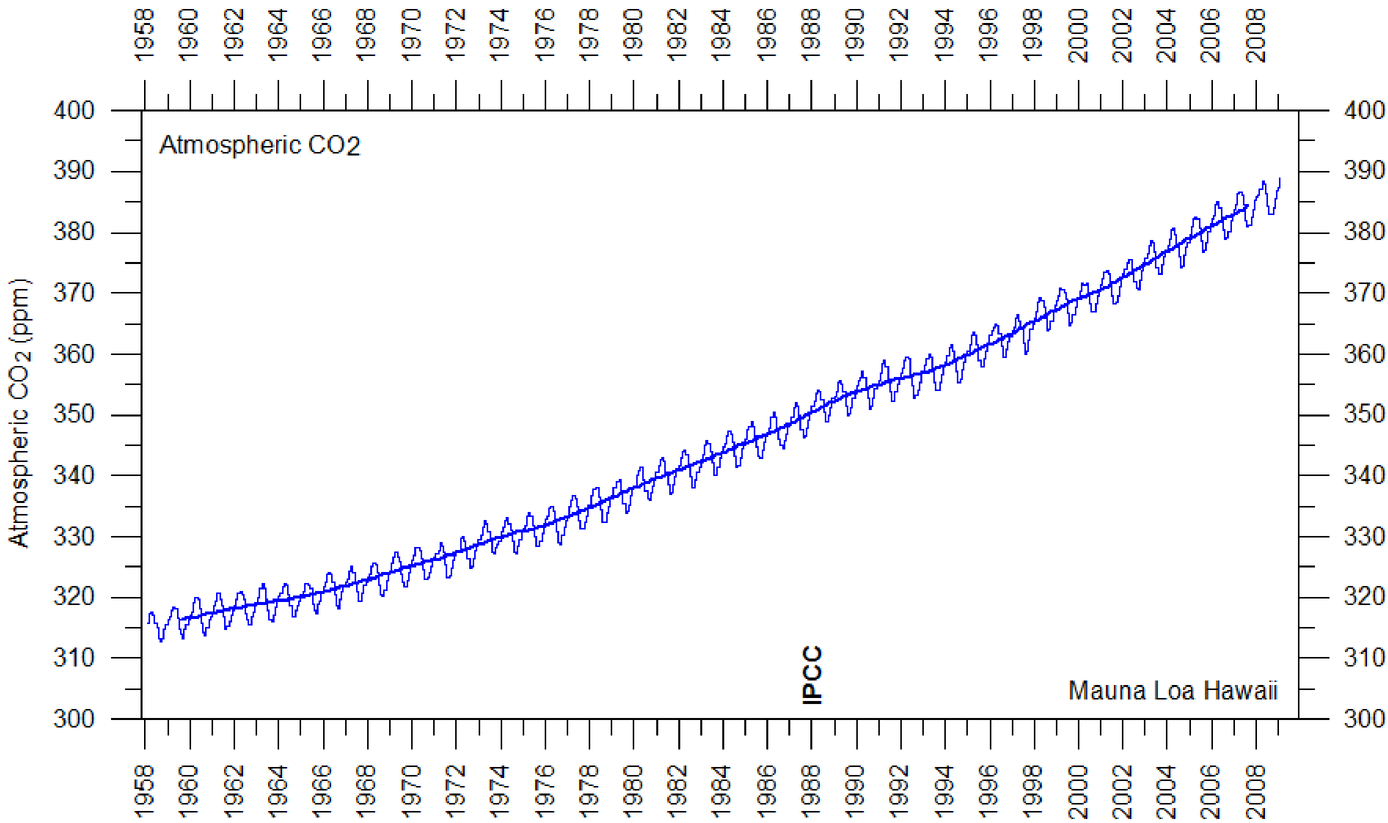


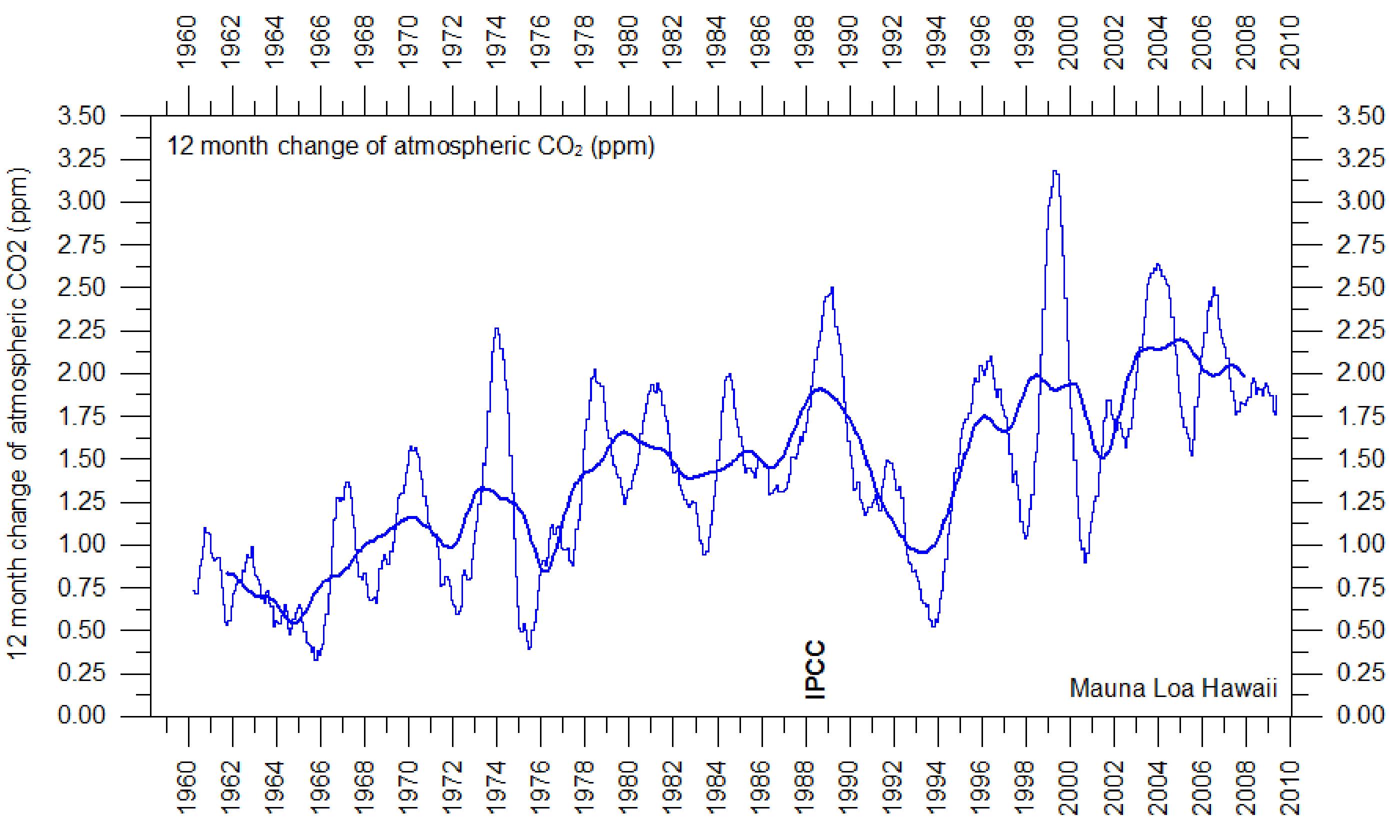
Globa lmonthly sea level since late 1992 according to the Colorado Center for Astrodynamics Research at [*University of Colorado at Boulder*]*, USA. The thick line is the simple running 37 observation average, nearly corresponding to a running 3 yr average.*



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.*

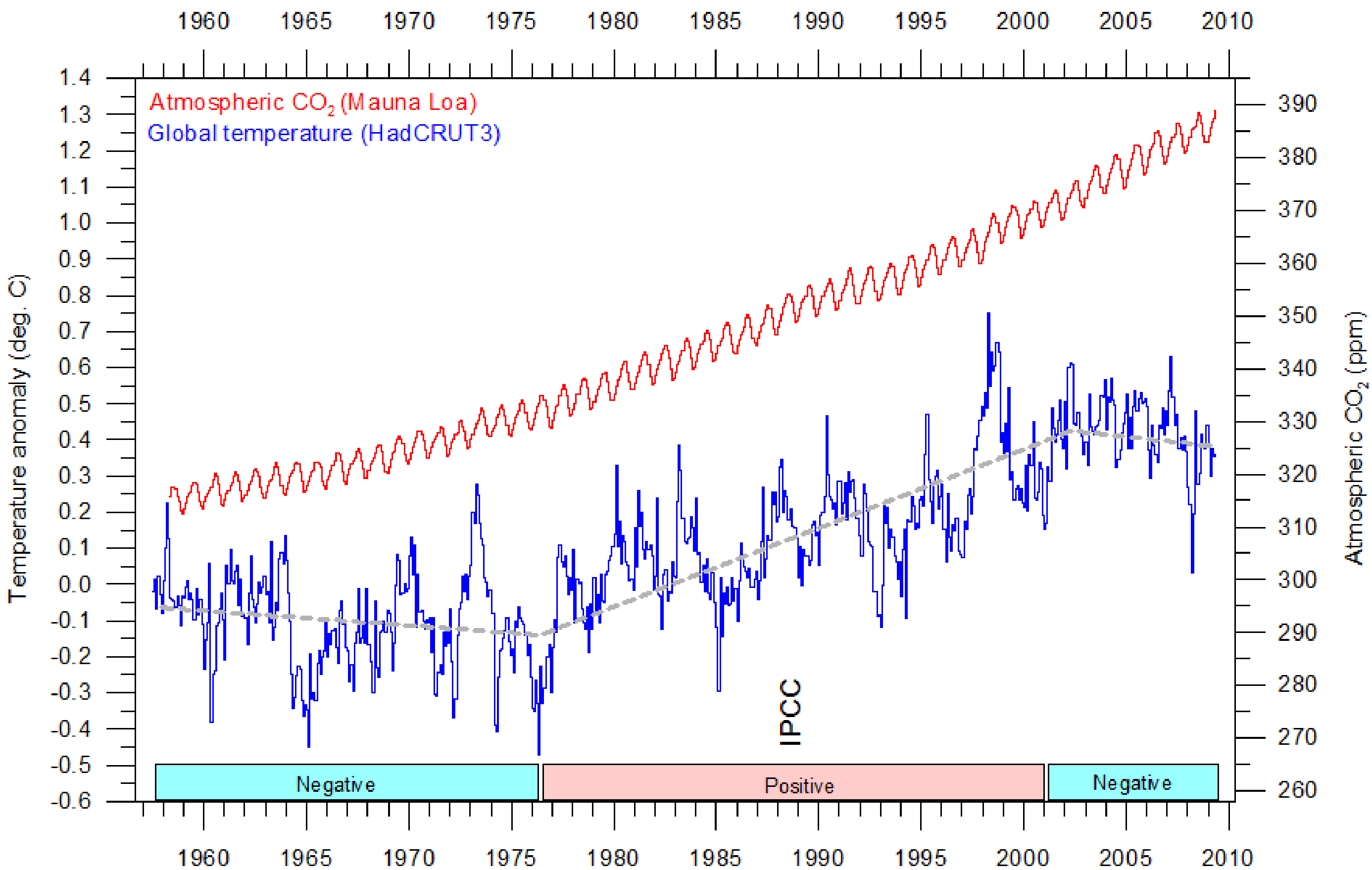
Atmospheric CO_2, updated to March 2009

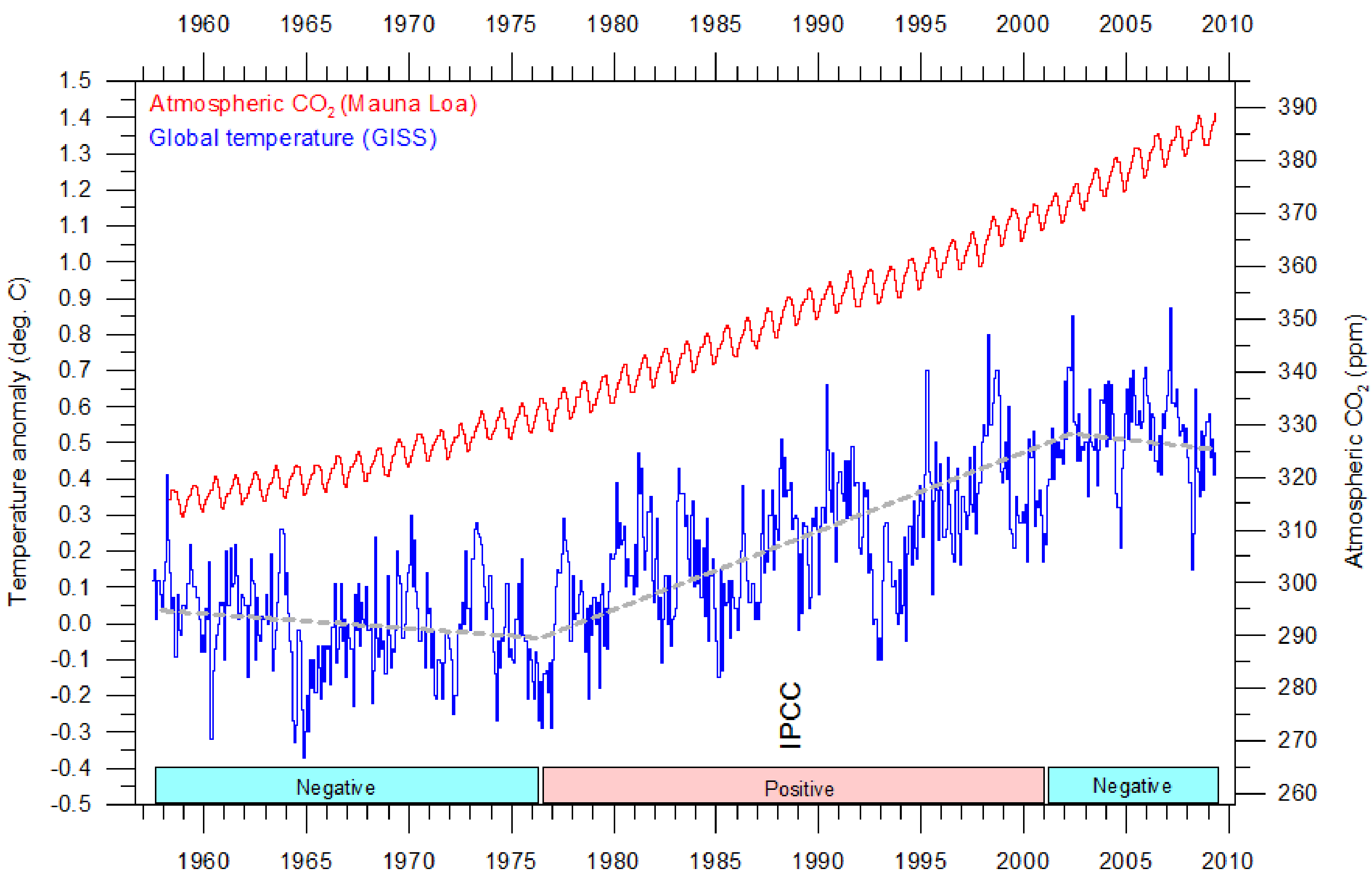


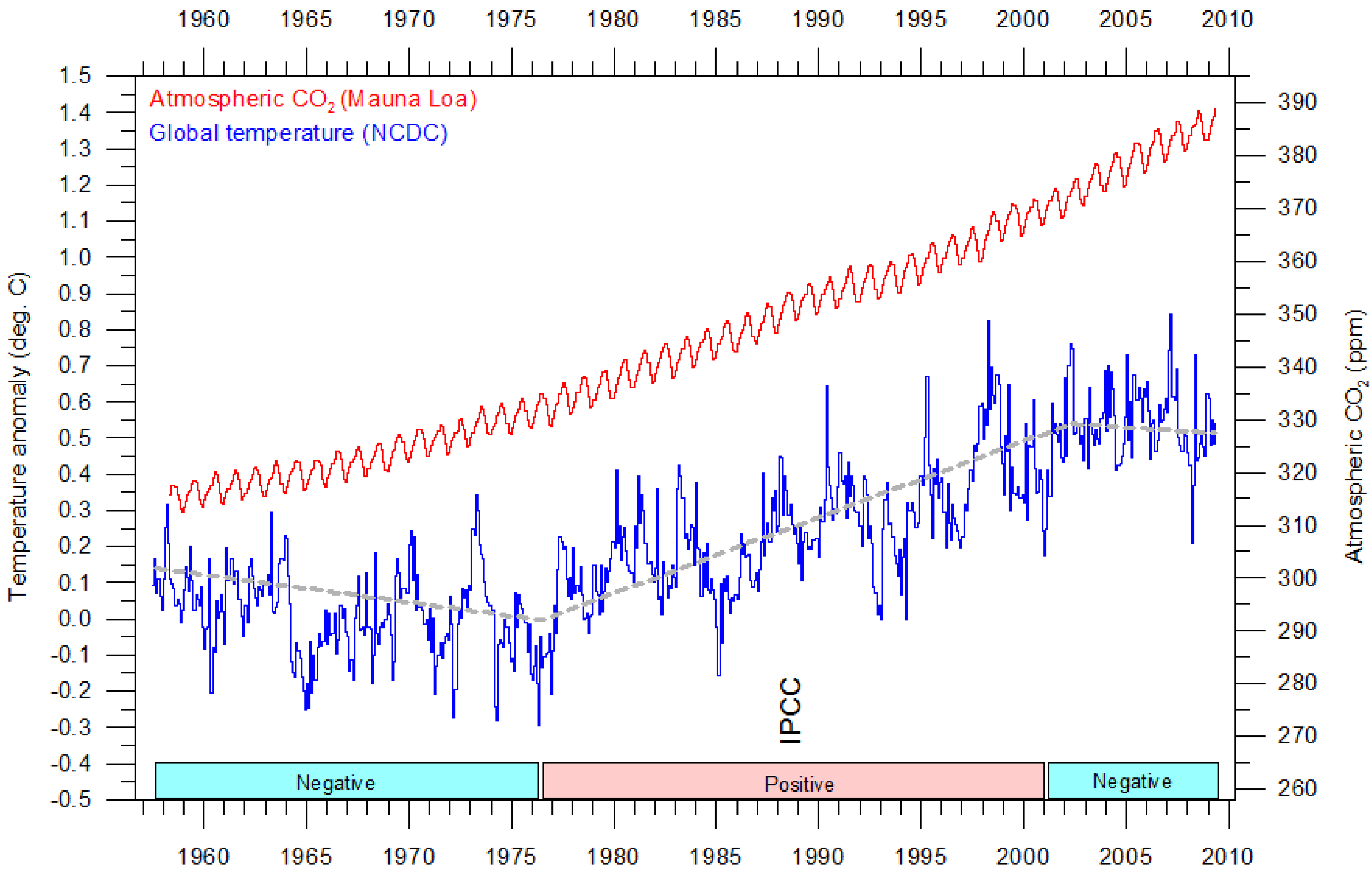


Monthly amount of atmospheric CO_2 (above) and annual growth rate (below; average last 12 months minus average preceding 12 months) of atmospheric CO_2 since 1959, according to data provided by the Mauna Loa Observatory, Hawaii, USA. The thick line is the simple running 37 observation average, nearly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

Global surface air temperature and atmospheric CO_2, updated to March 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.

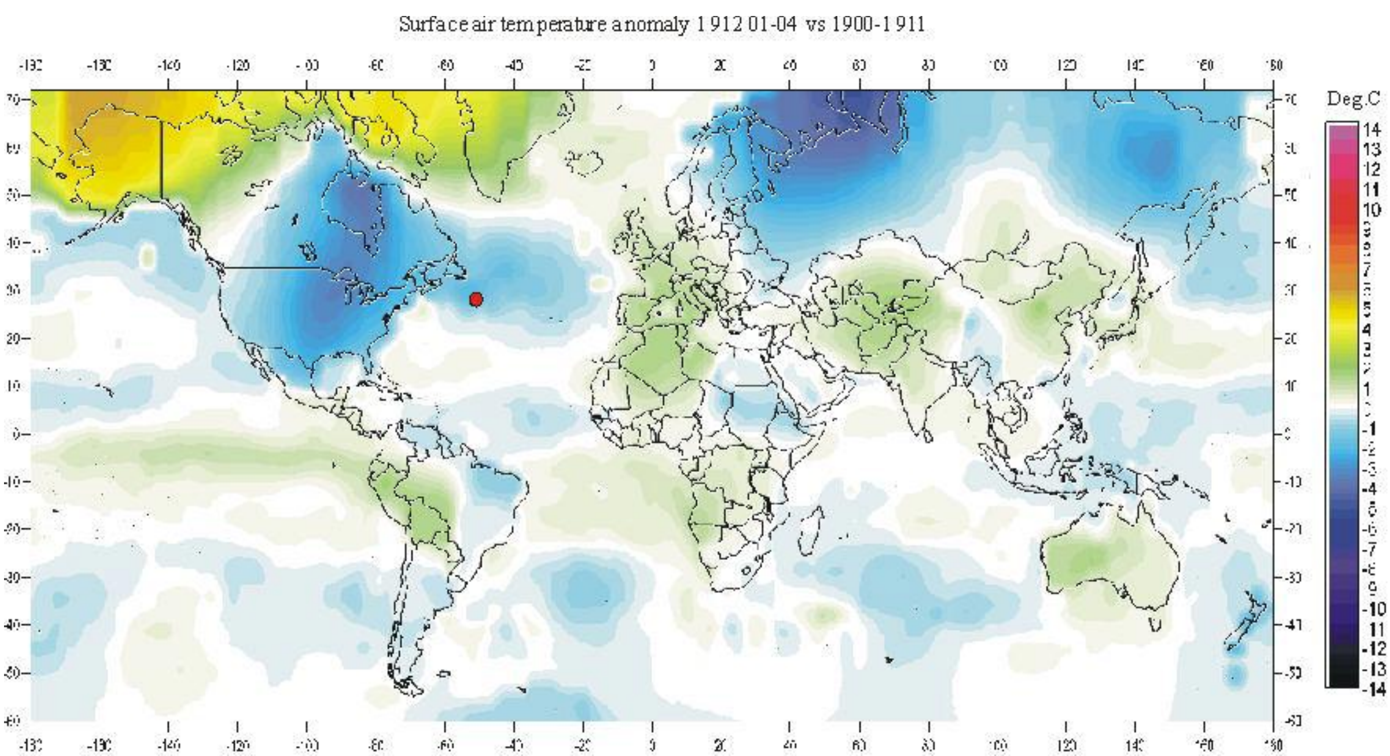
After about 10 years of global temperature increase, IPCC was established in 1988. Presumably, many scientists then believed their empirical and theoretical understanding of climate dynamics sufficient to conclude about the importance of CO_2 for global temperature. For obtaining public and political 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

April 1912: The loss of the Titanic

Titanic leaving Southampton 10 April 1912 (left), foundering 15 April (centre), and today sitting 3821 m below the surface of the North Atlantic (right).

Around 10:30 PM 14 April 1912 the new passenger liner Titanic on her maiden voyage to New York was steaming with about 22.5 knots across a calm sea in a clear and cold night about 400 km SE of Newfoundland. Both the air temperature and sea temperature had been dropping to a degree below freezing during the last hour. Less than 19 miles further to the west was a dense field of floating ice floes and icebergs. Almost at the same time Captain Stanley Lord, master of the freighter Californian, became thoroughly chocked as his ship with engines in full reverse rammed into this field of floating ice. Californian was lucky to escape damage, but was sitting still in the ice for the night.

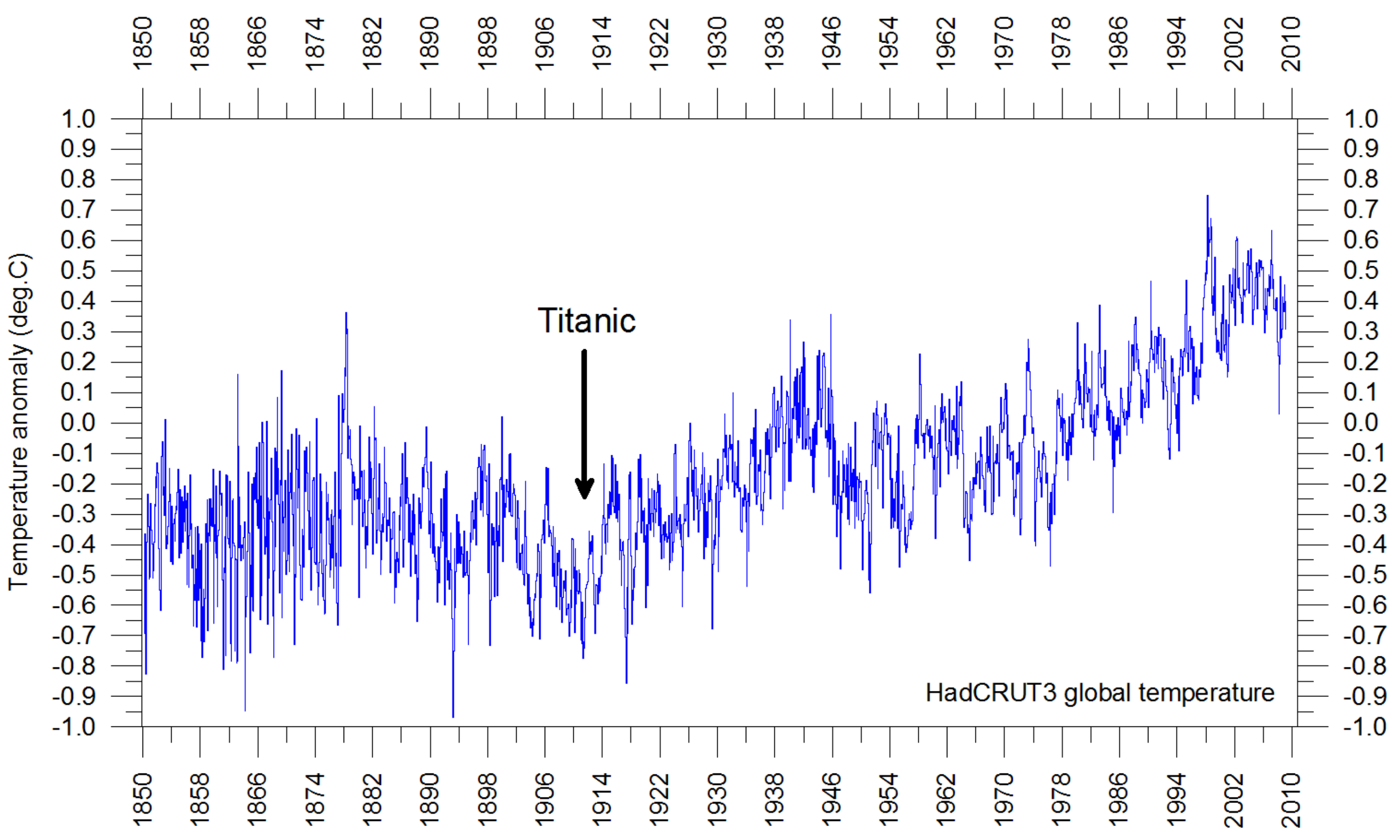


Surface air temperature anomaly January-April 1912, compared to average 1900-1911. Data source: GISS. Titanics final position SE of Newfoundland is shown by a red dot. Data source: NASA Goddard Institute for Space Studies (GISS).

At 11:40 PM an iceberg in this fatal ice field was sighted less than 900 m directly in front of Titanic. First Officer W.M. Murdoch on Titanic reacted spontaneously and in all likelihood came very close to saving the ship by a rapid port-around manoeuvre, ordering first full rudder to port and half a minute later hard to starboard, thereby swerving the liner around the iceberg in an S-shaped manoeuvre. His intention was of course to protect the all-important midship section of the hull with boilers and engines against serious damage. Presumably Murdoch actually succeeded in porting around the iceberg, but by doing this Titanic ran across an underwater extension of the iceberg and received damage to her bottom. Captain Edward J. Smith's following decision to resume steaming with reduced speed is likely to have been the actual dead sentence for the liner; the forward movement forcing large amounts of water through her damaged bottom into the hull, more than the pumps were able to cope with (Brown 2001).

Presumably the dense field of ice floes and icebergs SE of Newfoundland came as a surprise to Captain Smith on the fatal voyage with the Titanic. From the surface air temperature map above it is apparent that temperature conditions January-April 1912 in this part of the North Atlantic were several degrees below what would have been considered ‘normal’ since 1900. The warm region extending across Alaska and northern Canada , and the cold region covering the remaining part of North America, strongly suggests the presence of a high pressure area over North America for at least a considerable part of the period leading up to 14 April. Northerly winds east of the high pressure area would in the months before the disaster have enhanced the cold Labrador Current flowing from Baffin Bay, thereby transporting excess amounts of cold water and icebergs into the area SE of Newfoundland. At the same time, southerly winds west of the high pressure region was transporting warm air to high latitudes in Alaska and northern Canada.

It is very likely that the fatal iceberg was produced by the most productive calving outlet glacier in Greenland, the Jakobshavn Isbræ in central west Greenland.



HadCRUT3 monthly surface air temperature since 1850.

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

Yours sincerely, Ole Humlum

26 April 2009. Email: Ole.Humlum@geo.uio.no