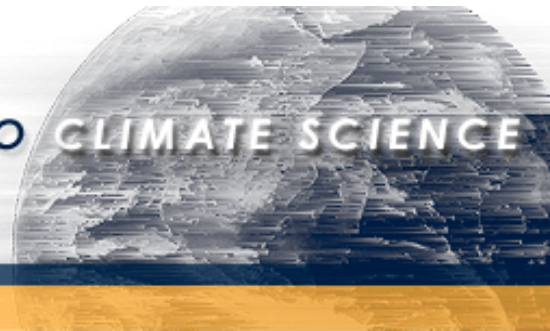




PROVIDING INSIGHT INTO CLIMATE SCIENCE



## Climate Change Science

Compiled by Ken Gregory,  
Calgary, Alberta, Canada  
email: [kgregory@shaw.ca](mailto:kgregory@shaw.ca)

Revised November 11, 2007 ([Revision history](#))

### *Table of Contents*

[Introduction](#)

[The Science in Summary](#)

[Greenhouse Gas Effect](#)

[Climate Is Always Changing](#)

[CO2 - Temperature Correlation](#)

[CO2 Changes Do Not Lead Temperature Changes](#)

[Sun Activity Does Correlate with Temperature](#)

[Sun and Cosmic Rays](#)

[Heating of the Troposphere](#)

[Stratospheric Cooling](#)

[Warming on Other Planets](#)

[CO2 Versus the Sun/Cosmic Ray Warming Theories](#)

[CO2 Greatly Increases Plant and Forest Growth](#)

[IPCC and Model Projections](#)

[The IPCC Hockey Stick](#)

[Urban Heat Island Effects](#)

[Falsified Historical CO2 Measurements](#)

[No Consensus](#)

[Effects of Warming](#)

[Global Sea Level Rise Is Not Accelerating](#)

[Severe Weather](#)

[Warming Is Good for Your Health](#)

[Warming Effects on Animals](#)

[Kyoto Protocol - Misallocation of Funds](#)

[An Inconvenient Truth](#)

[Warnings of Global Cooling](#)

## ***Introduction***

One of the goals of the Friends of Science Society is to educate the public through dissemination of relevant, balanced and objective technical information on the scientific merit of the Kyoto Protocol and the global warming issue. The science of climate change is complex. Unfortunately, politics and the media has affected the science. Climate research institutions know that they must present scary climate forecasts to receive continued funding - no crisis means no funding. The media presents stories of climate disaster to sell their products. Scientific research that suggests climate change is mostly natural does not receive much if any media coverage. These factors have caused the general public to be seriously misled on climate issues resulting in wasteful expenditures of billions of dollars in an ineffective attempt to control climate. This document gives an overview of climate change issues as determined by a comprehensive review of the state of climate science.

## ***The Science in Summary***

The history of the Earth tells us that the climate is always changing; from warm periods when the dinosaurs flourished, to the many ice ages when glaciers covered much of the land. Climate has always changed due to natural cycles without any help from people.

The United Nations Intergovernmental Panel on Climate Change (IPCC) is a political organization promoting a theory that recent minor temperature increases may be caused largely by man-made carbon dioxide (CO<sub>2</sub>) emissions. CO<sub>2</sub> is an infrared gas, and increasing concentrations can potentially increase the average global temperature as the gas absorbs radiation from the Earth and emits the absorbed energy at longer wavelengths. However, the warming ability of CO<sub>2</sub> is limited because much of the absorption spectrum is near or fully saturated. When CO<sub>2</sub> concentrations were ten times greater than today the Earth was in the grips of one of the coldest ice ages.

The history of climate and CO<sub>2</sub> concentration shows that temperature changes precede CO<sub>2</sub> changes and can not be a significant driver of climate. Temperature changes over different time scales have been well correlated to solar cycles, cosmic ray flux and cloud cover. Recent research shows that cosmic rays act as a catalyst to create low clouds, which cool the planet. When the Sun is more active, the solar wind repels the cosmic rays, reducing low cloud cover allowing the Sun to warm the planet.

Computer model results presented in the IPCC Fourth Assessment Report shows that if CO<sub>2</sub> is the main climate driver, the temperature profile in the atmosphere will show a unique and distinctive pattern - a CO<sub>2</sub> fingerprint of global warming. Actual temperature data shows no such CO<sub>2</sub> fingerprint. Therefore, the computer model data proves that CO<sub>2</sub> is not the main climate driver. Real world data shows that high clouds cause a strong negative feedback on climate, but climate models assume that clouds cause a positive feedback.

Several planets and moons have warmed recently along with the Earth, confirming a natural warming trend. Over longer time periods, as the solar system moves in and out of the galactic arms the cosmic ray flux changes, causing ice ages and warm ages. A comparison of temperature and solar activity proxy data suggests that solar effects can explain at least 50% of the warming during the last 100 years.

CO<sub>2</sub> is plant food and the increase in the CO<sub>2</sub> concentration may have increased the global food production by 15% since 1950 resulting in huge benefits for

people. For Canada, any CO<sub>2</sub> warming effect would also benefit us by reducing our space heating costs and making a more pleasant climate.

The IPCC predicts that global average temperatures will increase by 0.17 to 0.38 °C per decade to the end of the century depending on the rate of CO<sub>2</sub> growth in the atmosphere and other assumptions. The projections assume that no action is taken to limit CO<sub>2</sub> emissions. However, these predictions are unrealistic because they falsely assume that the recent temperature changes are driven solely by CO<sub>2</sub> and that the Sun has little effect on climate. A recent study of past climate change used by the IPCC has been shown to be wrong due to using a faulty algorithm, and the inappropriate selection of data.

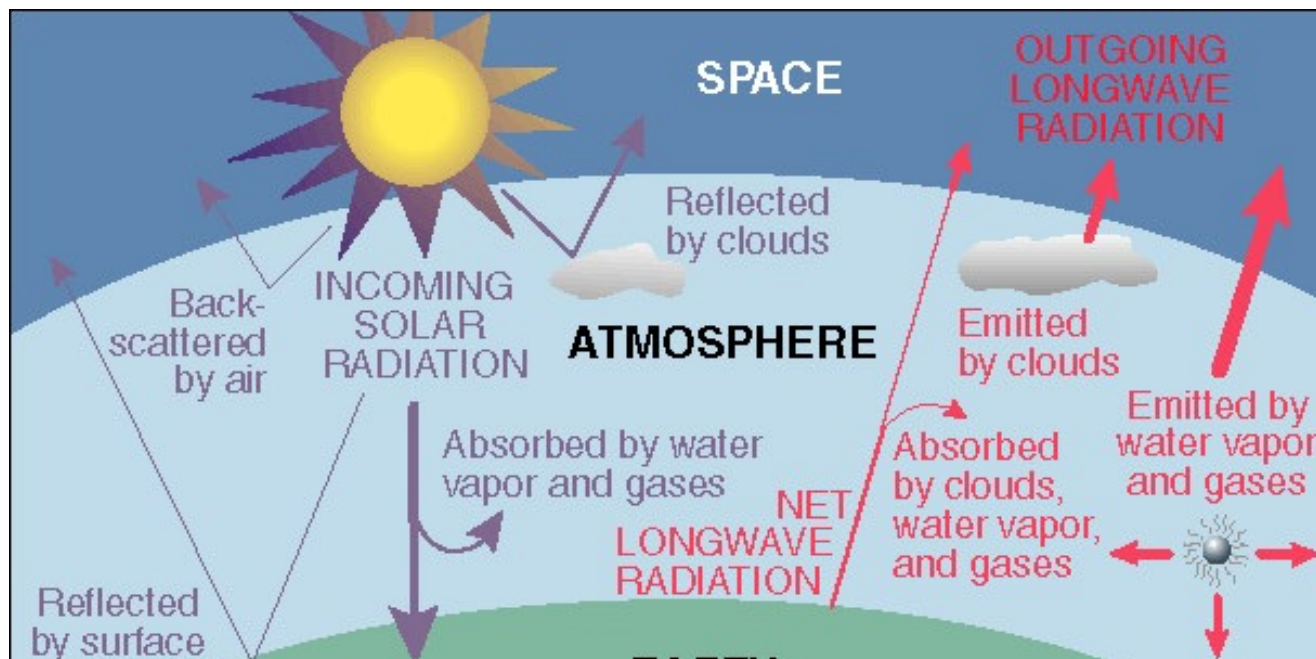
The land temperature record is contaminated by the urban heat island effect. The IPCC historical CO<sub>2</sub> record may be incorrect due to inappropriate adjustments to the ice core data, and ignoring direct historical CO<sub>2</sub> measurements. The IPCC selects and adjusts data to conform to its CO<sub>2</sub> warming hypothesis and ignores alternative climate theories. This is the wrong way to do science. Many scientists strongly disagree with the IPCC conclusions.

Sea level data shows no acceleration in the sea level rise and no increase in the rate of sea level rise is expected over the next hundred years. There has been no detected increase in severe storms and there is no reason to expect an increase in the number or intensity of hurricanes resulting from a slight expected warming due to human caused CO<sub>2</sub> emissions.

Any increase in temperatures due to human caused CO<sub>2</sub> emissions will likely be beneficial to human health. The CO<sub>2</sub> fertilization effect will increase the rate of forest growth and CO<sub>2</sub> induced crop yield increases will reduce the pressures to cut down forests for farmland expansion. This will greatly benefit animals by slowing habitat destruction.

The benefits of CO<sub>2</sub> emissions greatly exceed any likely harmful effects. Several authorities who have studied solar cycles have warned that the Earth may soon enter a cooling phase as the Sun is expected to become less active. The atmosphere may warm because of human activity, but if it does, the expected change is unlikely to be more than 1° C, and probably less, in the next 100 years.

### ***Greenhouse Gas Effect***

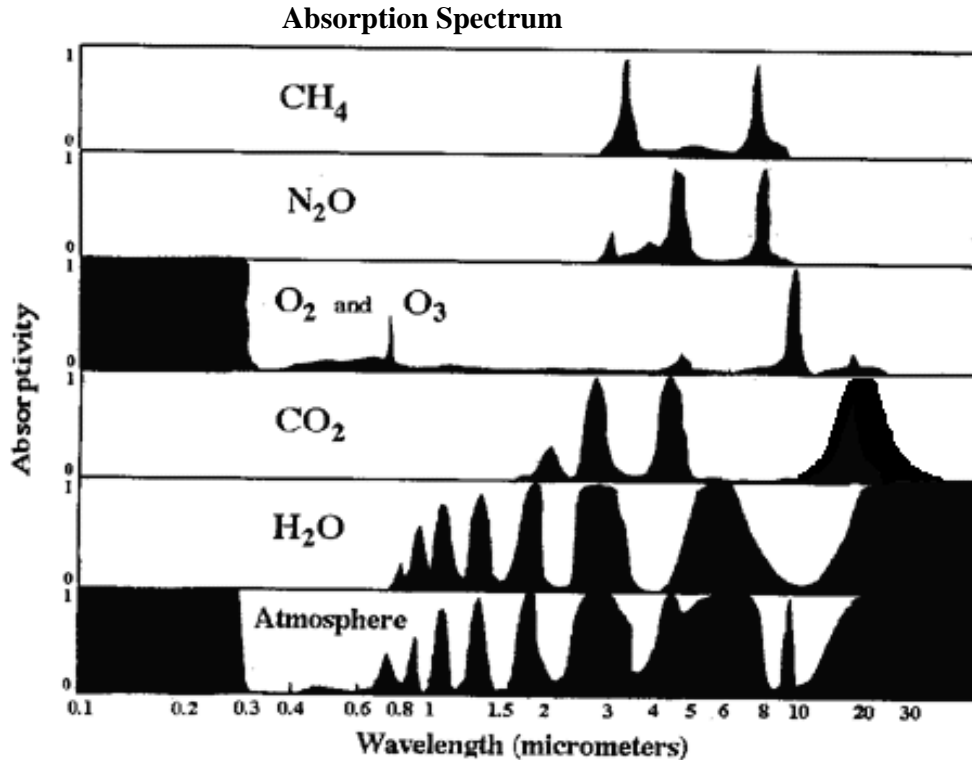


This graphic shows the exchange of energy among Space, the Sun, the atmosphere and the Earth. Greenhouse gases are primarily water vapour, carbon dioxide and ozone. Greenhouse gases are mostly transparent to incoming solar radiation, but absorb outgoing long wavelength radiation. The absorbed energy is then transferred to cooler molecules or radiated at longer wavelengths than the energy previously absorbed. This process make the Earth warmer than it otherwise would be without the greenhouse gases (but with the atmosphere and clouds) by about 33 degrees Celsius. See [here for a graphic](#) of the energy



transfers expressed in Watts per square meter ( $W/m^2$ ).

Water vapour and clouds together account for over 70% of the total current greenhouse effect. However, in terms of changes to the greenhouse effect due to human activities, water vapour is generally considered a feedback and not a forcing agent. See [here for a discussion of CO2 versus water's](#) contribution to the greenhouse effect.



Absorptivity of various gases of the atmosphere and the atmosphere as a whole as a function of the wavelength of radiation. An absorptivity of zero means no absorption while a value of one means complete absorption. The dominant absorbers of infrared radiation are water vapor (H<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>). Oxygen (O<sub>2</sub>) and ozone (O<sub>3</sub>) absorb much of the sun's ultraviolet radiation.

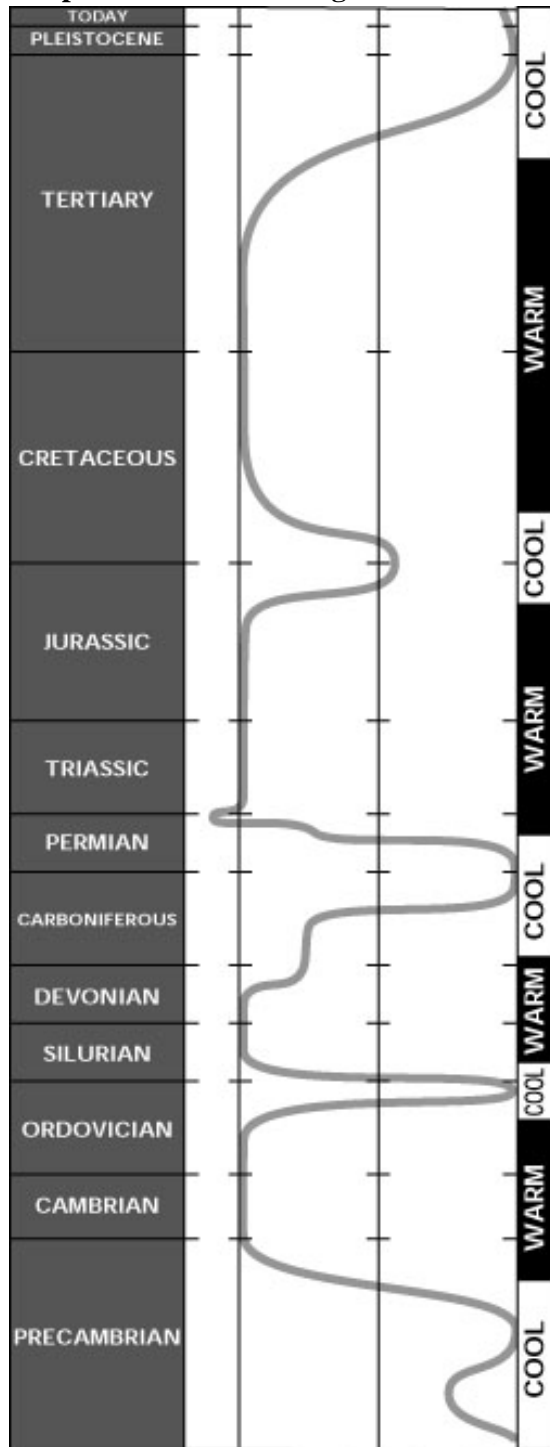
short-term and long-term time scales. These changes have sometime been abrupt and severe, without any help from humans. Climate temperature reconstructions are determined from a variety of sources, such as from tree ring width studies and ocean floor sediments. During the last 2 billion years, the Earth has alternated between cool periods like today, and warm periods like when the dinosaurs roamed the planet. The figure below on the left is a temperature reconstruction of the Earth over 2 billion years. Temperatures over this time frame are determined by mapping the distribution of ancient coals, desert deposits, tropical soils, salt and glacial deposits, as well as the distribution of plants and animals that are sensitive to climate, such as alligators, palm trees & mangrove swamps. See [here for further information](#).

The graph at the left shows the absorption spectra of the greenhouse gases. Where the black shading extends from 0 to 1, it indicates that at that wavelength the energy is fully absorbed. Adding more gas of that type will not absorb any more energy as that wavelength is fully saturated. Comparing the CO<sub>2</sub> and H<sub>2</sub>O absorption spectra shows that much of the CO<sub>2</sub> spectrum overlaps with that of water. Parts of the CO<sub>2</sub> spectrum are already fully saturated. Adding more CO<sub>2</sub> will result in ever diminishing effects as more of the available wavelengths become saturated. The temperature response to adding CO<sub>2</sub> to the atmosphere depends on the amount of positive and negative feedbacks from water vapour, clouds and other sources. The temperature effect of increasing CO<sub>2</sub> concentration is approximately logarithmic. This means if doubling the CO<sub>2</sub> concentration from 300 ppm to 600 ppm causes the temperature to rise by 1 °C, a further doubling can be expected to add only 0.5 °C temperature gain. See [here](#).

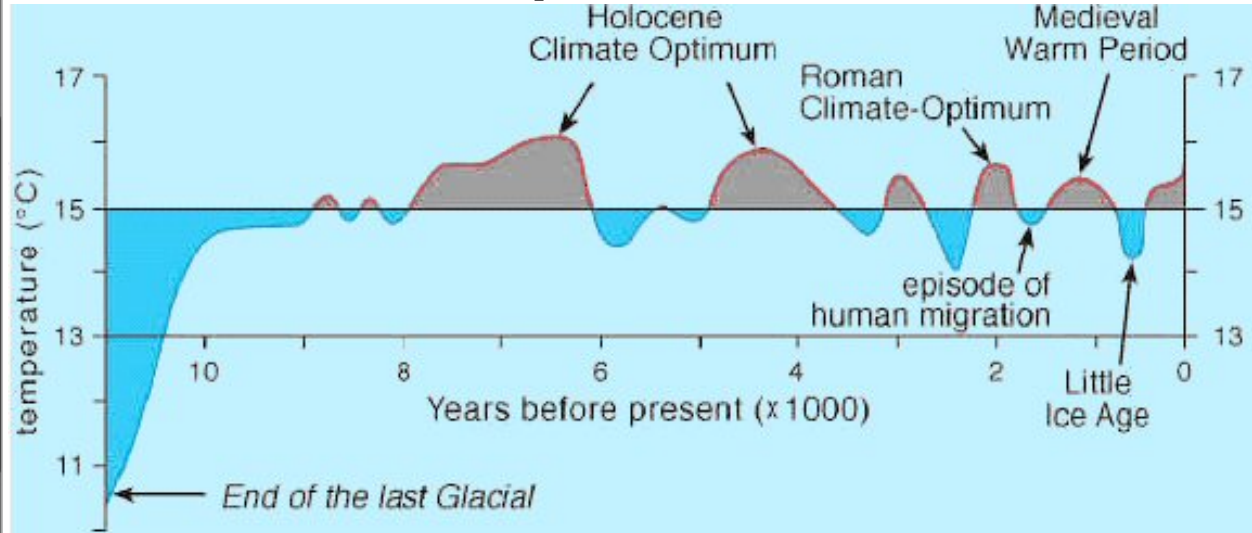
### *Climate Is Always Changing*

The Earth's history shows that the climate has always been changing, over both

### Temperature Over Geological Time



### Holocene Optimum

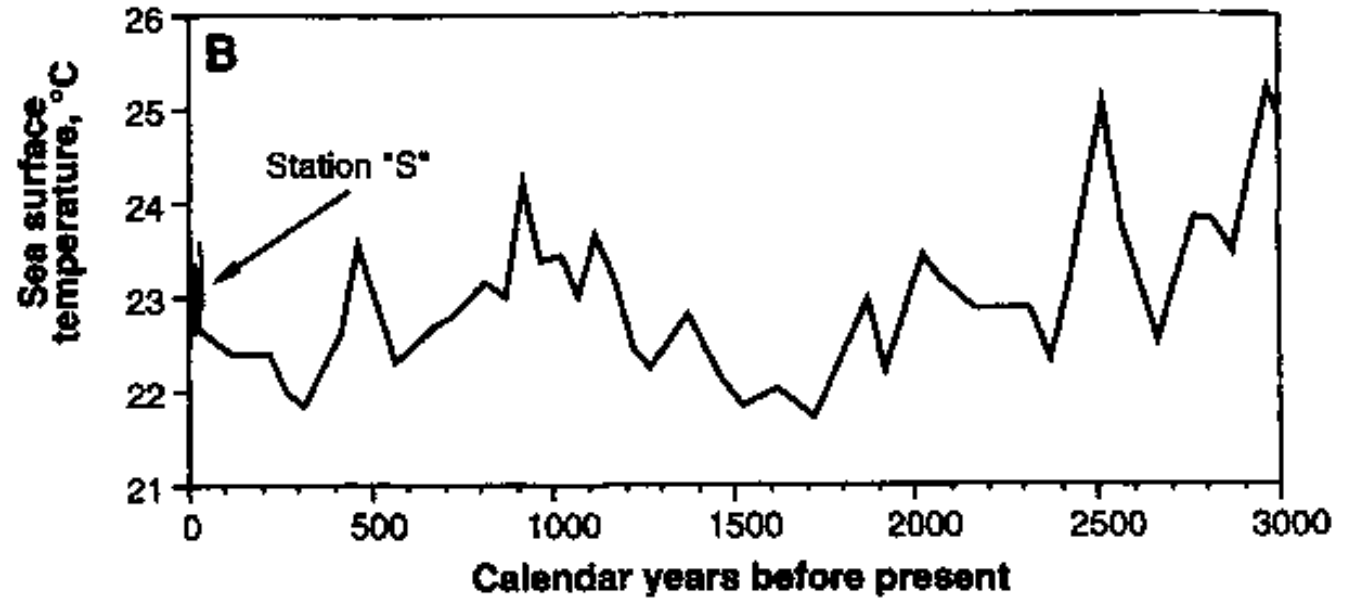


Average near-surface temperatures of the northern hemisphere during the past 11,000 years (after Dansgaard et al., 1969, and Schönwiese, 1995)

The graph above shows the northern hemisphere temperature history since the last ice age.

### Temperature History from North Atlantic Ocean Sediments

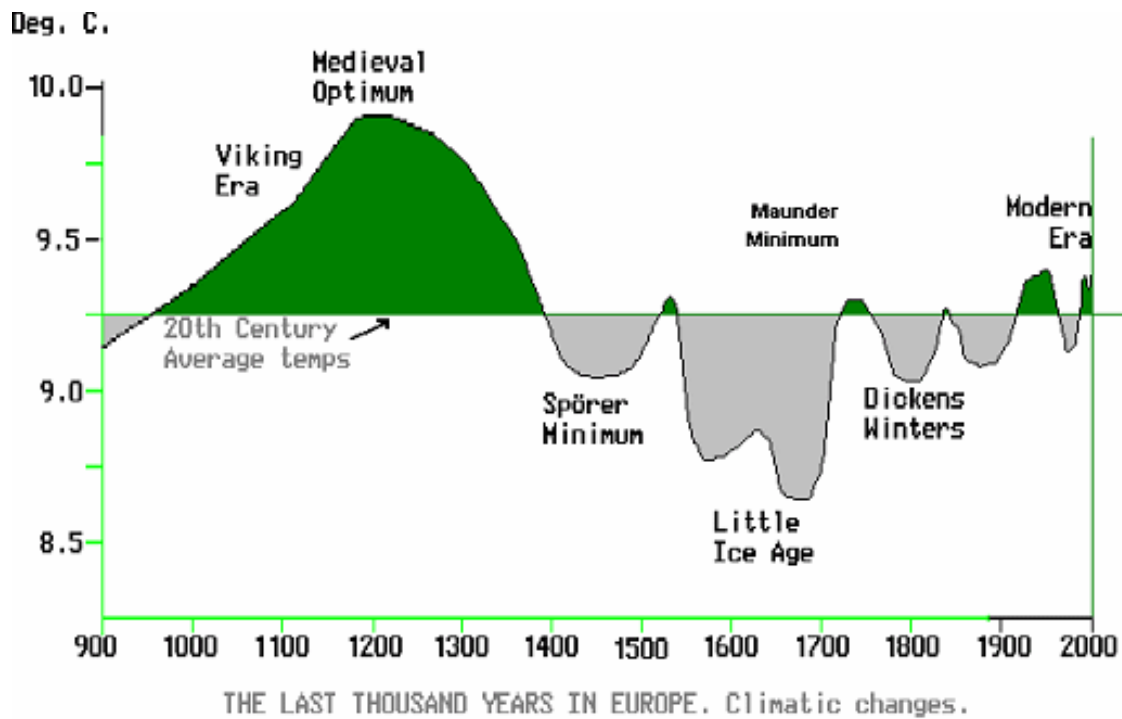
22°C      17°C      12°C  
Average Global Temperature



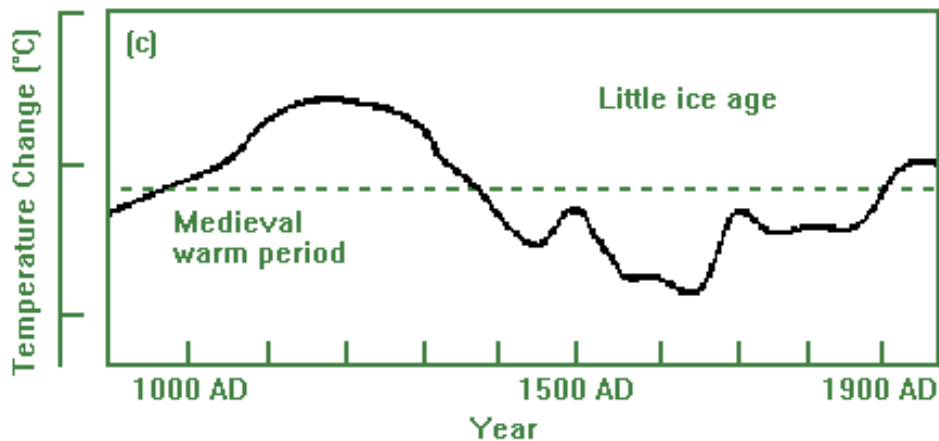
The graph above right shows temperature variations of the past 3,000 years (during recorded history), as determined from ocean sediment studies in the North Atlantic. [Keigwin, 1996]. Note the rapid variations, as well as the much warmer temperatures 1,000 and 2,500 years ago. See [here for further information](#).

Climate is always changing, as the history of Europe's temperature over the last thousand years shows in the two graphs below:

### Temperature History in Europe



### 1000 Years Temperature History IPCC 1990



The temperature history shown at the left was published in the first IPCC report in 1990, based on Lamb's estimated climate history of Central England.

Clearly, human activity could not have had a significant effect on the temperature changes before 1900. These changes are the result of natural processes.

See [here](#).

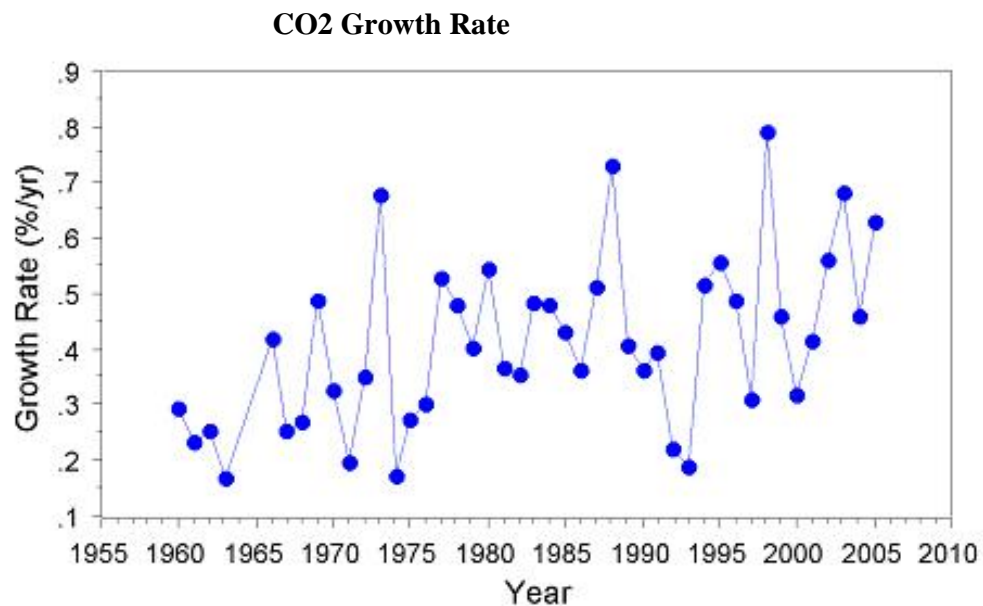
See [here for NASA's GISS temperature graphs since 1880](#).

### CO<sub>2</sub> - Temperature Correlation

The temperature of the Earth has warmed slightly, about 0.7 degrees Celsius, over the last hundred years. Over this time, CO<sub>2</sub> concentration in the atmosphere has increased, mostly due to the increased use of fossil fuels. A short-term correlation does not imply that the CO<sub>2</sub> increase caused the temperature increase. Causation can be inferred if there is a correlation over several cycles of CO<sub>2</sub> concentration changes, with the CO<sub>2</sub> change preceding the temperature change. The actual climate history shows no such correlation, and there is no compelling evidence that the recent rise in temperature was caused by CO<sub>2</sub>. Temperatures have

been variable over time, and do not correlate to CO<sub>2</sub> concentration. When CO<sub>2</sub> concentrations were 10 times higher than they are now we were in a major ice age. As a greenhouse gas, CO<sub>2</sub> is vastly outweighed by (natural) water vapour and clouds, which accounts for over 70% of the greenhouse effect. Human-related CO<sub>2</sub> emissions soared after 1940. Yet most of the 20th century's world-wide temperature increase occurred beforehand.

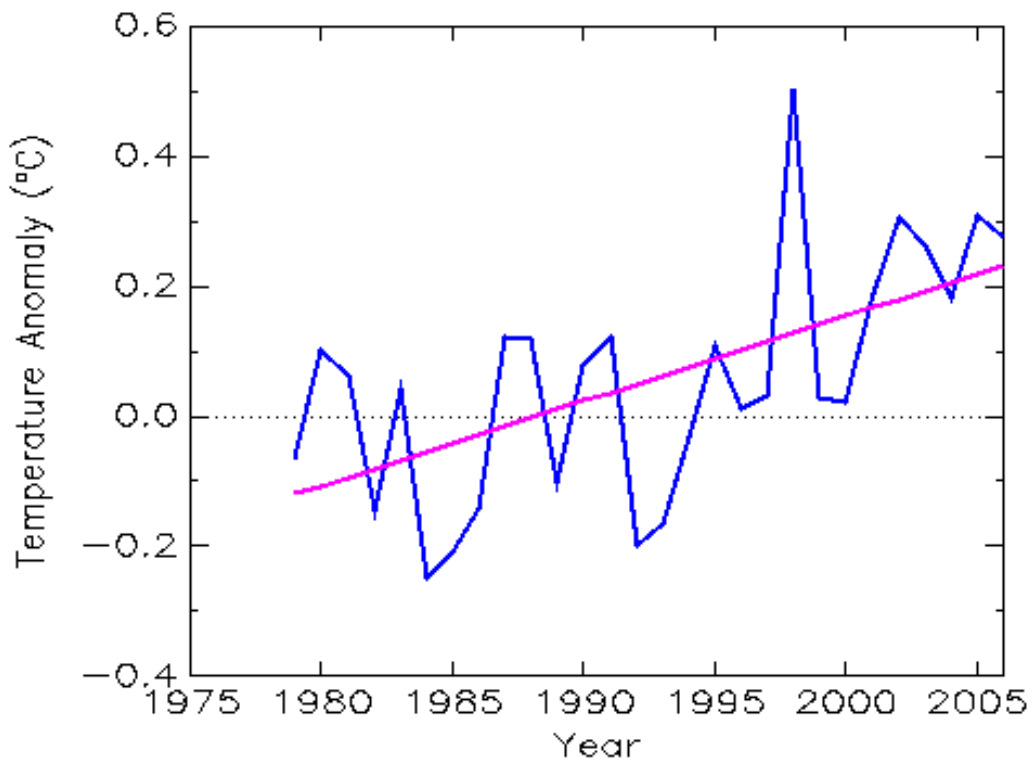
The CO<sub>2</sub> growth rate is given below.



The actual increase of CO<sub>2</sub> concentration averaged 0.5% per year since 1990.

**World Temperature Trend MSU Data 1979 - 2006**





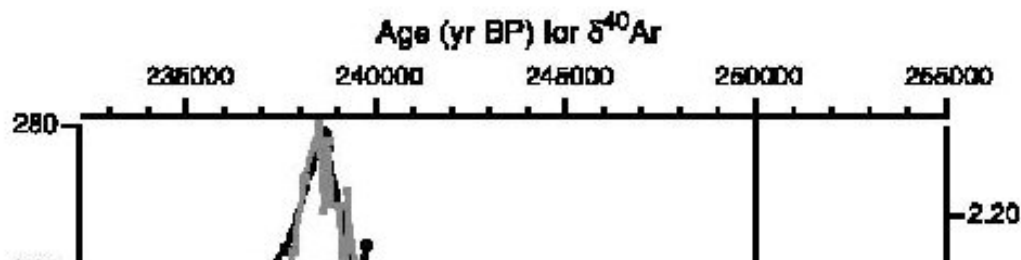
This graph was created from the MSU Data from [www.CO2Science.org](http://www.CO2Science.org). The MSU Satellite data set is a product of the NASA and the University of Alabama in Huntsville. The MSU data set represent the temperatures of a layer of the atmosphere that extends from the surface to approximately 8 kilometres (5 miles) above the surface. The data are obtained from microwave sounding units (MSUs) on the National Oceanic and Atmospheric Administration's TIROS-N satellites, which relate the intensity or brightness of microwaves emitted by oxygen molecules in the atmosphere to temperature.

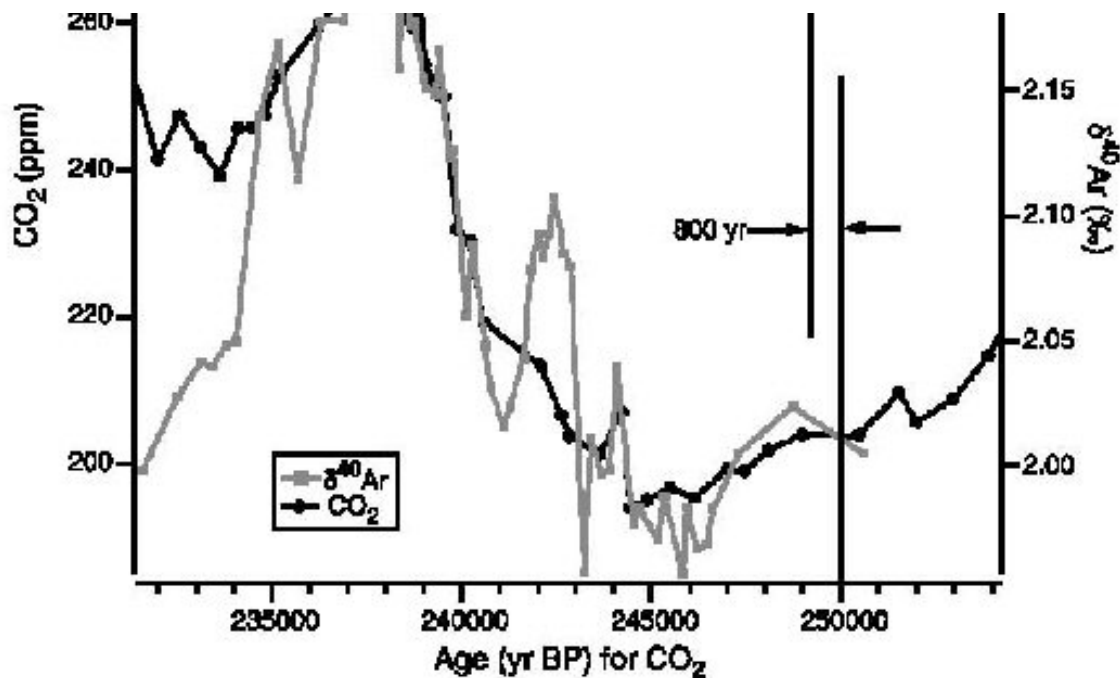
The trend line indicates a warming of 0.13 Celsius per decade.

### ***CO2 Changes Do Not Lead Temperature Changes***

Fischer et al. (1999) examined records of atmospheric CO<sub>2</sub> and air temperature derived from Antarctic Vostok ice cores that extended back in time across a quarter of a million years. Over this immense time span, the three most dramatic warming events experienced on earth were those associated with the terminations of the last three ice ages; and for each and every one of these tremendous global warmings, Earth's air temperature rose well before there was any increase in atmospheric CO<sub>2</sub>. In fact, the air's CO<sub>2</sub> content did not begin to rise until 400 to 1,000 years after the planet began to warm. Ice cores provide a detailed record of local temperature and CO<sub>2</sub> concentrations. A study by Caillon et al. (2003) finds that the CO<sub>2</sub> increase lagged Antarctic deglacial warming by  $800 \pm 200$  years. The authors measured the isotopic composition of argon<sup>40</sup> and CO<sub>2</sub> concentration in air bubbles in the Vostok core during the end of the third most recent ice age (Termination III), 240,000 years before the present. The argon<sup>40</sup> isotope is found to be an excellent proxy for temperature.

### **Vostok Ice Core Data over End of Third Ice Age BP The CO<sub>2</sub> and Argon (Temperature) Age Scales are Shifted 800 Years**





The CO<sub>2</sub> concentration shown by the black line is plotted against age in years before present (BP) on the bottom axis, and the Argon40, a temperature proxy, shown by the grey line is plotted against age on the top axis. The age scale for the CO<sub>2</sub> has been shifted by a constant 800 years to obtain the best correlation of the two data sets. The correlation shows that temperature changes precede CO<sub>2</sub> concentration changes by about 800 years.

These findings confirm that an increase in CO<sub>2</sub> has never initially caused an increase in temperature during a deglaciation. Temperature increases cause the oceans to expel CO<sub>2</sub>, increasing the CO<sub>2</sub> content of the atmosphere. When temperature is at its maximum in each cycle and starts to fall, CO<sub>2</sub> concentrations continue to increase for another 800 years! As CO<sub>2</sub> increases, temperatures fall. This is the opposite of what one would expect if CO<sub>2</sub> were a primary climate driver. The ice core data proves that CO<sub>2</sub> is not a primary climate driver. One must invoke reverse time causality to claim the ice

core data shows CO<sub>2</sub> causes temperature change, like suggesting actions taken today can affect the conquests of Mongol leader Genghis Khan. Logic demands that cause must precede effect. Increases in air temperature drive increases in atmospheric CO<sub>2</sub> concentration, and not vice versa. See [here](#) for more information. See [here for a graph](#) of Vostok ice core data. See [here](#) for the Cailion et al (2003) paper.

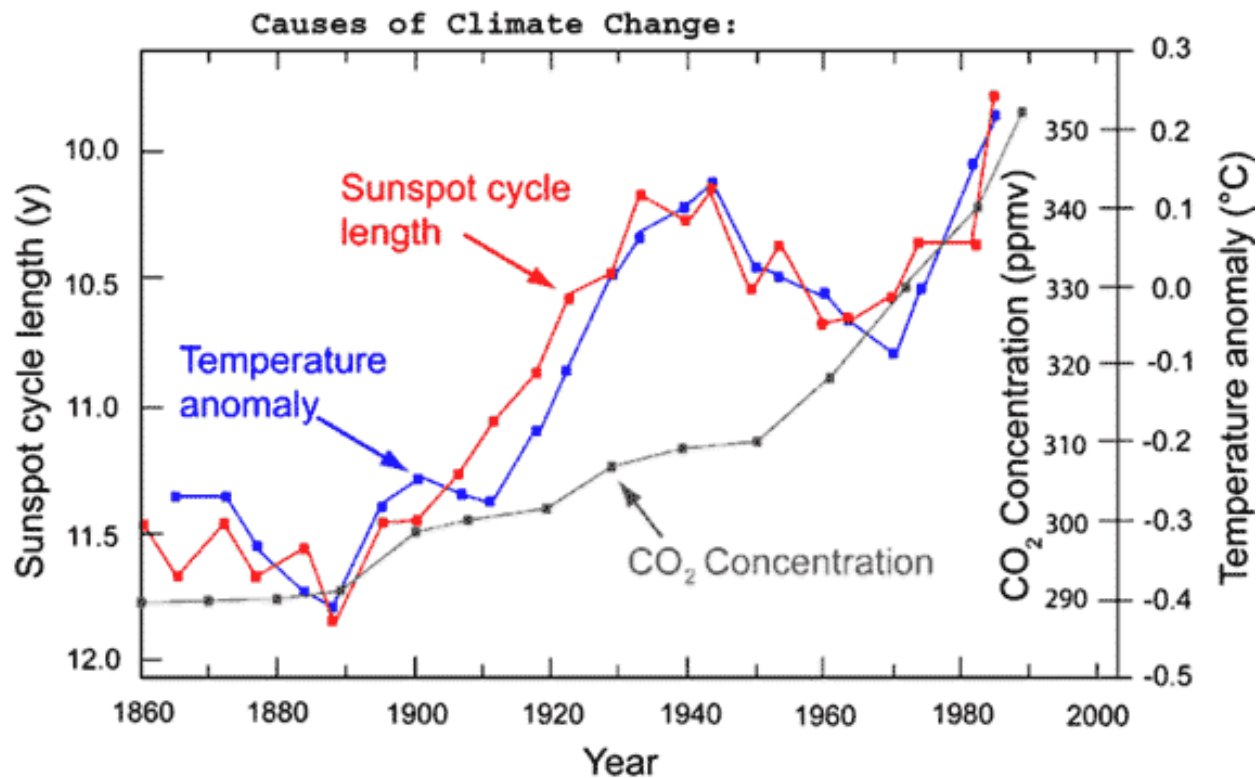
### *Sun Activity Does Correlate with Temperature*

Numerous papers published in major peer-reviewed scientific journals shows the Sun is the primary driver of climate change. There is a very strong correlation between the Sun activity and temperature.

Early in the nineteenth century, William Herschel (1738-1822), discoverer of Uranus, found that five periods of low number of sunspots corresponded to high wheat prices when the temperatures were cold. (Cold climate reduces the supply of wheat causing its price to rise.) See [here](#).

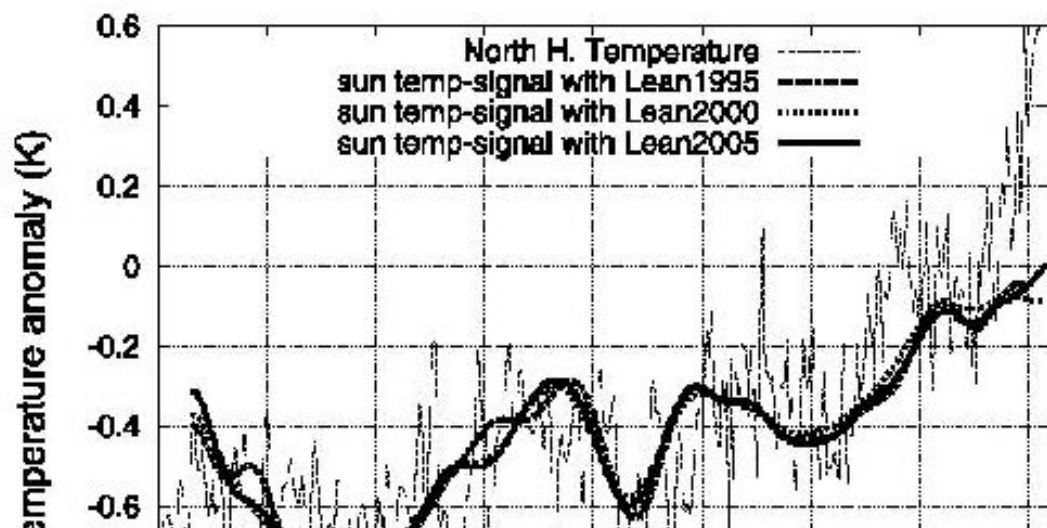
E. Friiz-Christensen and K.Lawsen have shown that the length of the mean 11 year Sunspot cycle closely correlates to the northern hemisphere temperature during the past 130 years. The length of the Sunspot cycle is known to vary with solar activity, whereas high solar activity implies short sunspot cycle length. See [here for further information](#).

Here is a correlation of the Sun activity, temperature and CO<sub>2</sub>.



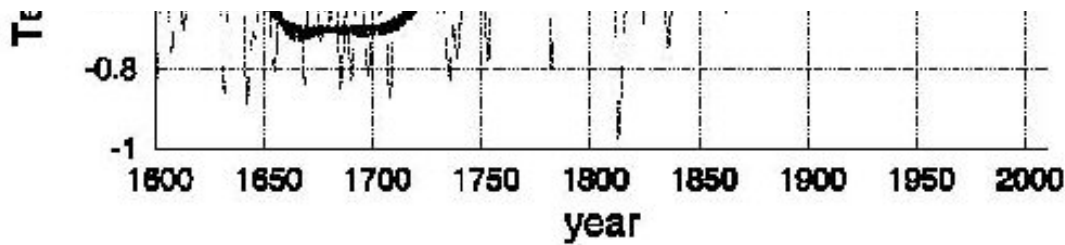
N. Scafetta and B.J. West of Duke University, Durham, North Carolina study the solar impact on 400 years of global temperatures since 1600. They find good correspondence between temperature and solar irradiance proxy reconstructions up until 1920.

#### Northern Hemisphere Temperature vs Solar Irradiance 400 years



The temperature curve is derived from proxy record to 1850 by Moberg et al. [2005], and from instrumental surface temperature data since 1850. The temperature record includes the urban heat island and land use changes effects. Three different solar irradiance proxy reconstructions are shown: Lean et al. 1995; Lean, 2000; Wang et al., 2005. Note the low solar activity periods occurring during the Maunder Minimum (1645–1715, the Little Ice Age) and during the Dalton Minimum (1795–1825).

Note the excellent correlation from 1600 to 1900 when humans were unlikely to effect climate. During the 20th century one



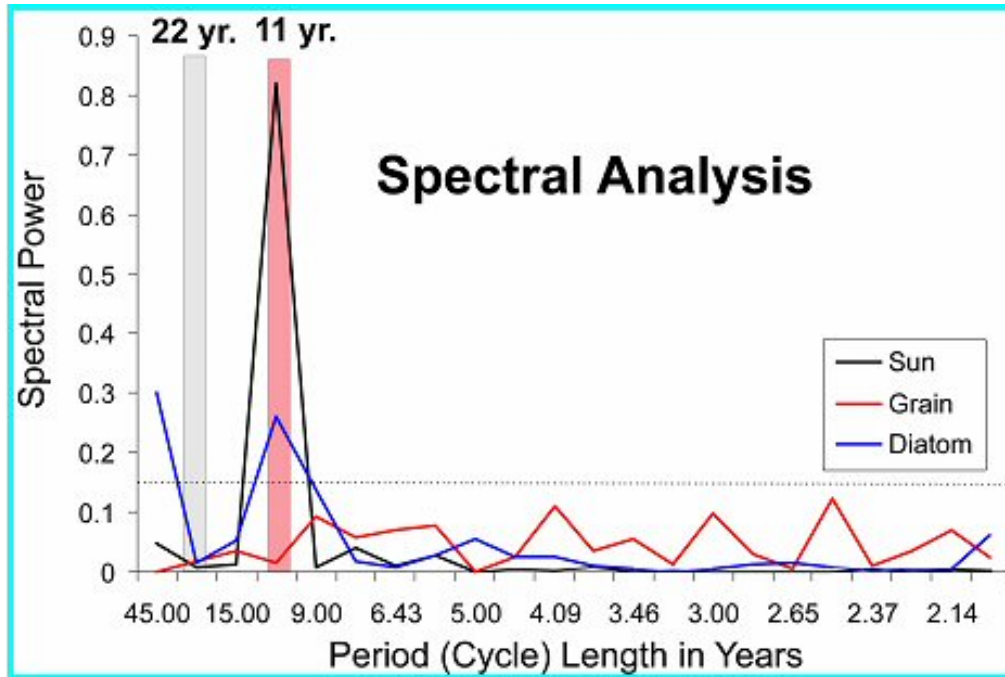
continues to observe a significant correlation between the solar and temperature patterns:

both records show an increase from 1900 to 1950, a decrease from 1950 to 1970, and again an increase from 1970 to 2000.

A divergence of the curves indicates that the Sun likely contributed 50% of the global warming since 1920. The remainder may be due to CO2 and land use changes. See [here for the abstract](#), or [here for the full article](#).

A group of NASA and university scientists have found convincing evidence of a link between the Sun activity and climate by comparing the records of the historical water level of the Nile River to the number of auroras observed in northern Europe and the Far East between 622 and 1470 AD. Auroras are bright glows in the night sky following solar flares, and are an excellent means of tracking solar activity. See [this link for further information](#).

Recently, Tim Patterson, an adviser to the FOS, has studied high-resolution Holocene climate records from fjords and coastal lakes in British Columbia and demonstrates a link between temperature and solar cycles.

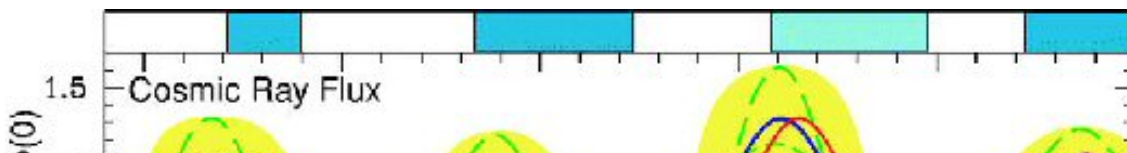


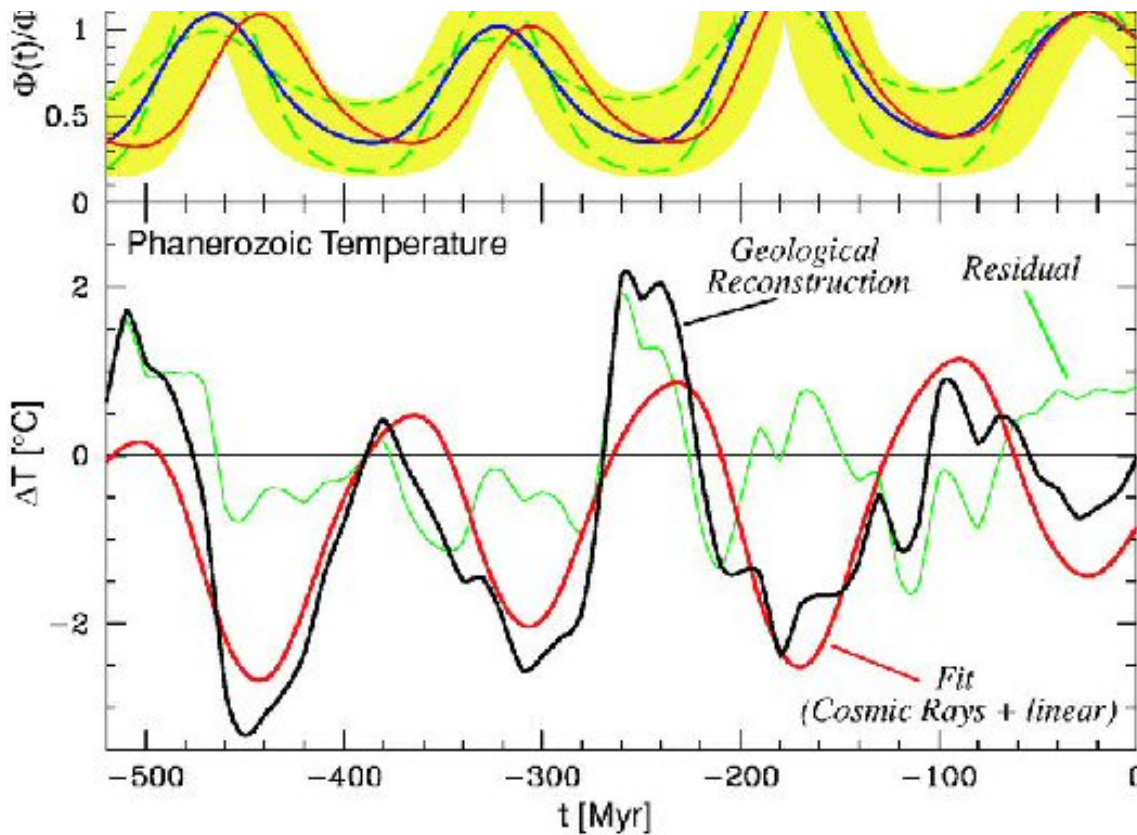
The spectral analysis shown here is from sediment cores obtained from Effingham Inlet, Vancouver Island, British Columbia. The annually deposited laminations of the core are linked to the changing climate conditions. The analysis shows a strong correlation to the 11-year sunspot cycle.

See [here for a powerpoint slide show](#) by Tim Patterson.

N. Shaviv and J. Veiser using seashell thermometers shows a strong correlation between temperature and the cosmic ray flux over the last 520 million years.

**Cosmic Ray Flux and Tropical Temperature Variation Over the Phanerozoic 520 million years**





The upper curves describe the cosmic ray flux (CRF) using iron meteorite exposure age data. The blue line depicts the nominal CRF, while the yellow shading delineates the allowed error range. The two dashed curves are additional CRF reconstructions that fit within the acceptable range. The red curve describes the nominal CRF reconstruction after its period was fine-tuned to best fit the low-latitude temperature anomaly. The bottom black curve depicts the smoothed temperature change ( $\Delta T$ ) derived from calcitic shells over the Phanerozoic. The red line is the predicted  $\Delta T$  model for the red curve above. The green line is the residual. The top blue bars indicate ice ages.

### Sun and Cosmic Rays

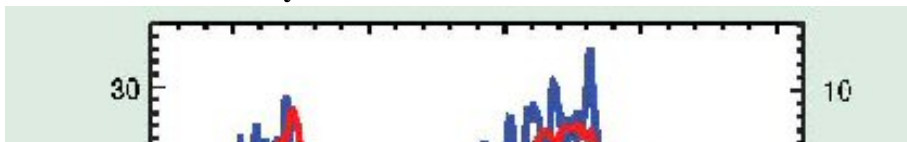
During the 20th century the Sun has continued to warm and may have contributed directly to a third of the warming over the last hundred years. The change in solar output is too small to directly account for most of the observed warming. However, the Sun-Cosmic Ray connection provides an amplification mechanism by which a small change in solar irradiance will have a large effect on climate.

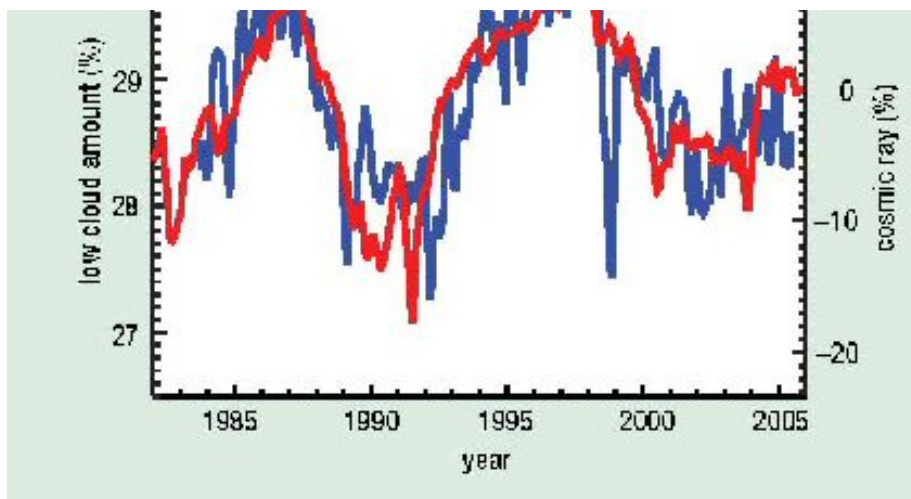
A paper by H. Svensmark and E. Friis-Christensen of the Center for Sun-Climate Research of the Danish National Space Center in Copenhagen has shown that cosmic rays highly correlate to low cloud formation. Changes in the intensity of galactic cosmic rays alter the Earth's cloudiness.

A recent experiment in 2005 shows the effect of cosmic rays in a reaction chamber containing air and trace chemicals found over the oceans. Electrons released in the air by cosmic rays act as a catalyst in making aerosols. They significantly accelerate the formation of stable, ultra-small clusters of sulphuric acid and water molecules, which are the building block for the cloud condensation nuclei.

Data from the International Satellite Cloud Climatology Project and the Huancayo cosmic ray station shows a remarkable correlation between low clouds (below 3 km) and cosmic rays. There are more than enough cosmic rays at high altitudes, so changes in the cosmic rays do not effect high clouds. But fewer cosmic rays penetrate to the lower clouds, so they are sensitive to changes in cosmic rays.

### Cosmic Rays and Low Clouds



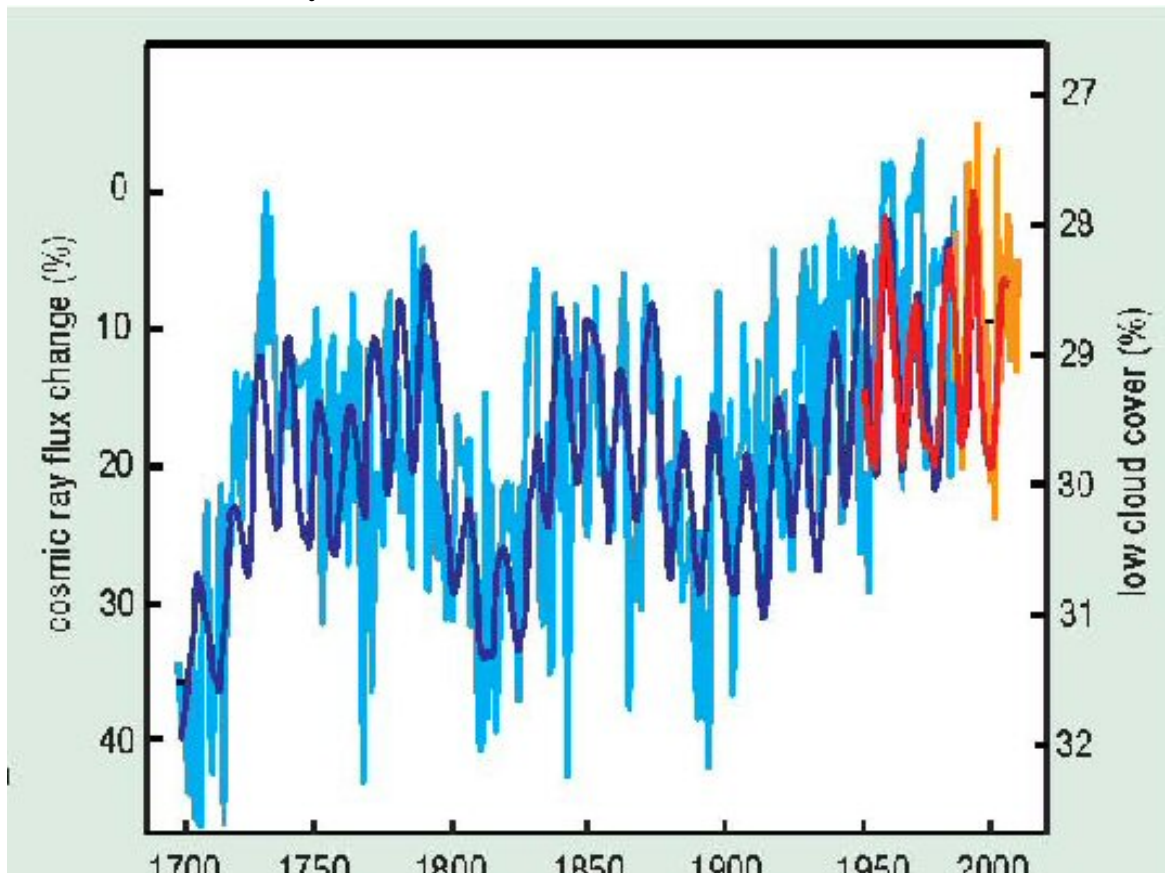


The blue line shows variations in global cloud cover collated by the International Satellite Cloud Climatology Project. The red line is the record of monthly variations in cosmic-ray counts at the Huancayo station.

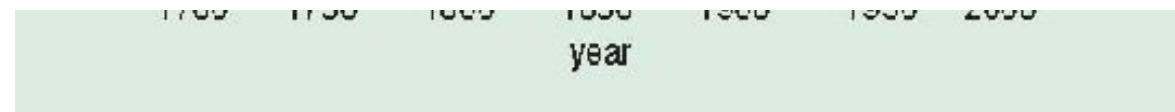
Low-level clouds cover more than a quarter of the Earth's surface and exert a strong cooling effect on the surface. A 2% change in low clouds during a solar cycle will change the heat input to the Earth's surface by 1.2 watts per square metre ( $\text{W/m}^2$ ). This compares to the total warming of  $1.4 \text{ W/m}^2$  the IPCC cites in the 20th century. (The IPCC does not recognize the effect of the Sun and Cosmic rays, and attributes the warming to  $\text{CO}_2$ .)

Cosmic ray flux can be determined from radioactive isotopes such as beryllium-10, or the Sun's open coronal magnetic field. The two independent cosmic ray proxies confirm that there has been a dramatic reduction in the cosmic ray flux during the 20th century as the Sun has gained intensity and the Sun's coronal magnetic field has doubled in strength.

### Cosmic Ray Flux Since 1700

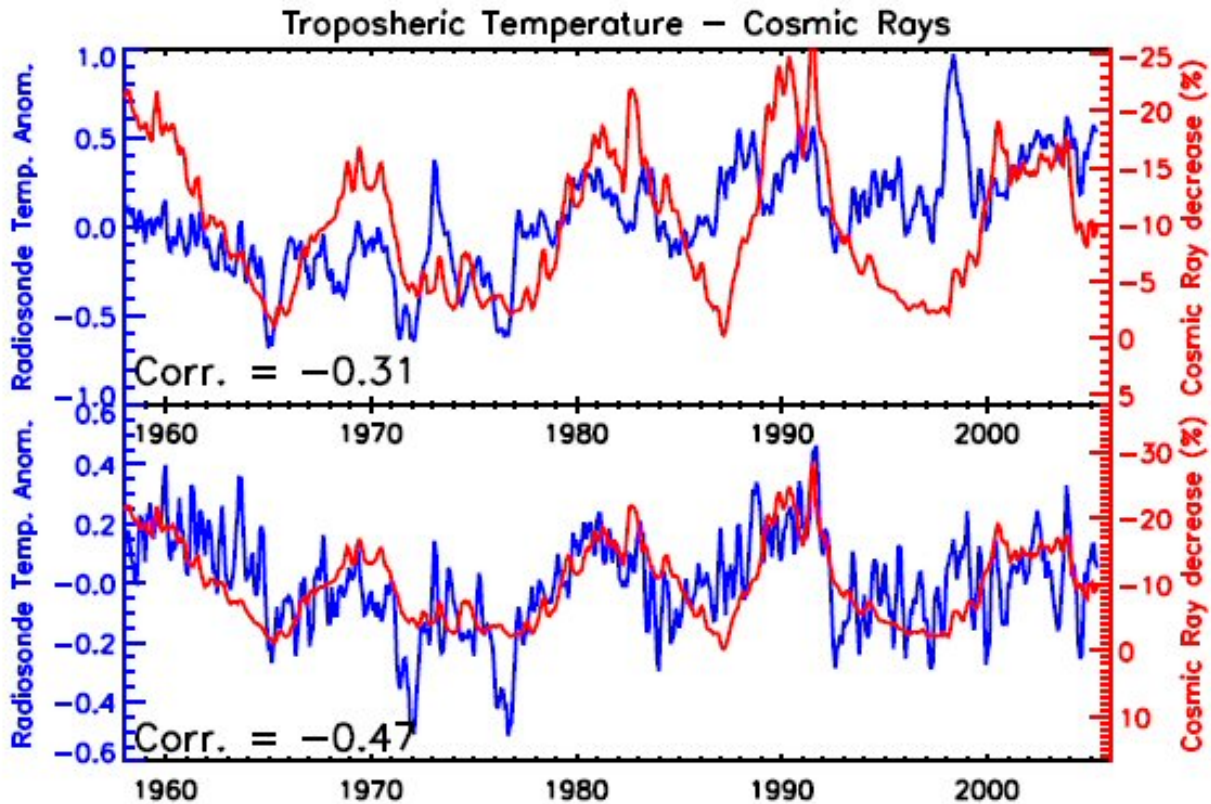


Changes in the flux of galactic cosmic rays since 1700 are here derived from two independent proxies,  $^{10}\text{Be}$  (light blue) and open solar coronal flux (dark blue) (Solanki and Fligge 1999). Low cloud amount (orange) is scaled and normalized to observational cosmic-ray data from Climax (red) for the period 1953 to 2005 (3 GeV cut-off). Both scales are inverted to correspond with rising temperatures. Note that high cosmic ray flux around 1700 is at the end of the Little Ice Age. Also note the increase in cosmic ray flux after 1780 at the time of the Dicken's Winters.



The graph below shows a correlation between the cosmic ray counts and the global troposphere temperature radiosonde data. The cosmic ray scale is inverted to correspond to increasing

temperatures. High solar activity corresponds to low cosmic ray counts, reduced low cloud cover, and higher temperatures. The upper panel shows the troposphere temperatures in blue and the cosmic ray count in red. The lower panel shows the match achieved by removing El Niño, the North Atlantic Oscillation, volcanic aerosols and a linear trend of 0.14 Celsius/decade.

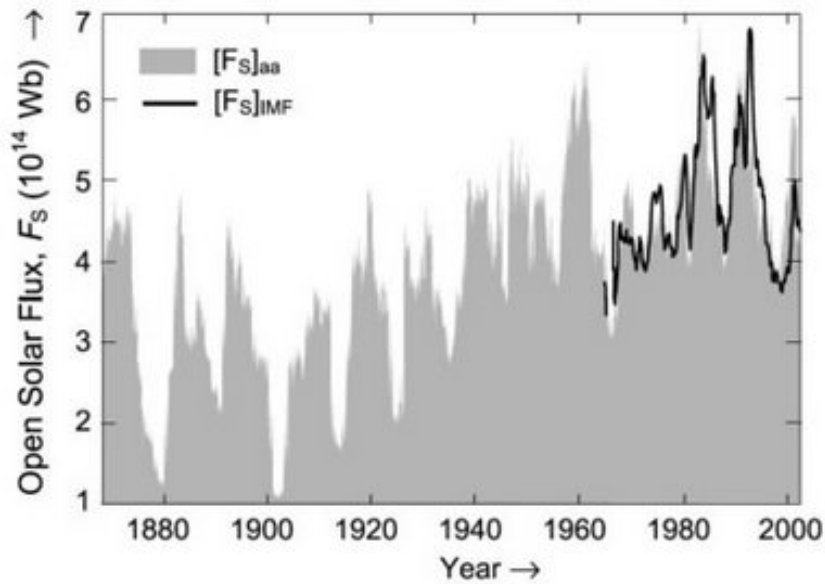


The negative correlation between cosmic ray counts and troposphere temperatures is very strong, indicating that the Sun is the primary climate driver. H. Svensmark and E. Friis-Christensen published the above graph in a paper October 2007 in response to a paper by M. Lockwood and C. Frohlich, in which they argue that the historical link between the Sun and climate came to an end about 20 years ago. However, the Lockwood paper had several deficiencies, including the problem that they used surface temperature data that is contaminated by the urban heat island effect (see below).

See the Svensmark rebuttal of the Lockwood paper [here](#), and a critique by myself [here](#).

Over the 20th century the Sun has increased activity and irradiance intensity, directly providing some warming. The graph below from [here](#) show the rising solar flux during most of the twentieth century.

### Open Solar Flux



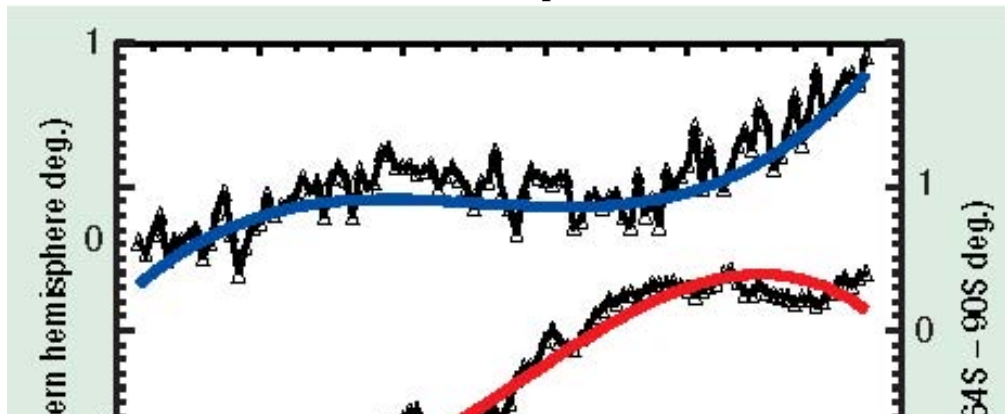
When the Sun is active it has a higher number of sun spots and emits more solar wind - a continuous stream of very high-speed charged particles. The increased solar wind and magnetic field repels cosmic rays that otherwise would hit the Earth's atmosphere, resulting in less aerosols in the lower atmosphere thereby reducing low cloud formation. The low clouds have a high reflectivity and have a strong cooling effect by reflecting sunlight back into space.

In summary, the process is:

More active Sun --> more Sunspots --> more solar wind --> less cosmic ray --> less aerosols --> less low clouds --> more sun light to the surface --> global warming.

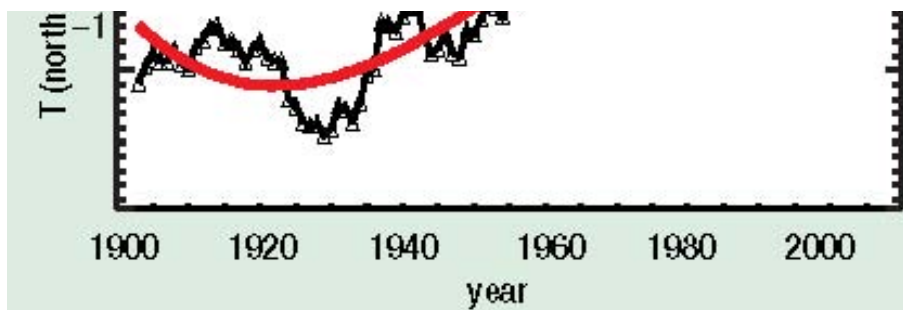
The theory of CO2 warming implies that the arctic and Antarctica should be warming about the same, and the polar regions should be warming more than the rest of the Earth. However, Antarctica has not warmed since 1975, which is a big problem for the CO2 theory. The ice covering Antarctica has even higher reflectivity than low clouds, so fewer low clouds cools Antarctica, while fewer low clouds warms the rest of the planet. (Greenland's ice sheet is much smaller and is not so reflective.) This Antarctica temperature trend is strong evidence that the Sun, not CO2, is the primary climate driver.

### Antarctica and North America Temperature Trends



The top curve is the North American surface temperature and the bottom curve is the Antarctica (64 S - 90 S) surface temperature over the past 100

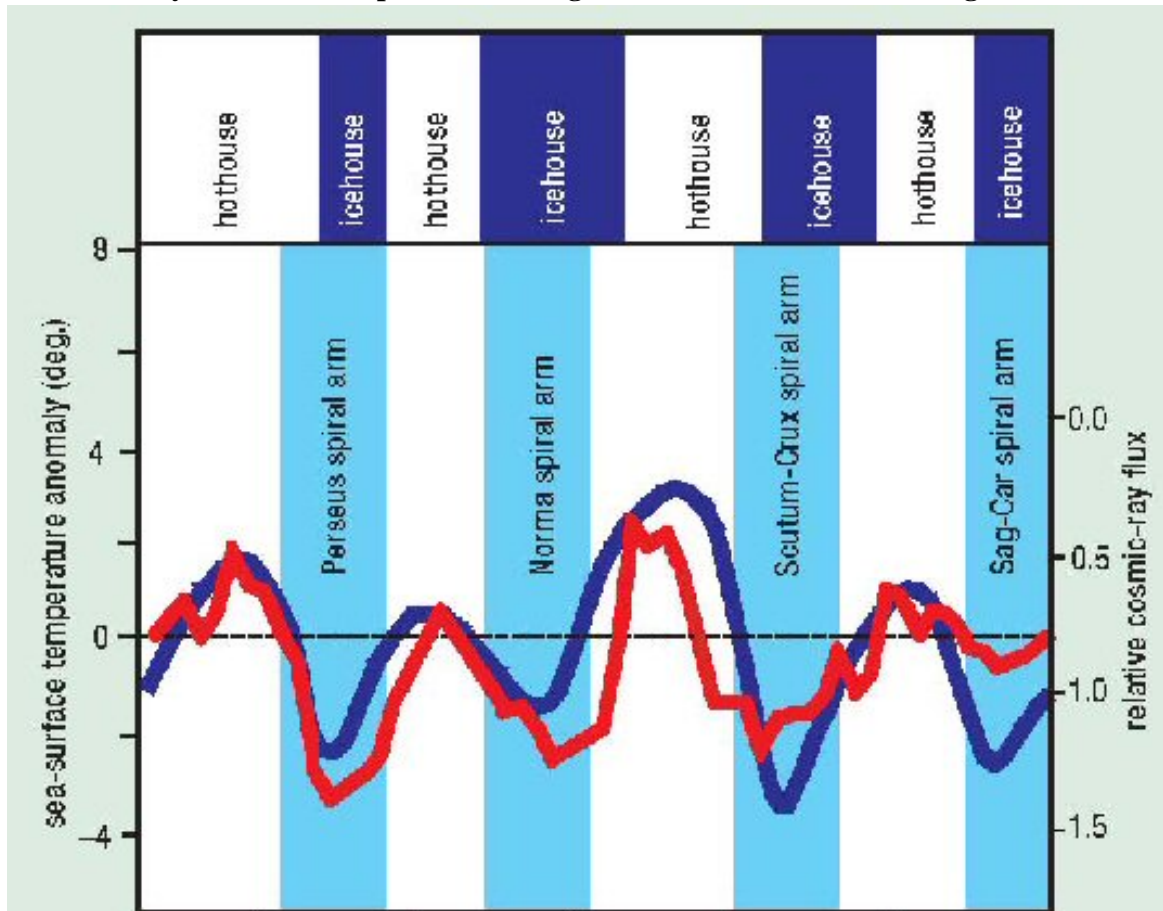




years. The Antarctic data have been averaged over 12 years to minimize the temperature fluctuations. The blue and red lines are fourth-order polynomial fits to the data. The curves are offset by 1 K for clarity, otherwise they would cross and re-cross three times.

The cosmic ray flux is not only influenced by the solar wind, it also varies with the position of the solar system in the galactic arms. The solar system passes through the arms of the Milky Way galaxy roughly every 140 million years. When the solar system is in the galactic arms the intensity of cosmic rays increases, as we are closer to more supernovas that give off powerful bursts of cosmic rays. The variations of the cosmic ray flux due to the solar system passing through four arms of the Milky Way galaxy during the last 550 million years is ten times greater than that caused by the Sun. The correlation between cosmic rays and temperatures over 520 million years by N. Shaviv and J. Veizer was shown previously. Below is a similar graph based on their work, but with the times of the galactic arm crossings shown.

### Cosmic Ray Flux and Temperature Changes with Galactic Arm Crossings

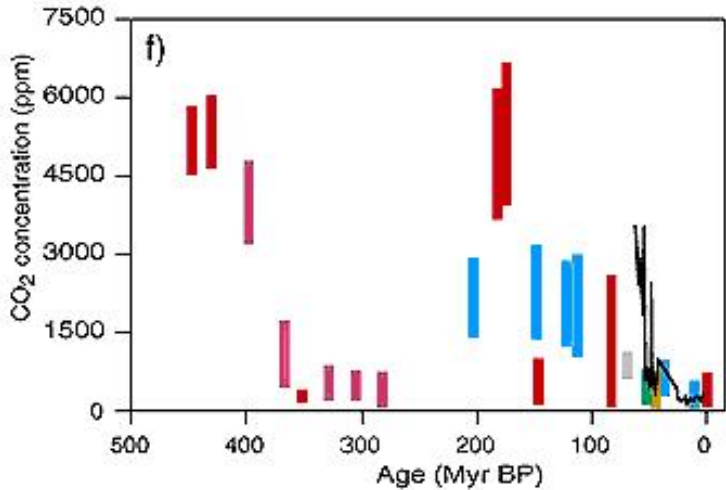


Four switches from warm “hothouse” to cold “icehouse” conditions during the Phanerozoic are shown in variations of several degrees K in tropical sea-surface temperatures (red curve). They correspond with four encounters with spiral arms of the Milky Way and the resulting increases in the cosmic-ray flux (blue curve, scale inverted). (After Shaviv and Veizer 2003)



Temperature changes over this time range can not be explain by the CO2 theory.

**CO2 Concentrations 500 Million Years**



The graph shows CO2 concentration over the last 500 million years. The CO2 does not correlate with temperature. Note when CO2 concentrations were more than 10 times present levels about 175 million years ago and 440 million years ago, the Earth was in two very cold ice ages.

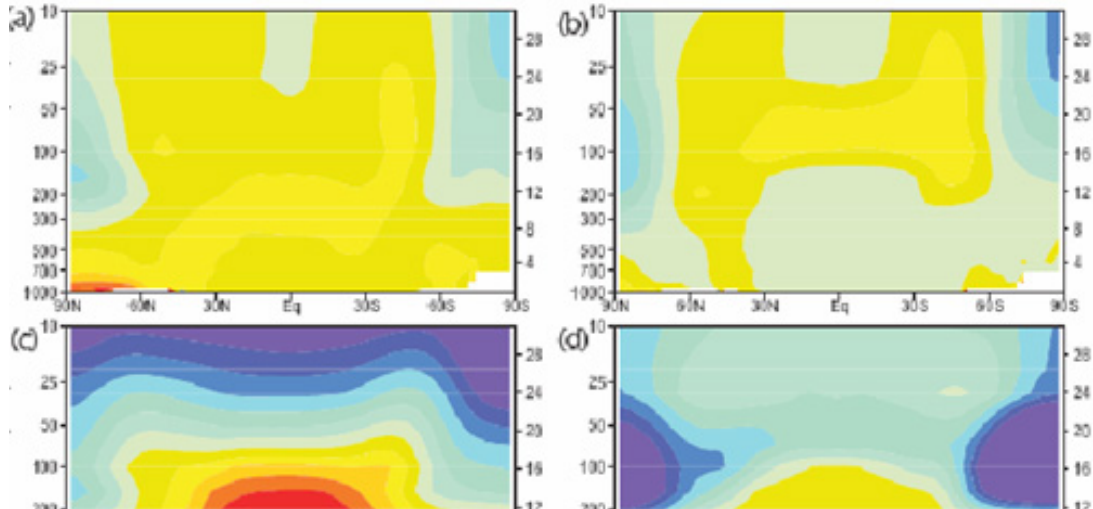
See [here for a paper on CosmoClimatology by Henrik Svensmark](#).  
 See [here for a discussion of the Shaviv and Veizer 2003 paper by Tim Patterson](#). See [here for their paper](#).

**Heating of the Troposphere**

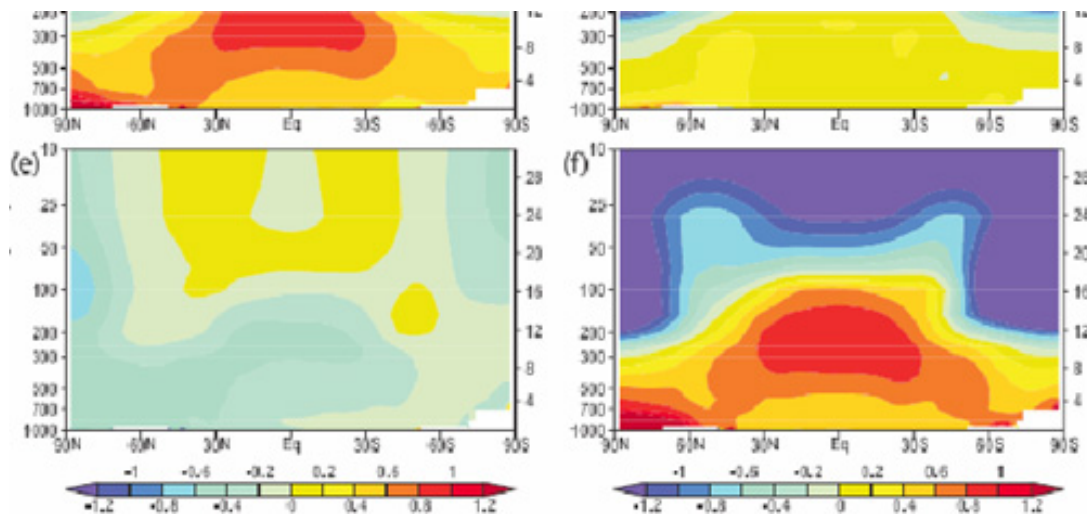
Computer models based on the theory of CO2 warming predicts that the troposphere in the tropics should warm faster than the surface in response to increasing CO2 concentrations, because that is where the CO2 greenhouse effect operates. The Sun-Cosmic ray warming will warm the troposphere more uniformly.

The UN's IPCC fourth assessment report includes a set of plots of computer model predicted rate of temperature change from the surface to 30 km altitude and over all latitudes for 5 types of climate forcings as shown below.

**Computer Model Predicted Temperature Change**



The six plots show predicted temperature changes due to:  
 a) the Sun



- b) volcanic activity
- c) anthropogenic CO2 and other greenhouse gasses
- d) anthropogenic ozone
- e) anthropogenic sulphate aerosol particles
- f) all the above forcings combined

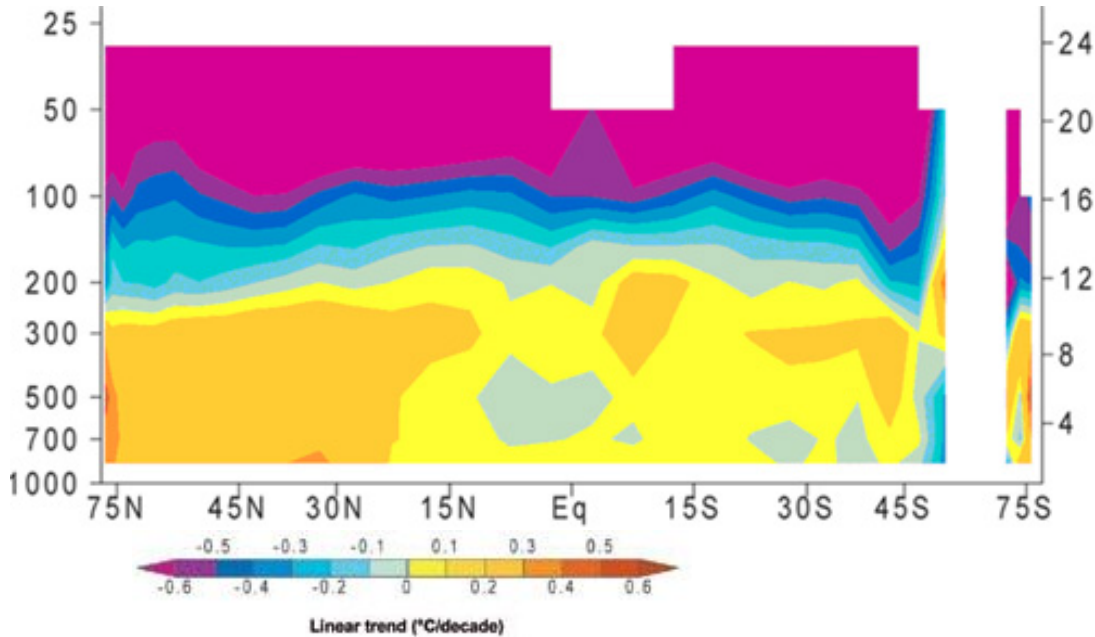
The rate of temperature change is shown by the colour in degrees Celsius per decade.

It is apparent that plot c) of warming caused by greenhouse gasses is strikingly distinct from other causes of warming. Plot f) is similar to plot c) only because the IPCC assumes that CO2 is the dominant cause of global warming.

The computer models show that greenhouse warming will cause a hot-spot at an altitude between 8 and 12 km over the tropics between 30 N and 30 S. The temperature at this hot-spot is projected to increase at a rate of two to three times faster than at the surface.

However, the Hadley Centre's real-world plot of radiosonde temperature observations shown below does not show the projected CO2 induced global warming hot-spot at all. The predicted hot-spot is entirely absent from the observational record. This shows that most of the global temperature change can not be attributed to increasing CO2 concentrations.

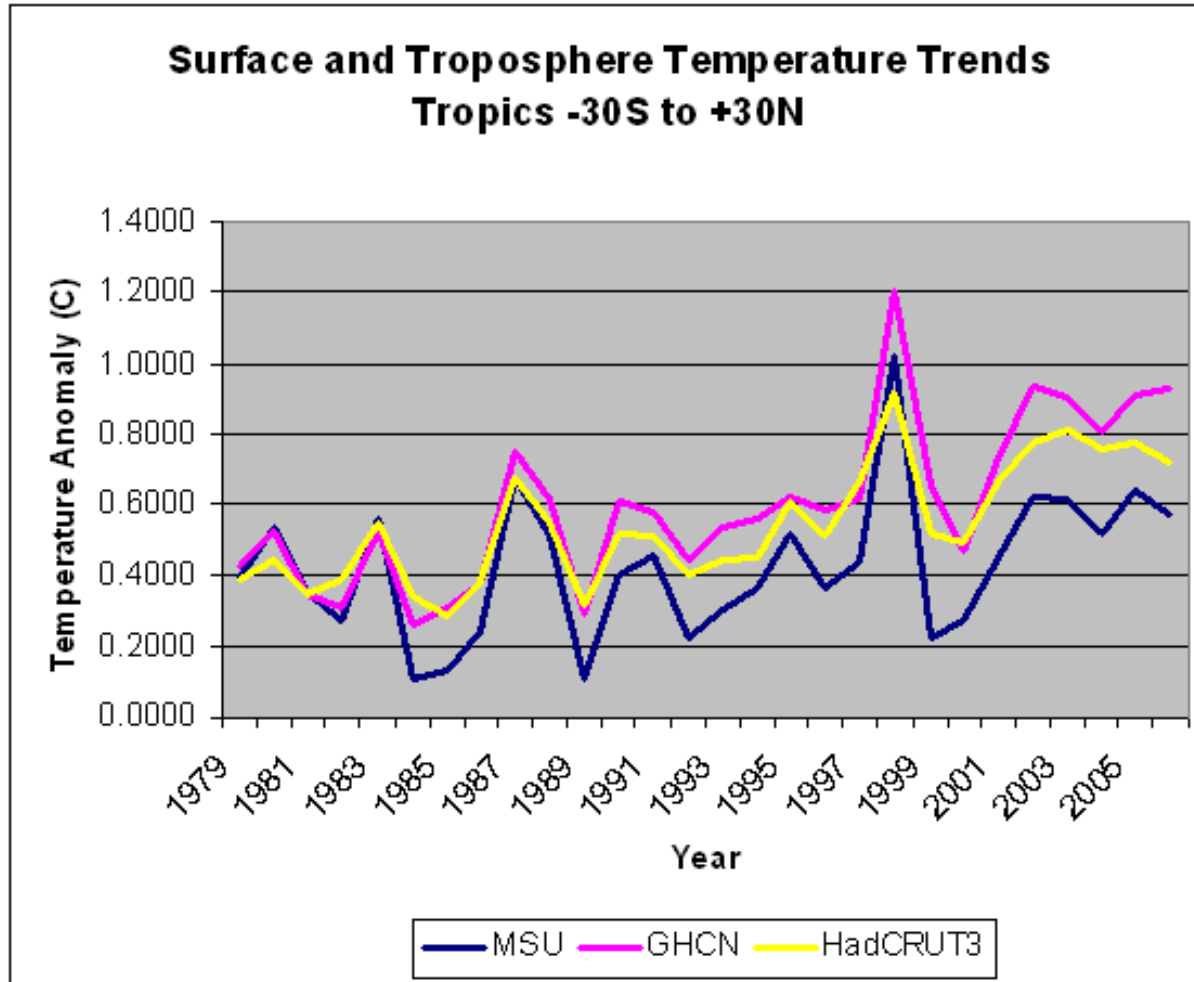
**HadAT2 Radiosonde Data 1979 - 1999**



The left scale is atmosphere pressure in hPa. The right scale is altitude in km.  
 Source: HadAT2 radiosonde observations, from [CCSP \(2006\)](#), p116, fig. 5.7E

See [Greenhouse Warming? What Greenhouse Warming? by Christopher Monckton](#)

This graph compares the annual temperatures of the troposphere to the surface measurements in the tropics from 30 degrees North to 30 degrees South. .



The MSU curve is the Microwave Sounding Unit satellite measurements. It measures the temperature of the troposphere up to approximately 8 km.

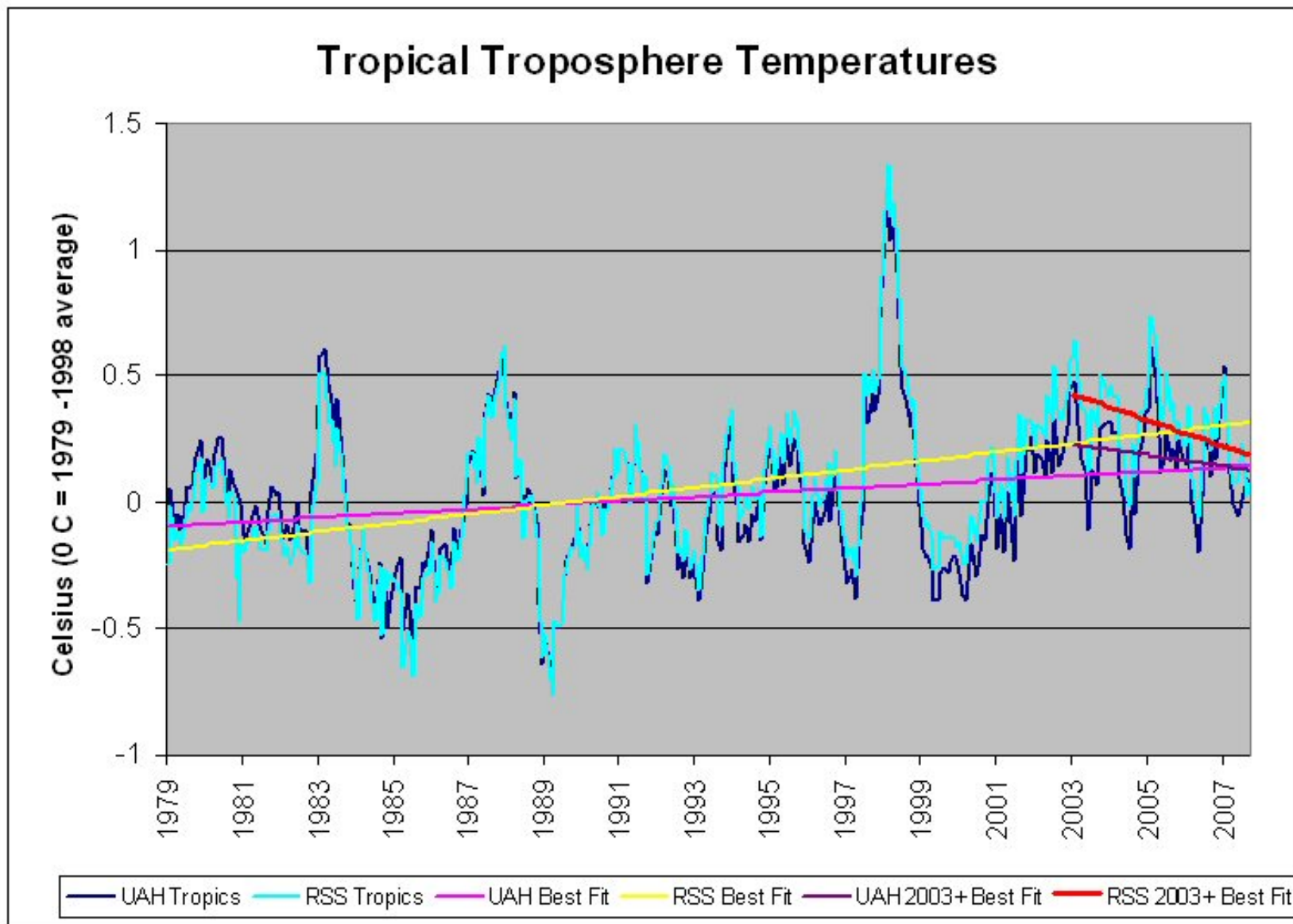
The GHCN curve is the Global Historical Climatology Network data set of land surface temperatures from the National Climatic Data Center.

The HadCRUT3 curve is the Land and Sea-Surface Temperatures data set from UK Met Office.

The three curves are scaled so that the average of the first 5 years are the same.

A comparison of the records show that the surface has warmed faster than the troposphere, the opposite of what is predicted by the theory of CO<sub>2</sub> warming. Observations agree with the Sun-Cosmic ray warming theory.

The response of the troposphere temperatures in the tropics is sometimes called the fingerprint of the CO<sub>2</sub> contribution to warming.

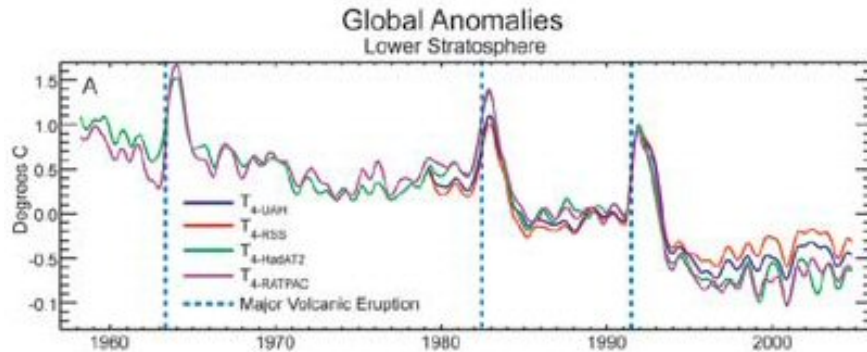


This graph shows two analyses of Microwave Sounding Unit (MSU) satellite temperature measurement data of the troposphere over the tropics from 20 degrees North to 20 degrees South. The UAH analysis is from the University of Alabama in Huntsville and the RSS analysis is from Remote Sensing Solutions. The two analyses use different methods to adjust for factors such as orbital decay and inter-satellite difference. The overall trend lines to September 2007 shows increasing temperatures at 0.08 C/decade for UAH and 0.17 C/decade for RSS. However, since January 2003, the temperatures have been declining at 0.21 C/decade for UAH and 0.50 C/decade for the RSS data. The IPCC projections do not agree with the data.

### *Stratospheric Cooling*

The graph "HadAT2 Radiosonde Data 1979 - 1999" in the previous section shows that the stratosphere (above 16 km) has cooled, which might appear to indicate a greenhouse gas effect. However, stratospheric cooling is predicted to occur due to both greenhouse gasses and ozone depletion. The ozone concentration in the

stratosphere has declined from 1970 until 1995, and has not declined at all since then due to the implementation of the Montreal Protocol, which limits the emission of ozone reducing CFCs. See [here](#). The stratosphere temperatures are given below from [here](#).

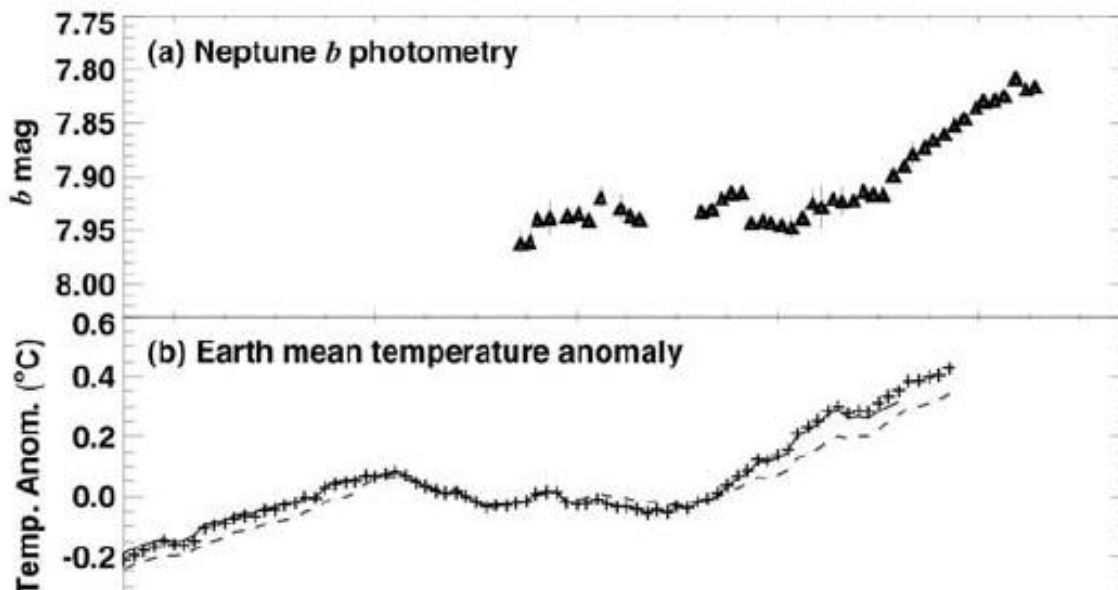


The lower stratosphere temperature has not declined at all since 1995 (when the ozone levels are stable or slightly increasing), so the data does not indicate any greenhouse gas cooling of the stratosphere. In fact, it appears that there has been a slight warming of the lower stratosphere since 1995, the opposite of what is predicted by computer models of the greenhouse gas effects. The stratosphere cooling indicated by the radiosonde data is caused by the changing ozone concentration, not by greenhouse gasses.

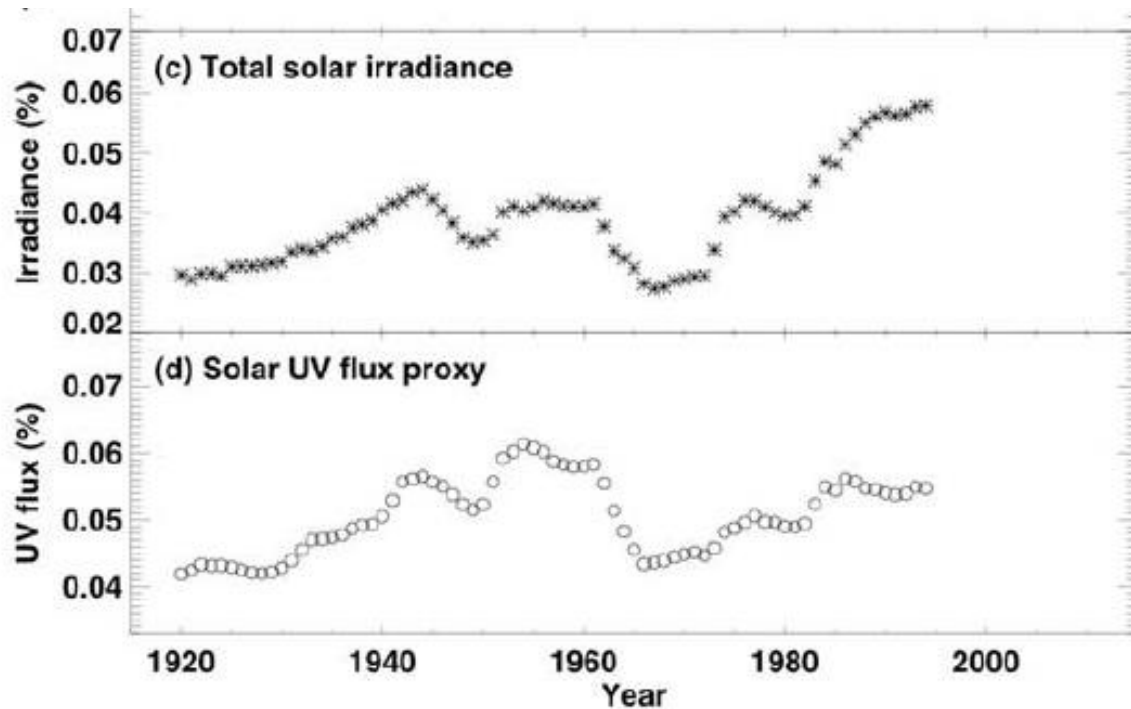
### *Warming on Other Planets*

If the Sun is the primary driver of climate change, one should expect to see evidence of recent warming on other planets. As the Earth has warmed over the last 100 years, so too has Neptune, Mars and Pluto.

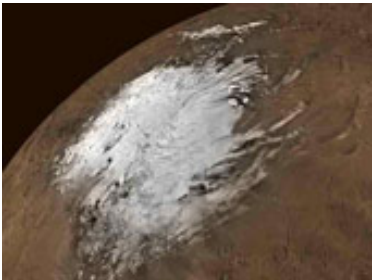
### Neptune Warming



Neptune is the furthest planet from the Sun (Pluto is now a dwarf planet) and orbits the Sun at 30 times the distance from the Sun to the Earth. In the recent article, Hammel and Lockwood, from the Space Science Institute in Colorado and the Lowell Observatory, show Neptune has been getting brighter since around 1980;



Sun activity, which increases dust storms. The study's authors led by Lori Fenton, a planetary scientist at NASA, says the dust makes the atmosphere absorb more heat causing a positive feedback. Surface air temperatures on Mars increased by 0.65 C (1.17 F) from the 1970s to the 1990s. Residual ice on the Martian south pole, they note, has steadily retreated over the last four years. Thermal spectrometer images of Mars taken by NASA's Viking mission in the late 1970s were compared with similar images gathered more than 20 years later by the Global Surveyor.



Mars polar ice cap

See [here](#) or [here](#) or [here](#) for more information.

The demoted planet Pluto is also undergoing warming according to astronomers. Pluto's atmosphere pressure has tripled over the last 14 years, indicating rising temperatures even as the planet moves further from the Sun. See [here](#) for further information.

### *CO2 Versus the Sun/Cosmic Ray Warming Theories*

The following table sets out a comparison of the predictions of two climate theories - the CO2 warming theory and the Sun/Cosmic Ray theory - and actual real

furthermore, infrared measurements of the planet since 1980 show that the planet has been warming steadily from 1980 to 2004.

In the figure, (a) represents the corrected visible light from Neptune from 1950 to 2006; (b) shows the temperature anomalies of the Earth; (c) shows the total solar irradiance as a percent variation by year; (d) shows the ultraviolet emission from the Sun. All data has been corrected for the effects of Neptune's seasons, variations in its orbit, the apparent tilt of the axis as viewed from the Earth, the varying distance from Neptune to Earth, and changes in the atmosphere near the Lowell Observatory.

See [here for more information](#).

A recent study shows that Mars is warming four times faster than the Earth. Mars is warming due to increased

world data.

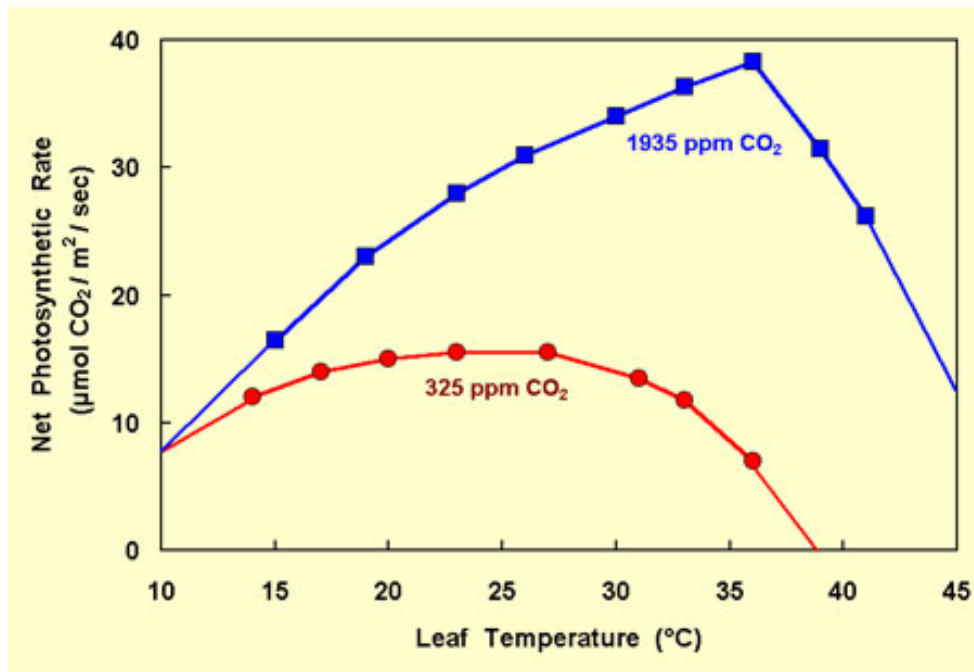
<b>Issue</b>	<b>Prediction - CO2 Theory</b>	<b>Prediction - Sun/ Cosmic Ray Theory</b>	<b>Actual Data</b>	<b>Which Theory Wins</b>
Antarctic and Arctic Temperatures	Temperatures in the Arctic and Antarctic will rise symmetrically	Temperatures will initially move in opposite directions	Temperatures move in opposite directions	Sun/Cosmic Ray
Troposphere Temperature	Fastest warming will be in the troposphere over the tropics	The troposphere warming will be uniform	The surface warming is similar or greater than troposphere warming	Sun/Cosmic Ray
Timing of CO2 and Temperature Changes at End of Ice Age	CO2 increases then temperature increases	Temperature increases then CO2 increases	CO2 concentrations increase about 800 years after temperature increases	Sun/Cosmic Ray
Temperature correlate with the driver over last 400 year	na	na	Cosmic ray flux and Sun activity correlates with temperature, CO2 does not	Sun/Cosmic Ray
Temperatures during Ordovician period	Very hot due to CO2 levels > 10X present	Very cold due to high cosmic ray flux	Very cold ice age	Sun/Cosmic Ray
Other Planets' Climate	No change	Other planets will warm	Warming has been detected on several other planets	Sun/Cosmic Ray

### ***CO2 Greatly Increases Plant and Forest Growth***

CO2 is a major plant fertilizer. The increase in CO2 emissions have caused increased crop yields and faster growing plants and forests, thereby greening the planet. Estimates vary, but somewhere around 15% seems to be the common number cited for the increase in global food crop yields due to aerial fertilization with increased carbon dioxide since 1950. This increase has both helped avoid a Malthusian disaster and preserved or returned enormous tracts of marginal land as wildlife habitat that would otherwise have had to be put under the plow in an attempt to feed the growing global population. Commercial growers deliberately generate CO2 and increase its levels in agricultural greenhouses to between 700 ppm and 1,000 ppm to increase productivity and improve the water efficiency of food crops far beyond those in the somewhat CO2 starved atmosphere. CO2 feeds the forests, grows more usable lumber in timber lots meaning there is less pressure to cut old growth or push into "natural" wildlife habitat, makes plants more water efficient helping to beat back the encroaching deserts in Africa and Asia and generally increases bio-productivity. See [here](#)

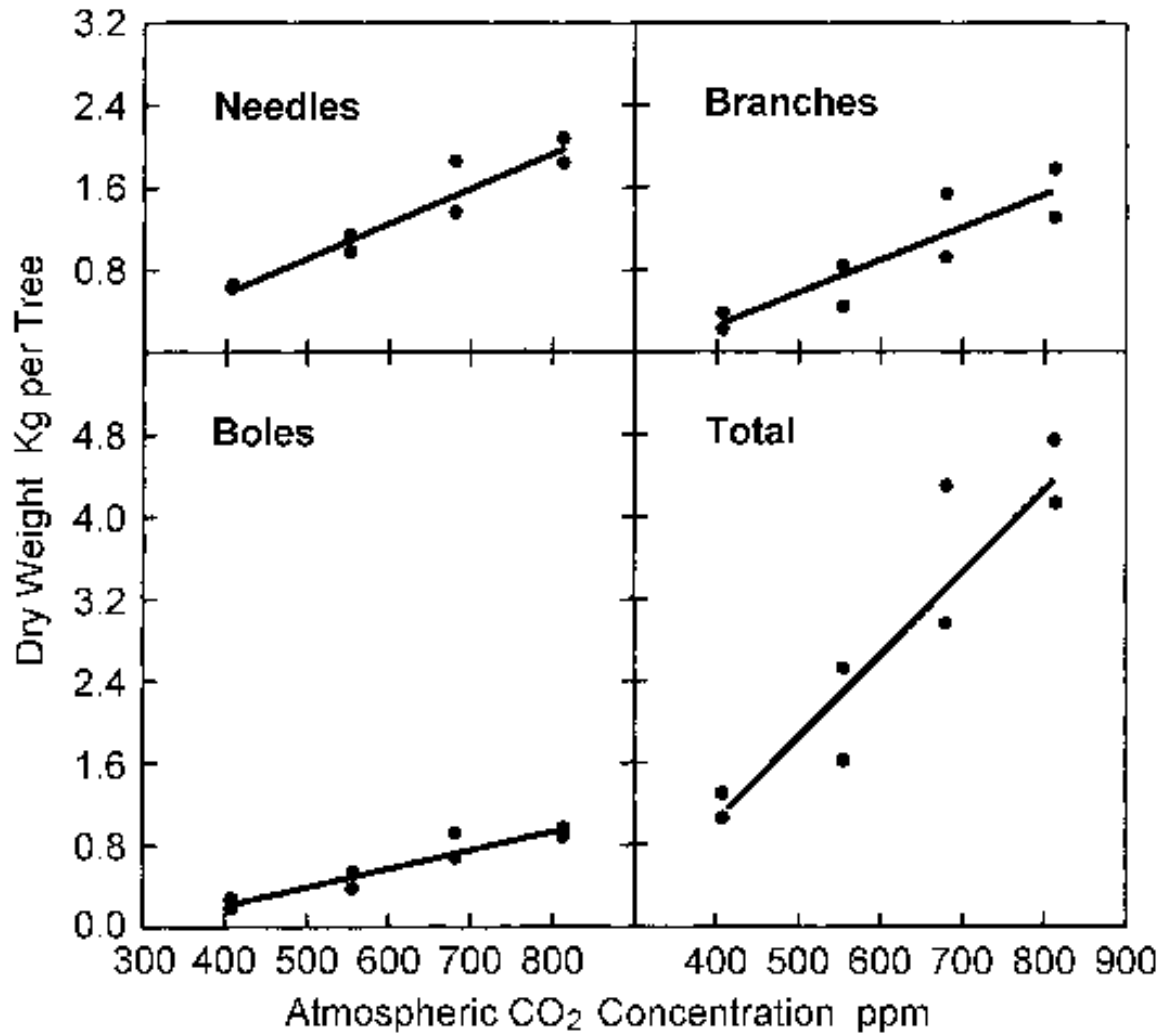
### **Bigtooth Aspen Growth Response to Enhanced CO2 and Temperature**





Jurik et al. (1984) exposed bigtooth aspen leaves to atmospheric CO<sub>2</sub> concentrations of 325 ppm and 1935 ppm and measured their photosynthetic rates at a number of different temperatures. At 25°C, where the net photosynthetic rate of the leaves exposed to 325 ppm CO<sub>2</sub> is maximal, the extra CO<sub>2</sub> of this study boosted the net photosynthetic rate of the foliage by nearly 100%; and at 36°C, where the net photosynthetic rate of the leaves exposed to 1935 ppm CO<sub>2</sub> is maximal, the extra CO<sub>2</sub> boosted the net photosynthetic rate of the foliage by a whopping 450%. These results are similar to studies of many other plants.

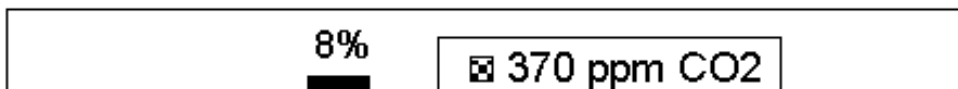
### Young Eldarica Pine Tree Growth Response to CO<sub>2</sub>

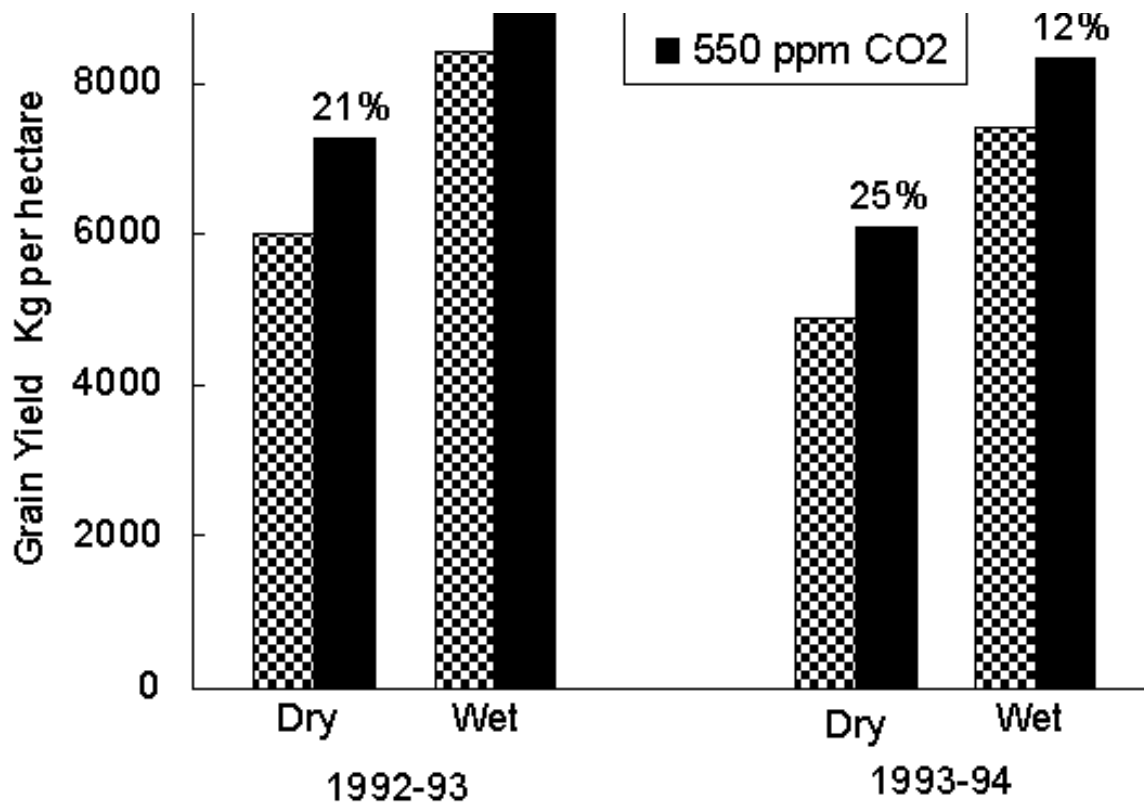


Young Eucalyptus pine trees were grown for 23 months under four CO<sub>2</sub> concentrations and then cut down and weighed. Each point represents an individual tree. Weights of tree parts are as indicated. [See here](#).

### Wheat Yield Response to CO<sub>2</sub>

10000





This graph shows the response of wheat grown under wet conditions and when the wheat was stressed by lack of water. These were open-field experiments. Wheat was grown in the usual way, but the atmospheric CO<sub>2</sub> concentrations of circular sections of the fields were increased by means of arrays of computer-controlled equipment that released CO<sub>2</sub> into the air to hold the levels as specified. Average CO<sub>2</sub>-induced increases for the two years were 10% for wet and 23% for dry conditions.

Since atmospheric CO<sub>2</sub> is the basic "food" of nearly all plants, the more of it there is in the air, the better they function and the more productive they become. For a 300 ppm increase in the atmosphere's CO<sub>2</sub> concentration above the planet's current base level of slightly less than 400 ppm,

for example, the productivity of earth's herbaceous plants rises by something on the order of 30% (Kimball, 1983; Idso and Idso, 1994), while the productivity of its woody plants rises by something on the order of 50% (Saxe et al., 1998; Idso and Kimball, 2001). Thus, as the air's CO<sub>2</sub> content continues to rise, so too will the productive capacity or land-use efficiency of the planet continue to rise, as the aerial fertilization effect of the upward trending atmospheric CO<sub>2</sub> concentration boosts the growth rates of nearly all plants.

The [world's population](#) is 6.6 billion and increasing at 1.18% per year. People will require increasing quantities of food and more natural ecosystems will be lost to crops and pastures. The resulting loss of habitat may result in species extinctions if crop yields are not significantly increased. Unfortunately, the rate of increase of crop yields is declining as crops are approaching the genetic yield limits. Increasing crop yields on existing farmlands would help to save lands for nature. If crop yields fail to increase, humans will suffer more frequent famines. Fortunately, the increase in CO<sub>2</sub> concentrations will substantially enhance crop yields and is essential to prevent or delay the destruction of habitat and animal species, and may allow us to produce sufficient agricultural commodities to feed the growing population. Any action taken by us to slow or reverse the increase in CO<sub>2</sub> concentration in the air may result in more frequent famines and species extinctions.

See [here from CO2Science](#).

### *IPCC and Model Projections*

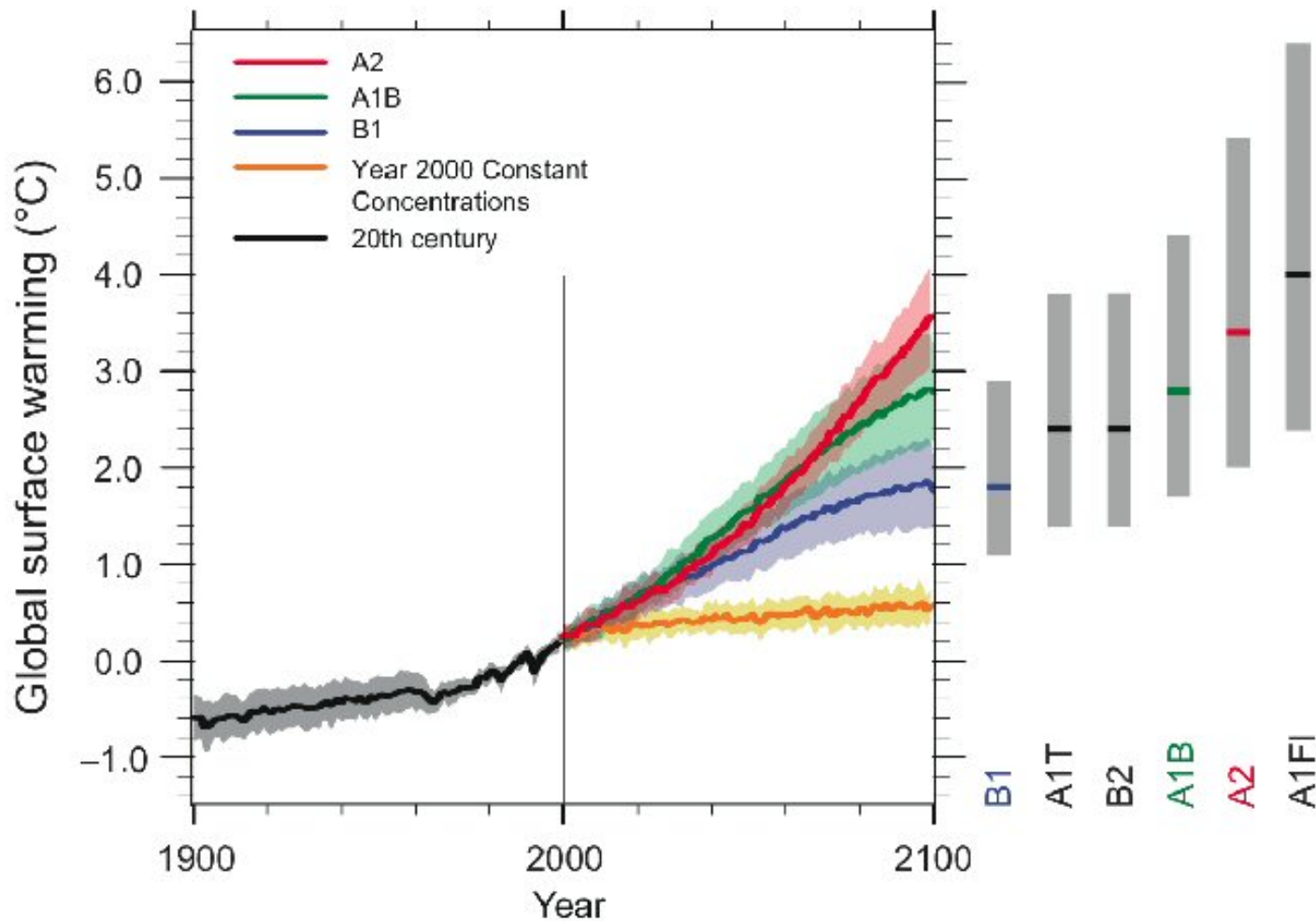
Intergovernmental Panel on Climate Change (IPCC) presents projections of climate change, which are based on computer models. The projections given in the Summary for Policy Makers are based on six scenarios, which include different assumptions of population growth, economic growth, technological change and CO<sub>2</sub> emissions. The scenarios assume that no climate change mitigation actions are taken, and they do not assume implementation of the Kyoto protocol. The IPCC does not assign any probability or likelihood to any of the scenarios, and the middle scenarios should not be interpreted as the most likely.

The initial growth rate of the projected CO<sub>2</sub> concentrations range from 0.45 %/year to 0.65 %/year. The CO<sub>2</sub> concentrations of the six projections increased from 370 ppm in the year 2000 to a range of 540 ppm to 940 ppm in the year 2100. The table below shows the Fourth Assessment Report projections.

Scenario	Temperature Change		at 2090-2099		CO <sub>2</sub> Concentration	CO <sub>2</sub> Average Growth
	(°C at 2090-2099 relative to 1980-1999)		From 2006	Rate of Change		
	Best Estimate	Likely Range	Best Estimate	Change	2100	%/year
	°C	°C	°C	°C/Decade		
B1	1.8	1.1 – 2.9	1.5	0.17	540	0.38
A1T	2.4	1.4 – 3.8	2.1	0.23	560	0.42
B2	2.4	1.4 – 3.8	2.1	0.23	600	0.48
A1B	2.8	1.7 – 4.4	2.5	0.27	695	0.63
A2	3.4	2.0 – 5.4	3.1	0.32	825	0.81
A1FI	4.0	2.4 – 6.4	3.7	0.38	940	0.94

The temperature changes "Best Estimate" given in the second column are from the average surface temperatures in the period 1980 to 1999. The "Best Estimate" from 2006 given in the fourth column is reduced by 0.3 °C to account for the actual temperature change to 2006 from the average of 1980-1999. The average CO<sub>2</sub> growth rates of the last two scenarios at 0.81 and 0.94 %/year appears to be unrealistic considering the actual CO<sub>2</sub> growth rate 1990-2006 is 0.5%/year, and fossil fuels are expected to become more expensive as it becomes increasingly difficult to replace depleting oil and gas reserves.

## Multi-model Averages and Assessed Ranges for Surface Warming



Kevin Trenberth is head of the large US National Centre for Atmospheric Research and one of the advisors of the IPCC. Trenberth asserts ". . . there are no (climate) predictions by IPCC at all. And there never have been". Instead, there are only "what if" projections of future climate that correspond to certain emissions scenarios. According to Trenberth, GCMs ". . . do not consider many things like the recovery of the ozone layer, for instance, or observed trends in forcing agents. None of the models used by IPCC is initialised to the observed state and none of the climate states in the models corresponds even remotely to the current observed climate." However, Scott Armstrong and Kesten Green audited the relevant chapter in the IPCC's latest report. They find that "in apparent contradiction to claims by some climate experts that the IPCC provides 'projections' and not 'forecasts', the word 'forecast' and its derivatives occurred 37 times, and 'predict' and its derivatives occur 90 times" in the chapter. Consequently, it is not surprising that the public has this misimpression that the IPCC predicts future climate.

The computer models predict that the 20th century temperatures should have increased by 1.6 to 3.74 Celsius, while the actual observed 20th-century temperature increase was about 0.6 Celsius. A model that fails to history match is useless for predicting the future.

The IPCC Third Assessment Report projected a surface temperature increase from 1990 to 2100 of 1.4 C° to 5.8 C°, corresponding to 0.13 C°/decade to 0.53 C°/decade. The IPCC low estimate corresponds to the actual temperature warming rate as measured by satellite data.

The IPCC assumes that the Sun has little effect, even though observational evidence clearly shows the Sun has a significant effect on climate.

The models assume the 20th century temperature rise is caused by CO<sub>2</sub> increases, and parameters are set in the models to make the temperature rise in response to the CO<sub>2</sub>. The direct effect of increasing CO<sub>2</sub> concentration on global warming is very small. All the models amplify an initial increase in temperature due to CO<sub>2</sub> by employing water vapour and clouds as a large positive feed back. However, there is no evidence that water vapour and clouds provides a large positive feed back. They may provide a negative feed back.

Climate models are limited by our understanding of cloud formation. While scientists have a basic understanding of cloud formation, the details controlling how bright they are, how dense and how large they become is poorly understood. We lack the detailed understanding of clouds required to make accurate climate models. Clouds have a major role in climate by reflecting sunlight back into space, trapping heat, and producing precipitation.

As the Earth warms, there is more evaporation from the oceans, therefore more water vapour in the atmosphere available for cloud formation. But low clouds reflect sunlight back into space resulting in a strong cooling effect, negating most of the initial temperature increase.

Researchers at the University of Alabama in Huntsville (UAH) reported in August 2007 that individual tropical warming cycles that served as proxies for global warming saw a decrease in the coverage of heat-trapping [high altitude] cirrus clouds, says Dr. Roy Spencer, a principal research scientist in UAHuntsville's Earth System Science Center.



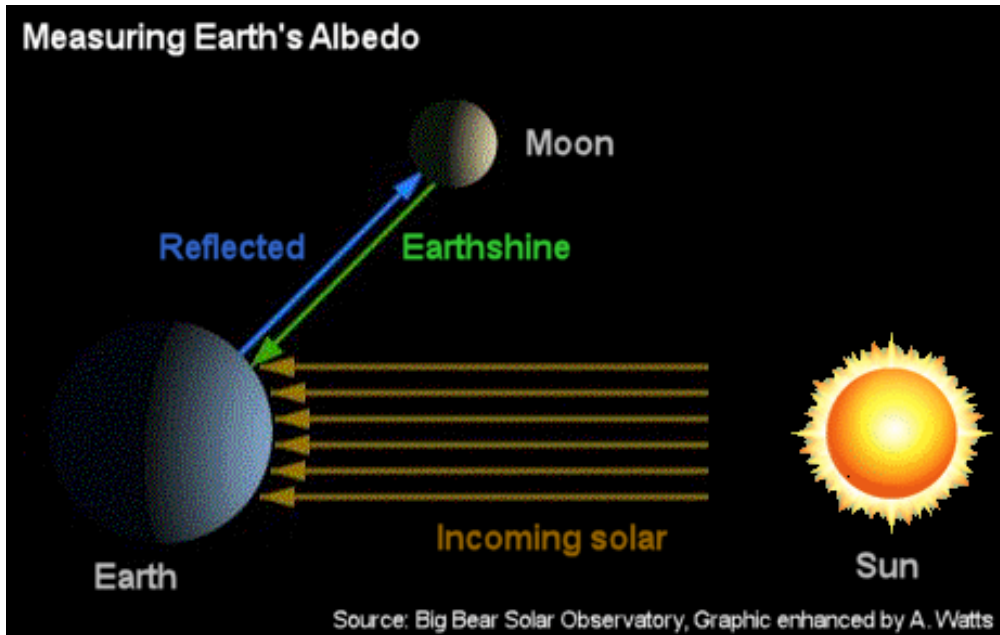
"All leading climate models forecast that as the atmosphere warms there should be an increase in high altitude cirrus clouds, which would amplify any warming caused by manmade greenhouse gases," he said. "That amplification is a positive feedback. What we found in month-to-month fluctuations of the tropical climate system was a strongly negative feedback. As the tropical atmosphere warms, cirrus clouds decrease. That allows more infrared heat to escape from the atmosphere to outer space."

"While low clouds have a predominantly cooling effect due to their shading of sunlight, most cirrus clouds have a net warming effect on the Earth," Spencer said. With high altitude ice clouds their infrared heat trapping exceeds their solar shading effect. If computer models incorporated this enhanced cooling effect from high clouds, "it would reduce estimates of future warming by over 75 percent," Spencer said.

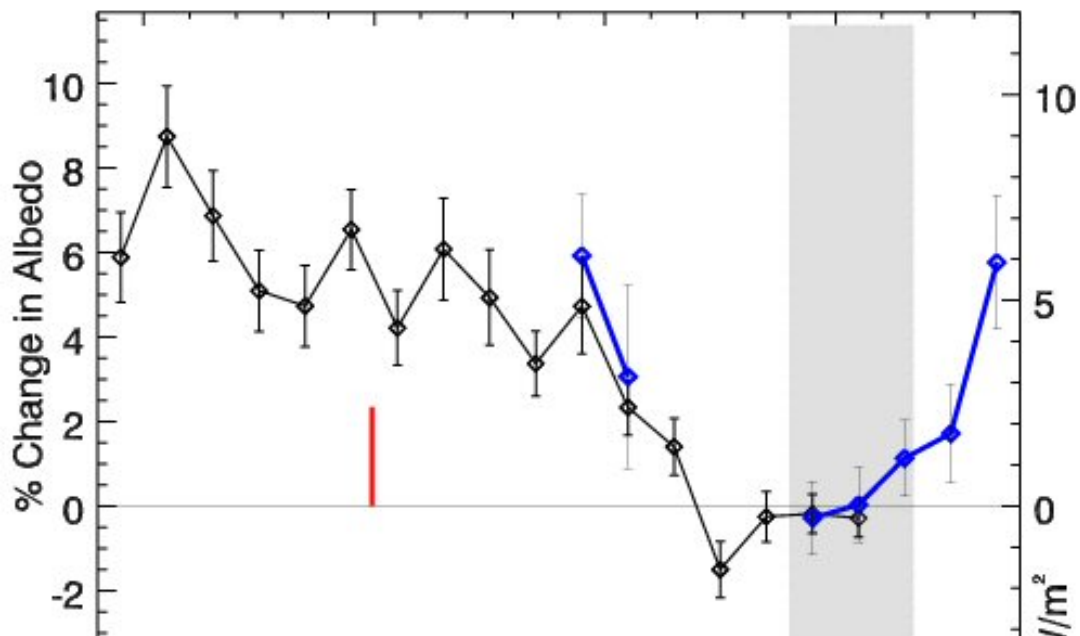
See the [UAH News article here](#), and a report in [ScienceDaily here](#). The paper abstract is [here](#).

The amount of solar energy the Earth receives depends on the Earth's albedo, or reflectivity. The greater the albedo, the more sunlight is reflected and the less

solar energy is absorbed by the Earth. Project "Earthshine" being done at the Big Bear Solar Observatory measures the Earth's albedo by observing the amount of sunlight reflected by the Earth to the dark side of the Moon and back to Earth. The process is shown below.



The results show that the Earth albedo has gradually fallen up to 1997, likely causing most of the global warming through 1998. Since 2001 the albedo increased rapidly, which has stopped the warming and resulted in the current global cooling. The recent dimming of the Earth is likely due to increased low cloud cover. The albedo is shown below.



The blue lines are the observed earthshine data for 1994-1995 and 1999-2003. The black line is the reconstructed albedo from partially overlapping satellite cloud data with respect to the mean of the calibration period 1999 to 2001. The vertical red line shows the cumulative climate forcing of the increase in greenhouse gases over the 20th century of 2.4 W/m<sup>2</sup> according to the IPCC. Note that the change



of the albedo's climate forcing in  $W/m^2$  is much greater than that due to greenhouse gases. Current climate models do not show such large albedo variability. See an article by Anthony Watts [here](#) for further information. See the project Earthshine site [here](#).

Climate models utilize large grid blocks to simulate climate, which are too large to include thunderstorms or hurricanes, so they use parameterization to account for these. These parameterizations ignore real-world transfers of energy, moisture and momentum that could significantly alter the results and severely limits the usefulness of climate model projections. Computer models employ approximations to represent physical processes that cannot be directly computed due to computational limitations. Because many empirical parameters can be selected to force a model to match observations, the ability of a model to match observations cannot be cited as evidence that the model is realistic and does not imply it is reliable for forecasting climate. See the Fraser Institutes [Independent Summary For Policy Makers](#).

Atmospheric methane concentrations have been declining in recent years. [Methane](#) is a significant greenhouse gas. Climate models assume that methane concentrations increase with temperature, and it is not known why its concentration is declining. Aerosols play a key roll in climate, with a potential impact of more than three times that of CO<sub>2</sub> emissions, but their influence is very poorly understood. Aerosol's effect on cloud formation is poorly understood and clouds are very crudely modelled. Aerosols exert an overall cooling effect on climate but estimates of the effect vary by a factor of ten. Models used in the IPCC Fourth Assessment Report assume aerosols have a large cooling effect, thereby attributing a large warming effect to CO<sub>2</sub>.

Only 2 of the 23 models used by the IPCC account for varying Sun intensity, and these models do not assume the Sun affects the cosmic ray flux and cloud formation. Only 2 of the models account for land use changes.

Computer models predict warming at the north and south poles to be symmetrical, but there is a warming trend at the North Pole but not at the South Pole. They also predict that the polar surface regions will warm more than the surface at the tropics. Winter temperatures will warm more than summer temperatures; night-time temperatures will warm more that day-time temperatures. Therefore, according to the CO<sub>2</sub> warming theory, winter nights in the arctic will warm, but there will be little summer day time warming in the tropics.

Many important inputs to climate models are very uncertain and real world observational evidence does not support them, so it is foolish to rely on their projections to make expensive policy decisions.

A scorecard listing the success of models is [here](#).

### ***The IPCC Hockey Stick***

The IPCC published the "Hockey Stick" graph from Mann, Bradley and Hughes (MBH 1998), in its Third Assessment Report, which shows little change in temperatures for hundreds of years then a sharp increase recently in the last hundred years. This temperature history was given bold prominence in the IPCC reports, distributed to all Canadian households and used to support major policy decisions involving the expenditure of billions of dollars. The IPCC argues that there was little natural climate change over the last 1000 years, so that the temperature change over the last 100 years is unusual and likely caused by human activities. A senior IPCC researcher said in an email "We have to get rid of the Medieval Warm Period." Christopher Monckton says "They did this by giving one technique, measurement of tree-rings from bristlecone pines, 390 times more weighting than other techniques but didn't disclose this. Tree-rings are wider in warmer years, but pine tree rings are also wider when there's more carbon dioxide in the air: it's plant food. This carbon dioxide fertilization distorts the calculations. They said they had included 24 data sets going back to 1400. Without saying so, they left out the set showing the medieval warm period, tucking it into a folder marked "Censored Data". They used a computer model to draw the graph from the data, but two Canadians [Ross McKittrick and Stephen McIntyre]

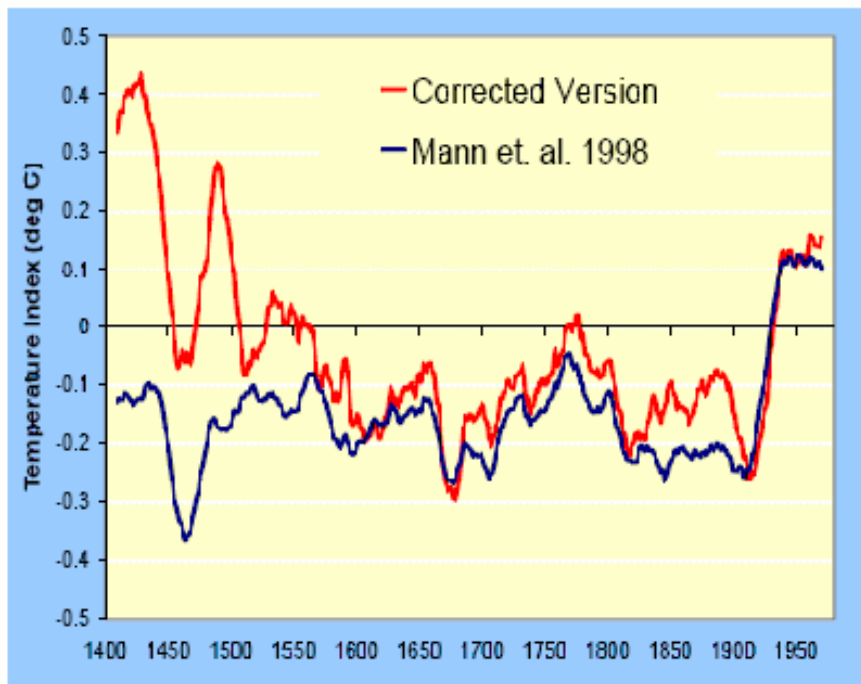


later found that the model almost always drew hockey-sticks even if they fed in random, electronic "red noise" because it used a faulty algorithm." The MBH 1998 report was never properly peer reviewed before the IPCC used it in their publications.

See [here for comments from Christopher Monckton](#).

McKittrick and McIntyre say in their paper "the dataset used to make this construction contained collation errors, unjustified truncation or extrapolation of source data, obsolete data, incorrect principal component calculations, geographical mislocations and other serious defects. These errors and defects substantially affect the temperature index. The major finding is that the values in the early 15th century exceed any values in the 20th century. The particular "hockey stick" shape derived in the MBH98 proxy construction – a temperature index that decreases slightly between the early 15th century and early 20th century and then increases dramatically up to 1980 — is primarily an artefact of poor data handling, obsolete data and incorrect calculation of principal components." See [here for their paper](#).

The IPCC hockey stick is shown below, along with the corrected version. The error ranges are not shown here.



The dispute over the hockey stick caused the United States Congress to decide to investigate the matter. The US National Research Council (NRC) held public hearings and prepared a report in 2006 for the US House of Representatives Committee on Science. The NRC Report made no criticism of the McKittrick and McIntyre papers. The report concludes "strip-bark samples should be avoided in temperature reconstructions." These strip-bark Bristlecone/Foxtail samples are responsible for the sharp increase in the graph in the twentieth century, but the growth spurt is not related to temperatures. It also confirmed that Mann's algorithm, which used non-centered principal component analysis, mines for hockey stick shapes from random red noise data as previous shown by McKittrick and McIntyre, and notes that "uncertainties of the published reconstructions have been underestimated."

Meanwhile, the US House of Representatives Committee on Energy and Commerce had independently commissioned a study from Edward Wegman who is chairman of the NAS Committee on Applied and Theoretical Statistics and a Fellow of the Royal Statistical Society. The Wegman Report states "Overall, our

committee believes that Mann's assessments that the decade of the 1990s was the hottest decade of the millennium and that 1998 was the hottest year of the millennium cannot be supported by his analysis." It also states "In general, we find the criticisms by [the McKittrick and McIntyre papers] to be valid and their arguments to be compelling. We were able to reproduce their results and offer both theoretical explanations (Appendix A) and simulations to verify that their observations were correct." The study also studied the social network of the group of scientists who publish temperature reconstructions. The study found that they collaborate with each other and share proxy data and methodologies, so that the "independent" studies are not independent at all.

Both of these reports were public six months before the IPCC began the release of the Fourth Assessment Report; however, the 4AR makes no mention of the Wegman Report, gives only one citation of the NRC Report, and ignores the findings and recommendations of the reports.

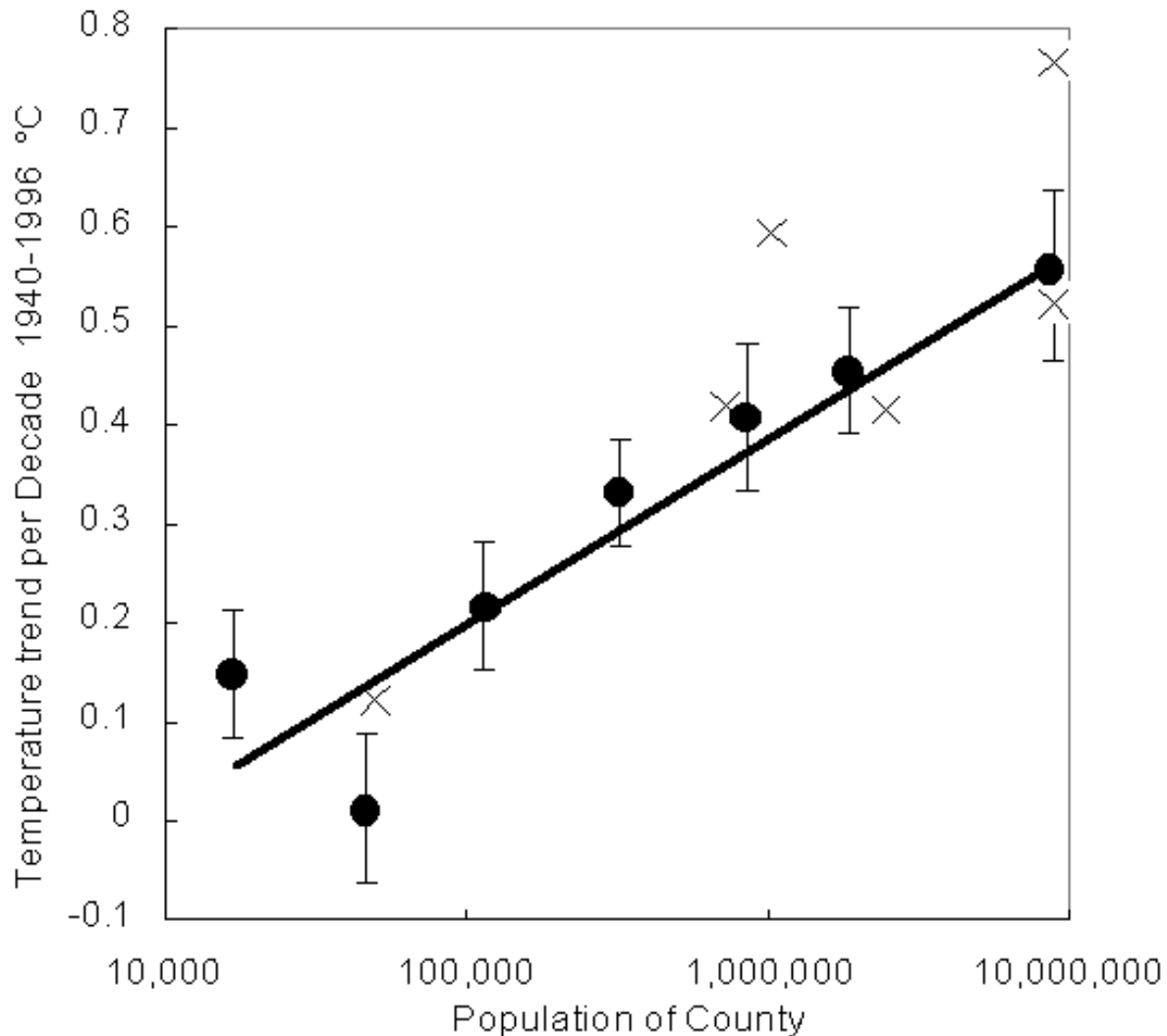
David Holland wrote a comprehensive history and discussion of the hockey stick affair. See Holland's paper - "Bias and Concealment in the IPCC Process: The 'Hockey Stick' Affair and its Implications" published by "Energy & Environment", October 2007 [here](#).

David Holland says "it is scandalous that the WGI Chapter 6 authors ignored most of its [NRC Report] substantive findings. Despite the clear analysis in Wegman et al. showing the lack of independence between the various temperature reconstructions, the authors of AR4 WGI Chapter 6 persisted with their reliance on a "spaghetti" diagram of reconstructions in Figure 6.10(b) to continue to justify the claim that "Average Northern Hemisphere temperatures during the second half of the 20th century were likely the highest in at least the past 1,300 years."

### ***Urban Heat Island Effects***

The urban heat island effect is caused by the heat-retaining properties of concrete and asphalt in urban areas that artificially increase local temperatures. It is the effect that humans have on local surface temperature such that the temperatures in or near urban centres are warmer than rural areas.

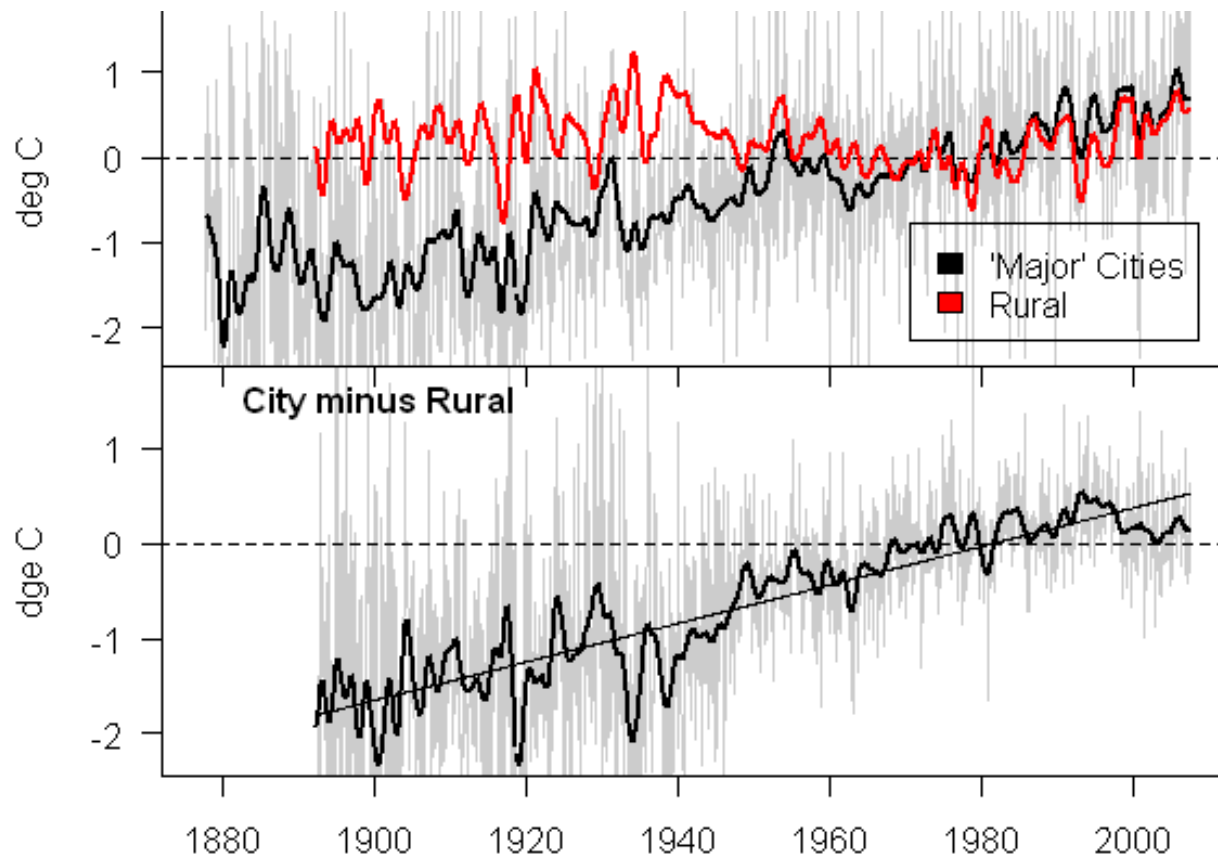
### **Surface Temperature Trends in 47 California Counties**



This graph shows the size of the effect on surface temperatures and the problems associated with objective sampling. The surface temperature trends determined from ground stations for the period 1940 to 1996 were averaged for each county. The trends were grouped by county population and plotted as closed circles along with the standard errors of their means. The straight line is a least-squares fit to the closed circles. The points marked "X" are the six unadjusted station records selected by NASA GISS for use in their estimate of global temperatures. Note that 5 of the 6 selected stations are in populous counties. Note also that extrapolating the straight line to a county population of 10,000 gives a temperature trend of zero. See [here](#).

Here is an example of a [weather station](#) used by the IPCC to record temperature rise.

### Temperature Trends of Major City Sites and Rural Sites



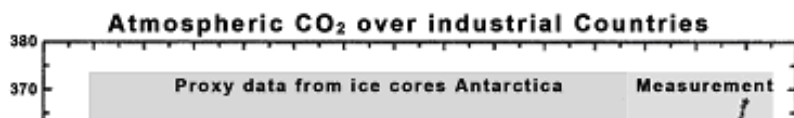
[Peterson \(2003\)](#) is an influential study cited by IPCC Fourth Assessment Report purporting to show that the urbanization effect is negligible.

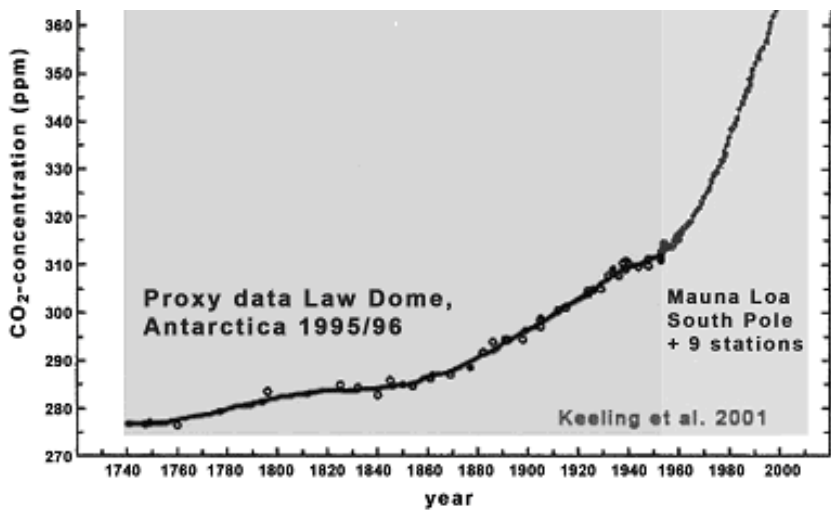
The IPCC relied heavily on this flawed study, where Peterson states "no statistically significant impact of urbanization could be found in annual temperatures." However, Steve McIntyre using Peterson's data shows that "actual cities have a very substantial trend of over 2 deg C per century relative to the rural network - and this assumes that there are no problems with rural network - something that is obviously not true since there are undoubtedly microsite and other problems." Peterson

uses two lists of stations in his study, one labelled Urban and one labelled Rural. However an analysis of the lists shows that the Urban list includes many rural sites and the Rural list includes many urban sites. These results are discussed in a Climate Audit article [here](#).

### ***Falsified Historical CO<sub>2</sub> Measurements***

The IPCC uses a CO<sub>2</sub> concentration history that shows a low pre-industrial CO<sub>2</sub> content which increases during the industrial era. The IPCC may have used corrupted CO<sub>2</sub> data in its analysis of climate change. Their conclusions and projections of climate change are all based on the assumption of low CO<sub>2</sub> concentrations in the pre-industrial atmosphere based on ice core studies. Unfortunately, ice cores do not form a closed system. In the highly compressed deep ice, CO<sub>2</sub> combines with liquid water to form gas hydrates, or clathrates, which are tiny crystals. When the ice core is brought to the surface, the pressure falls causing the clathrates to decompose to the gas form, exploding in the process as if they were microscopic grenades, forming tiny cracks in the ice. Other cracks are formed by the ice decompression. Gas escapes through these cracks as the ice core is brought to the surface, but since CO<sub>2</sub> forms clathrates at lower pressures than other gases, CO<sub>2</sub> is preferentially lost leading to depletion of CO<sub>2</sub> in the gas trapped in the ice core. Consequently, the measured CO<sub>2</sub> concentration from deep ice cores is less than the CO<sub>2</sub> concentration of the originally trapped air.



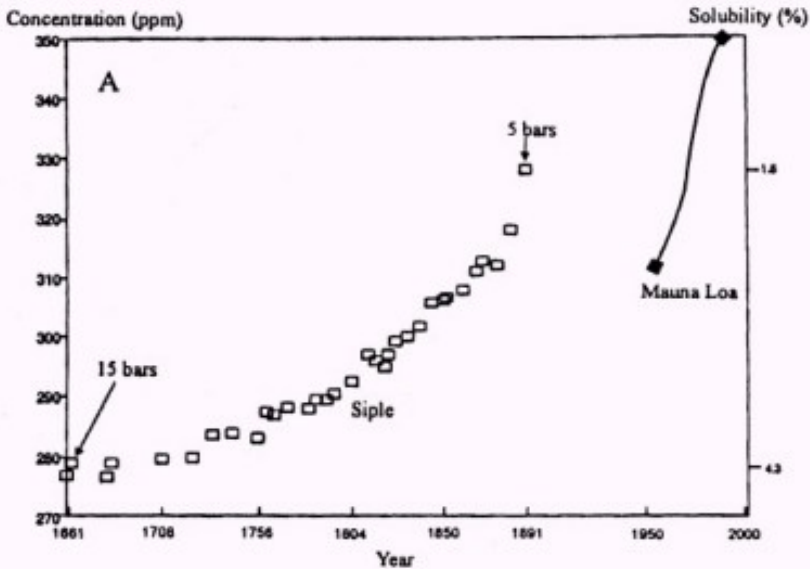


The graph on the left shows the IPCC history of CO2 concentration in air.

Data from shallow ice cores such as from Siple, Antarctica, show that the CO2 concentration of pre-industrial ice (from depths too shallow for clathrate formation) are much higher than that measured at Mauna Loa, Hawaii in 1960. As the actual measurements show ice deposited in 1890 AD is 328 ppm, not the 290

ppm required to fit the IPCC human caused increasing CO2 concentration and global warming hypothesis, the average age of air was arbitrary decreed to be exactly 83 years younger than the ice in which it was trapped.

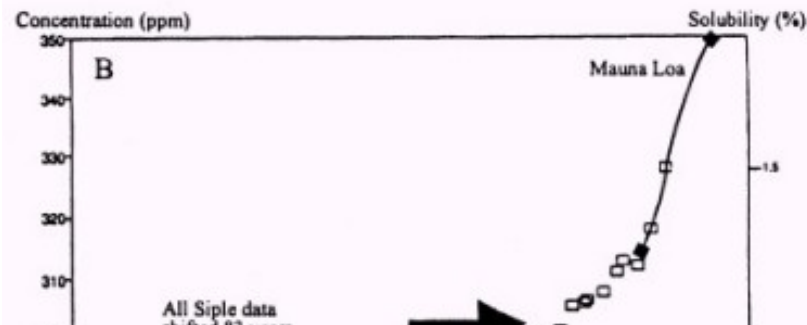
**Actual Siple, Antarctica Ice Core and Mauna Loa Data**



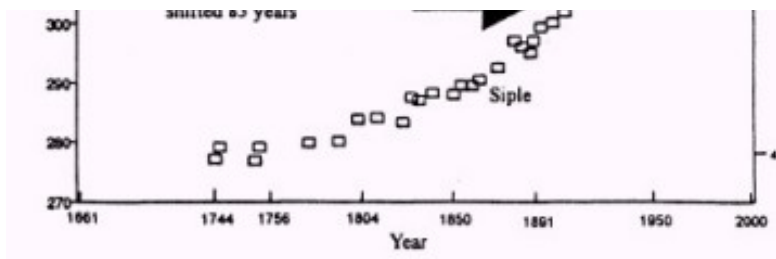
Data from shallow ice cores such as from Siple, Antarctica, show that the CO2 concentration of pre-industrial ice (from depths too shallow for clathrate formation) are much higher than that measured at Mauna Loa, Hawaii in 1958.

Note that the measured concentration declines with increasing load pressure and depth.

**Shifted Siple, Antarctica Ice Core and Mauna Loa Data**



As the actual measurements show ice deposited in 1890 AD is 328 ppm, not the 290 ppm required to fit the

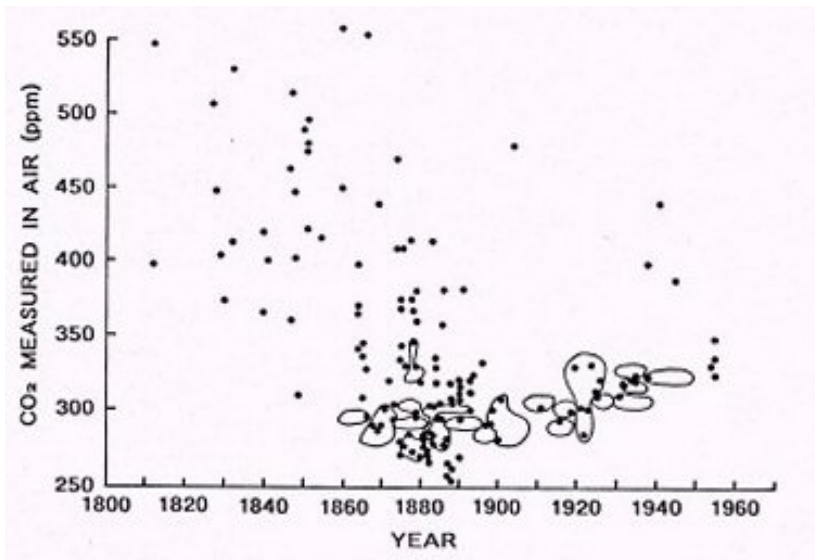


IPCC human caused increasing CO2 concentration and global warming hypothesis, the average age of air was arbitrary decreed to be exactly 83

years younger than the ice in which it was trapped.

The “corrected” ice data were then smoothly aligned with the Mauna Loa record, and reproduced in countless publications as a famous “Siple curve”. Only thirteen years later, in 1993, glaciologists attempted to prove experimentally the “age assumption”, but they failed.

### CO2 Measurements between 1800 and 1955



IPCC modellers ignored the direct measurements of CO2 concentration indicating that the 19th century CO2 concentration was 335 ppm.

The encircled values were arbitrarily selected by Callendar for estimation of 292 ppm as the average 19th century CO2 concentration.

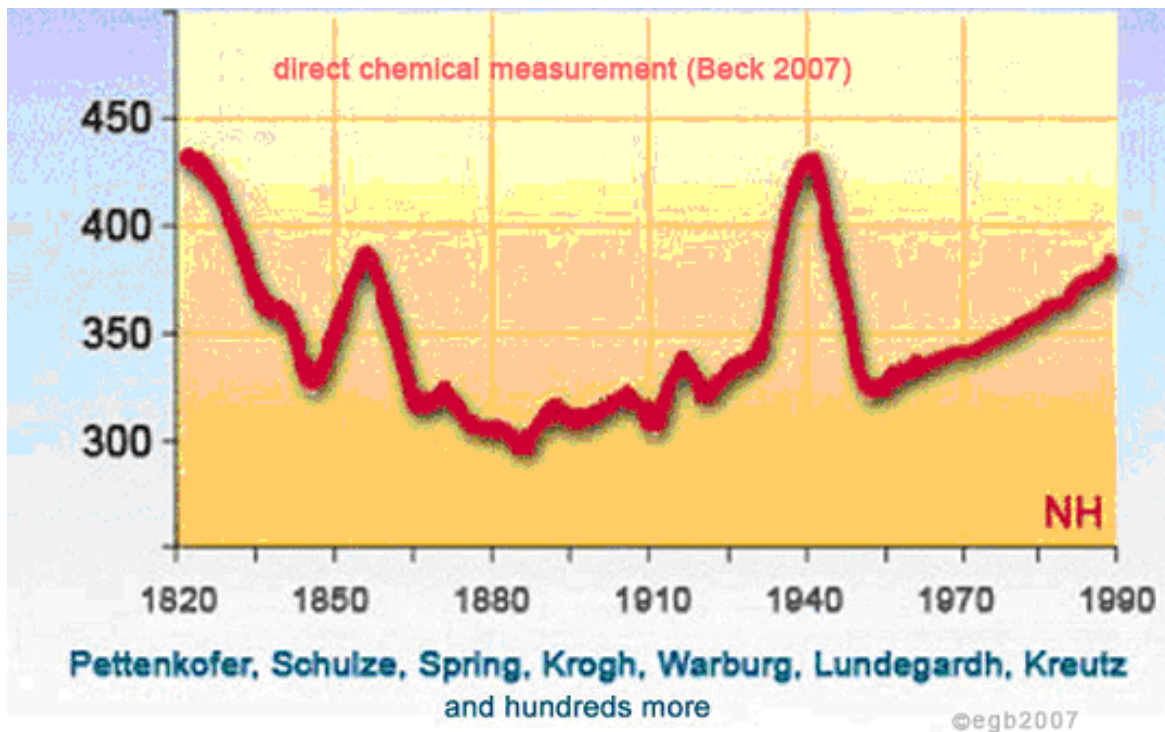
A study of stomatal frequency in fossil leaves from Holocene lake deposits in Denmark, showing that 9400 years ago CO2 atmospheric level was 333 ppm, and 9600 years ago 348 ppm, falsify the concept of stabilized and low CO2 air concentration until the advent of

industrial revolution.

See [here for more information](#).

Recently, Ernst-Georg Beck has summarized 90,000 accurate chemical analysis of CO2 in air since 1812. The historic chemical data reveal that changes in CO2 track changes in temperature, and therefore climate in contrast to the simple, monotonically increasing CO2 trend depicted in the post 1990 literature on climate change. Since 1812, the CO2 concentration in northern hemispheric air has fluctuated exhibiting three high level maxima around 1825, 1857 and 1942 the latter showing more than 400 ppm.





Between 1857 and 1958, the Pettenkofer process was the standard analytical method for determining atmospheric carbon dioxide levels, and usually achieved accuracy better than 3%. These determinations were made by several scientists of Nobel Prize level distinction. Following Callendar (1938), modern climatologists have generally ignored the historic determinations of CO<sub>2</sub>, despite the techniques being standard textbook procedures in several different disciplines. Chemical methods were discredited as unreliable choosing only few which fit the assumption of a climate CO<sub>2</sub> connection.

Ernst-Georg Beck calls the falsification of the CO<sub>2</sub> record "The greatest scandal in the modern history of science".

See [here](#) for a summary of the Beck paper, or [here](#) for the paper

See [here](#) for Beck's Berlin presentation of May 30, 2007.

See [here](#) for CO<sub>2</sub>: The Greatest Scientific Scandal of Our Time, by Zbigniew Jaworowski, Spring/Summer 2007 21st CENTURY Science & Technology.

### *No Consensus*

Author Michael Crichton warned of the dangers of "consensus science" in a 2003 speech. He says "Consensus is the business of politics. Science, on the contrary, requires only one investigator who happens to be right, which means that he or she has results that are verifiable by reference to the real world. In science consensus is irrelevant. What is relevant is reproducible results. The greatest scientists in history are great precisely because they broke with the consensus."

In an open letter to Prime Minister Stephen Harper, 61 prominent scientists called for an open climate science review. The letter states "Observational evidence does not support today's computer climate models, so there is little reason to trust model predictions of the future. Significant advances have been made since the protocol was created, many of which are taking us away from a concern about increasing greenhouse gases. If, back in the mid-1990s, we knew what we know today about climate, Kyoto would almost certainly not exist, because we would have concluded it was not necessary. Global climate changes all the time due to natural causes and the human impact still remains impossible to distinguish from this natural "noise.""

The Petition Project was organized by the Oregon Institute of Science and Medicine.

The petition states in part:

"There is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gasses is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate. Moreover, there is substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and animal environments of the Earth."

So far the petition has received 19,700 signatures. Nearly all of the initial 17,100 scientist signers have technical training suitable for the evaluation of the

relevant research data, and many are trained in related fields. Approximately 2,400 individuals have signed the petition who are trained in fields other than science or whose field of specialization was not specified on their returned petition. See [here](#).

The Heartland Institute has conducted an international survey of 530 climate scientists in 2003. The survey asked if “the current state of scientific knowledge is developed well enough to allow for a reasonable assessment of the effects of greenhouse gases.” Two-thirds of the scientists surveyed (65.9 percent) disagreed with the statement, with nearly half (45.7 percent) scoring it with a 1 or 2, indicating strong disagreement. Only 10.9 percent scored it with a 6 or 7, indicating strong agreement. See [here for the full survey results](#).

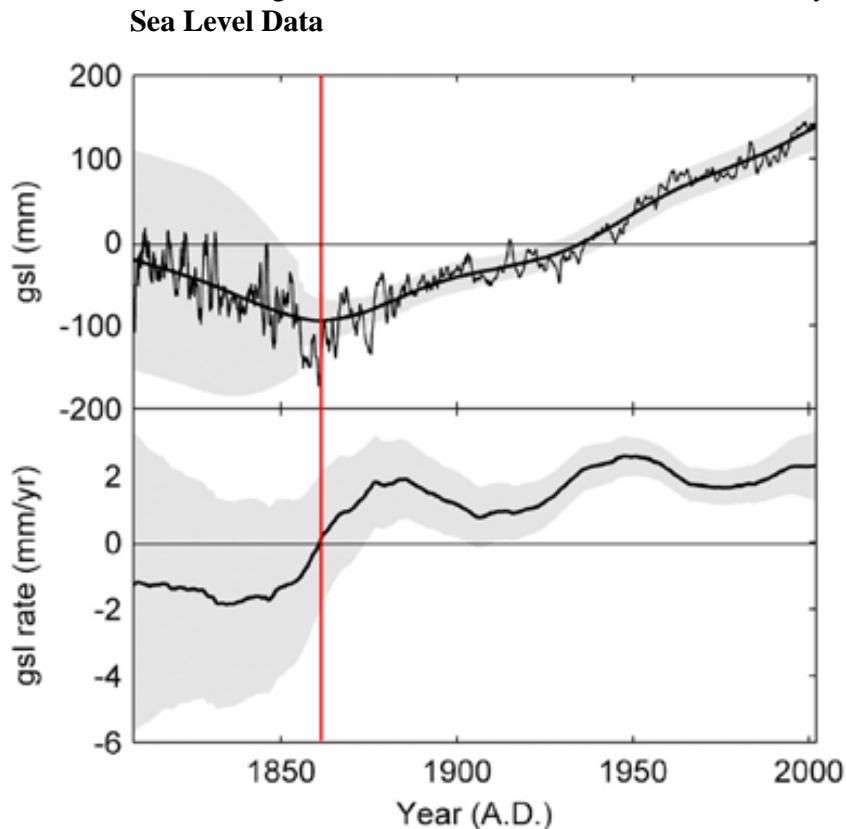
There is no consensus on whether or to what degree human activities are causing “the problem”, or even whether there is a problem. Global cooling, widely predicted in the 1970s, would have been much more dangerous than warming.

### *Effects of Warming*

The IPCC and related groups have suggested several adverse effects of global warming. Real world data shows that these claims are mostly false. They ignore the huge benefits of warming and of CO2 emissions on plant growth.

### *Global Sea Level Rise Is Not Accelerating*

There has been no change in the rate of sea level rise in the last 100 years as shown below.



Mean global sea level (gsl) (top), with its shaded 95% confidence interval, and mean gsl rate (bottom), with its shaded standard error interval. Adapted from Jevrejeva et al. (2006). See [here from CO2science](#).

The IPCC AR4 estimates that "Global average sea level rose at an average rate of 1.8 [1.3 to 2.3] mm per year over 1961 to 2003. The rate was faster over 1993 to 2003, about 3.1 [2.4 to 3.8] mm per year." It also states "There is high confidence that the rate of observed sea level rise increased from the 19th to the 20th century."

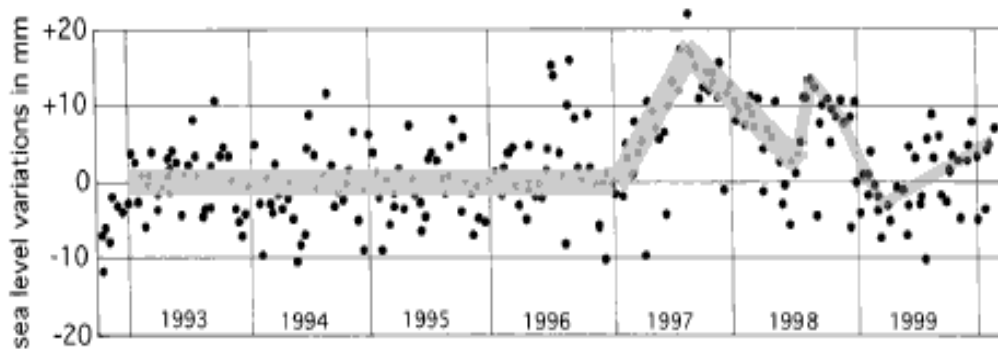
Dr. Nils-Axel Morner, who has spent a lifetime in the study of sea levels, says “There is a total absence of any recent ‘acceleration in sea level rise’ as often claimed by IPCC and related groups.”. Read his fascinating interview "[Claim That Sea Level Is Rising Is a Total Fraud](#)" June 22, 2007 EIR Economics 33.

Dr. Morner says the global sea level has been rising at 1.1 mm/year from 1850 to about 1940, then no increase to 1970. The IPCC uses a tide gauge in Hong Kong that shows 2.3 mm/year of sea level rise. The tide gauge is located where the land is known to be



subsiding, so the record should not be used. Satellite altimetry data from the TOPEX/POSEIDON mission measures the sea level relative to the centre of the Earth (rather than relative to the coast) since 1992.

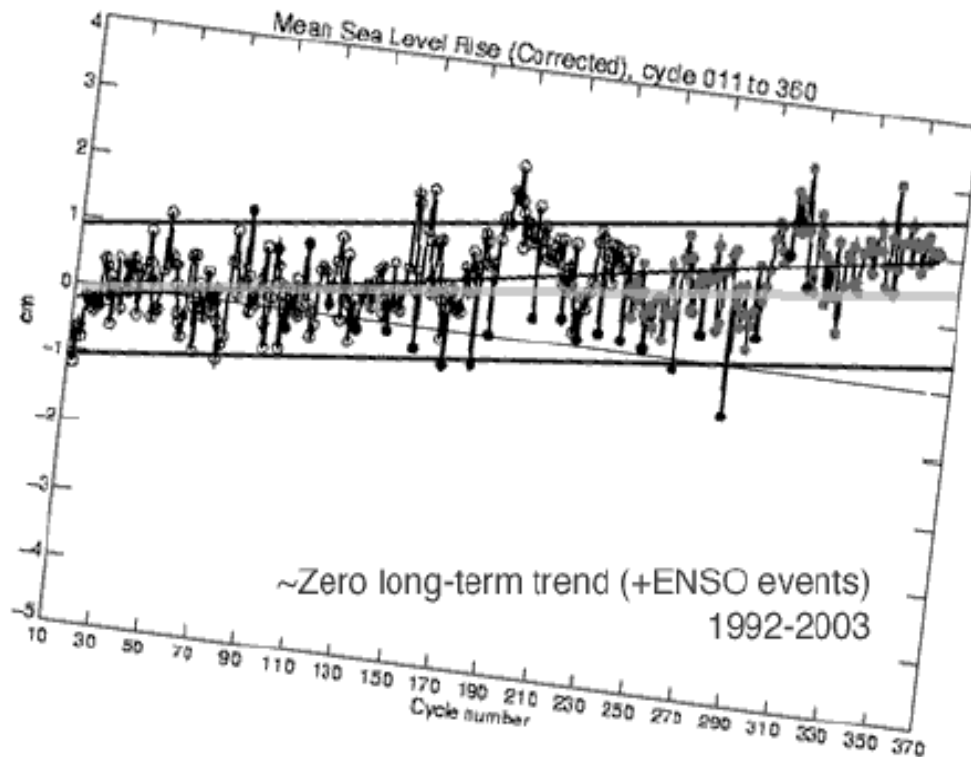
### Satellite altimetry of TOPEX/POSEIDON



The graph above from Morner, 2004, shows the original satellite sea level data from 1992 to early 2000. Other than the effect of the 1997/98 El Nino, the data shows no sea level rise.

The satellite data shows no increase, but the IPCC adds a "correction factor" to the satellite data to make it agree with the tide gauge data at 2.3 mm/year. This data is presented as satellite data, but Morner says "it is a falsification of the data set".

### Satellite Altimetry Data of TOPEX/POSEIDON Tilted Back to Original Level



The graph above from Morner, 2005, shows the satellite altimetry sea level data from 1993 to 2003 tilted back to the original level by excluding the tide-gauge factor. It shows variability around zero plus ENSO events.

See [here for Dr. Morner's Memorandum paper](#), which was presented to the United Kingdom's House of Lords.

Satellite altimetry Topex/Poseidon data is adjusted by the University of Colorado for NASA to match the rate of sea level rise measured by a set of 64 tide gauges. Any difference between the raw satellite measurement and the tide gauge measurement is assumed to be the sum of satellite measurement drift error and the vertical land movement at the tide gauge location. A separate estimate of the land movement is made mainly by using "doppler orbitography and radiopositioning integrated by satellite" (DORIS) data at the tide gauge location. The raw satellite data is tilted by applying the satellite measurement drift as determined by the tide gauges. See [here](#) and [here](#) for a description of how satellite data is calibrated from a set of tide gauges.

A famous tree in the Maldives shows no evidence of having been swept away by rising sea levels, as would be predicted by the global warming advocates. A group of Australian global-warming advocates came along and pulled the tree down, destroying the evidence that their "theory" was false.

The "INQUA Commission on Sea-Level Change and Coastal Evolution" led by Dr. Morner, prepared an estimate that the global sea level will rise 10 cm plus or minus 10 cm in the next 100 years. Dr. Morner has since revised his estimate to 5 cm per 100 years after considering data of the Sun activity suggesting that the warming trend may have ended and the Earth may be headed into a cooling trend.

It seems increasingly likely that a warming will increase precipitation and ice accumulation in the Polar Regions, and thus slow down or even reverse the ongoing sea level rise.

See [here](#) update 10.

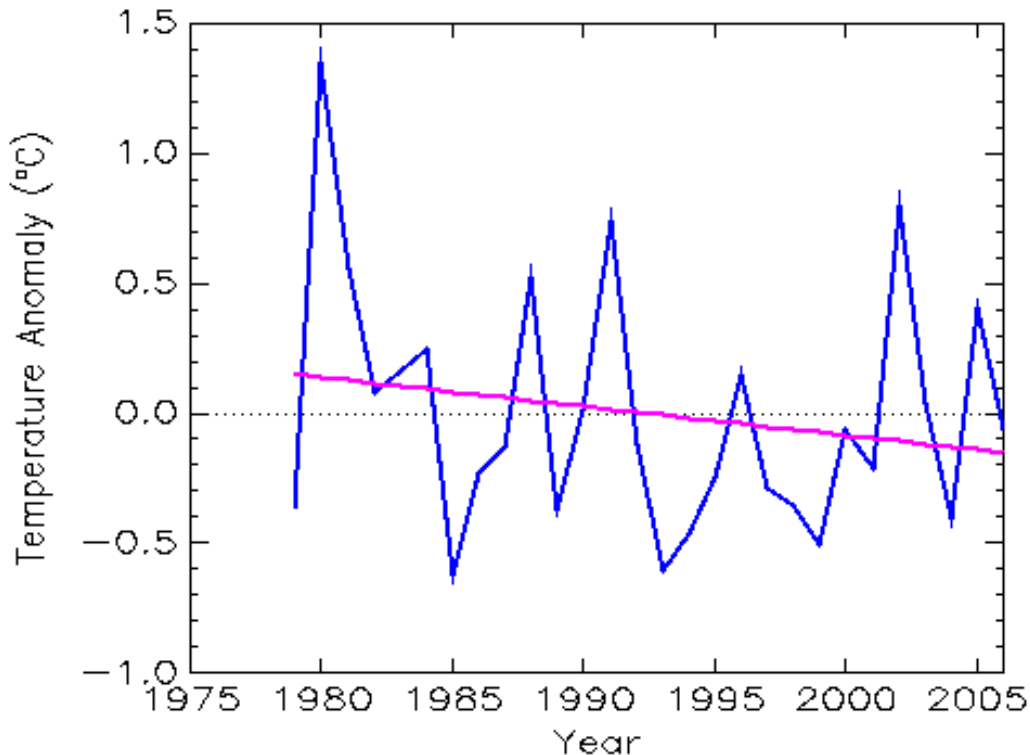
The Proudman Oceanographic Laboratory estimates the rate of sea level rise at 1.42 plus or minus 0.14 mm/year for the period 1954 to 2003. This is less than the estimate of 1.91 plus or minus 0.14 mm/year for the period 1902 to 1953, indicating a slowing of the rate.

See [here](#) for an analysis of sea level rise by the Proudman Oceanographic Laboratory.

Wöppelmann et al used global positioning satellite (GPS) stations to correct tide gauge data for vertical land movements. In a 2007 paper, Wöppelmann et al analyzed data from 160 GPS stations that were within 15 km of tide gauges to determine the vertical movement of the tide gauges. They determined that the global average sea-level rise from January 1999 to August 2005, after correcting the tide gauge data by the vertical land movement, was 1.31 +/- 0.30 mm/year. Note that this estimate is 58% less than the estimate reported (1993 - 2003) in the IPCC AR4. See [here](#) from World Climate Report, and the study abstract [here](#).

The movie "An Inconvenient Truth" (AIT) suggests that the Antarctic ice sheet could melt, but in fact the temperature of Antarctica has been declining over the last 25 years by 0.11 Celsius per decade. There has been no significant melting during previous warm periods when temperatures were warmer than today.

Antarctica Temperatures 1979 - 2006 MSU Data Set (Latitude -90 to -70)



This graph was created from the MSU Data from [www.CO2Science.org](http://www.CO2Science.org).

Antarctica ice sheet has been growing in thickness by 5 mm/year (1992 to 2003) according to a recent mass balance study. This net extraction of water from the global ocean, according to Wingham et al., occurs because "mass gains from accumulating snow, particularly on the Antarctic Peninsula and within East Antarctica, exceed the ice dynamic mass loss from West Antarctica."

A similar story is found in Greenland. The warmest period was not the last quarter century. Rather, as Vinther et al. report, "the warmest year in the extended Greenland temperature record was 1941, while the 1930s and 1940s were the warmest decades." In fact, their newly-lengthened record reveals there has been no net warming of the region over the last 75 years. A study of the Greenland ice sheet by Johannessen et al. found that below 1500 meters, the mean change of ice sheet height with time was a decline of  $2.0 \pm 0.9$  cm/year, qualitatively in harmony with the statements of Alley et al.; but above 1500 meters, there was a positive growth rate of fully  $6.4 \pm 0.2$  cm/year. Averaged over the entire ice sheet, the mean result was also positive, at a

value of  $5.4 \pm 0.2$  cm/year, which when adjusted for an isostatic uplift of about 0.5 cm/year yielded a mean growth rate of approximately 5 cm/year, for a total increase in the mean thickness of the Greenland Ice Sheet of about 55 cm over the 11-year period, which was primarily driven by accumulation of increased snowfall over the ice sheet.

A recent [study by Zwally et al. 2007](#) found the Greenland ice sheet have experienced a net accumulation of ice which is producing a  $0.03 \pm 0.01$  mm/year decline in sea-level.

### *Severe Weather*

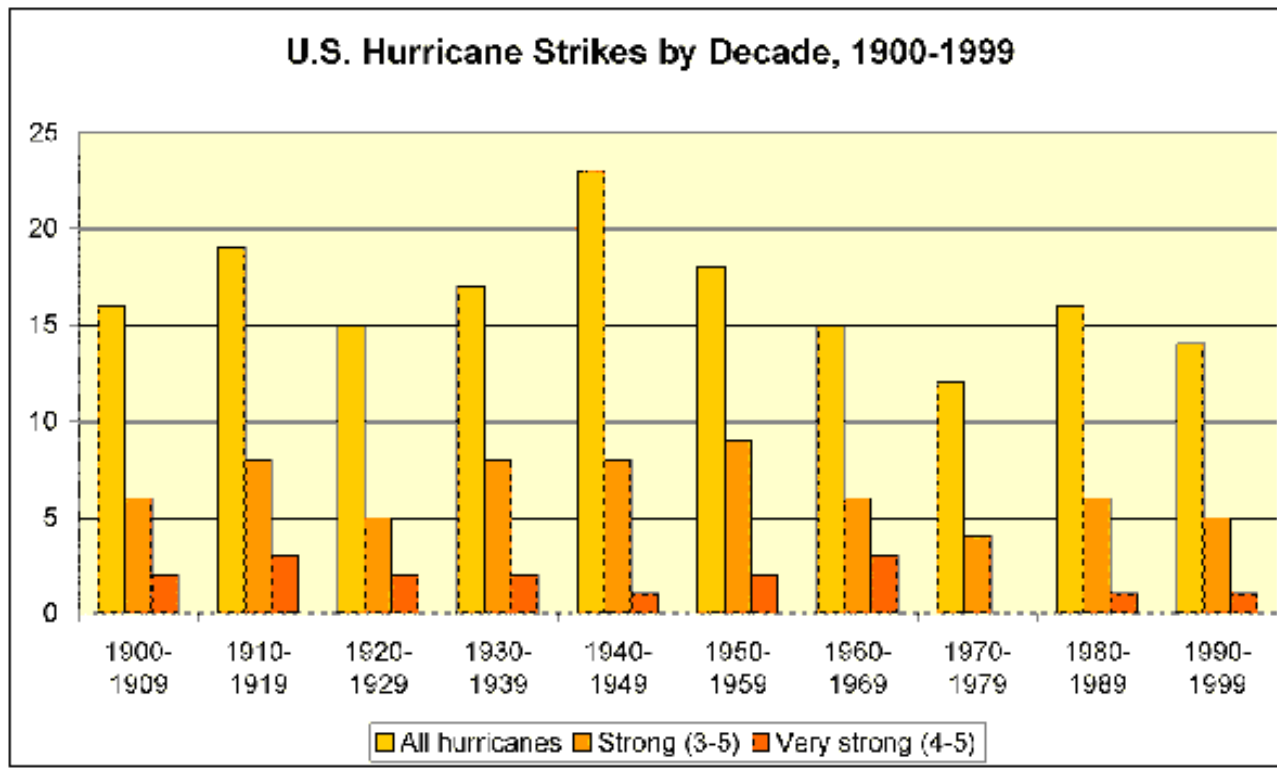
The IPCC claims that global warming will result in more severe weather. This doesn't make any sense, as most storms are caused by a difference in temperatures of colliding air masses. If CO2 warms the Polar Regions there will be smaller temperature differences, and less severe storms. All other things being equal, a warmer world should have fewer, not more, severe storms.

Unlike most storms, hurricanes are caused by difference in temperatures between the sea surface and the storm top.

Researchers Knutson and Tuleya examined a suite of climate models and found that they virtually unanimously projected that in a CO2-enhanced world, the middle and upper troposphere will warm at a faster rate than the surface, especially over the tropical oceans. More warming aloft than at the surface makes the atmosphere more stable and less conducive to storm formation. Thus, Knutson and Tuleya reported that the model-projected vertical stability increases in the future would temper (but not totally cancel out) the increase in storm intensity by rising sea surface temperature.

However, researchers Vecchi and Soden found that the climate models almost unanimously project that there will be an increase in the vertical wind shear during the hurricane season which also acts to inhibit tropical cyclone formation. The combined result is that any increase in hurricane intensity will be so small as to be largely undetectable. Incidentally, the actual vertical wind shear of Atlantic hurricanes have been declining since 1973, the opposite of the trend predicted by the climate models. See [here](#).

There is absolutely no evidence of increasing severe storm events in the real world data. Here is a graph of hurricane intensity for the USA.



For the North Atlantic as a whole, according to the World Meteorological Organization, "Reliable data ... since the 1940s indicate that the peak strength of the strongest hurricanes has not changed, and the mean maximum intensity of all hurricanes has decreased."

Gulev, et al (2000) employed NCEP/NCAR reanalysis data since 1958 to study the occurrence of winter storms over the northern hemisphere. They found a statistically significant (at the 95% level) decline of 1.2 cyclones per year for the period, during which temperatures reportedly rose in much of the hemisphere.

"Global warming causes increased storminess" makes for interesting headlines. It also violates fundamental scientific truth and the lessons of history.

### ***Warming is Good for Your Health***

The health benefits of a warmer planet are many times greater than any harmful effect. The positive health effects of heat have been well documented over the past quarter century. The early studies of Bull (1973) and Bull and Morton (1975a,b) in England and Wales, for example, demonstrated that even normal changes in temperature are typically associated with *inverse* changes in death rates, especially in older people. That is, when temperatures *rise*, death rates *fall*, while when temperatures *fall*, death rates *rise*.

Speculations on the potential impact of continued warming on human health often focus on mosquito-borne diseases. Elementary models suggest that higher global temperatures will enhance their transmission rates and extend their geographic ranges. However the histories of three such diseases-malaria, yellow fever, and dengue-reveal that climate has rarely been the principal determinant of their prevalence or range; human activities and their impact on local ecology have generally been much more significant. It is therefore inappropriate to use climate-based models to predict future prevalence.

### ***Warming Effects on Animals***

As indicated previously, both higher temperatures and CO2 concentrations enhance plant growth, especially for trees. This increases the habitat available for many animals. The bulk of scientific studies show an increase in biodiversity almost everywhere on Earth that is not restricted by habitat destruction in response to global warming and atmospheric CO2 enrichment.

The global warming alarmist has picked the polar bear as its poster animal. Time magazine has told its readers that they should be worried about polar bear extinction. The data however, does not support reasons for concern. In the Baffin Bay region between North America and Greenland, temperatures have been declining and the polar bear population has declined. In the Beauford Sea region the temperature has increased and so has the polar bear population. In other areas the polar bear population has been stable. So the trend of polar bear populations relative to temperature have been opposite to what Time would lead its readers to believe.

There has been recent warming in the western arctic as a result of the Pacific Decadal Oscillation, which periodically shifts the climate in the western arctic by changing ocean currents. These cycles have occurred over thousands of years. No evidence exists that suggests that both polar bears and the conservation systems that regulate them will not adapt and respond to the new conditions. Polar bears have persisted through many similar climate cycles. See [here](#) for an article by Dr. Mitchell Taylor, Polar Bear Biologist.

### ***Kyoto Protocol - Misallocation of Funds***

Of all the major problems of the world, climate change is one of the least important because funds spent to reduce CO2 emissions will have an insignificant effect on climate. Computer model projections show that full implementation of the Kyoto Protocol may result in temperature reduction of an undetectable 0.06 Celsius by 2050 at a cost of about \$1,000,000,000,000 US. See [here](#). (This estimate assumes the sun has no effect on climate. Since the sun has a major effect, the 0.06 Celsius estimate is likely high by a factor of 2 or more.)

The [Copenhagen Consensus](#) (directed by environmentalist Bjorn Lomborg) analysed the major challenges facing the world and produced a prioritized list of opportunities responding to those challenges. Submission by 24 United Nations ambassadors and other senior diplomats were reviewed by economists and determined that the top priority for addressing major world challenges would be given to communicable diseases, sanitation and water, malnutrition, and education. Ranked toward the bottom of the 40-category list were issues relating to climate change and the Kyoto Protocol.

### ***An Inconvenient Truth***

Al Gore's movie "An Inconvenient Truth" (AIT) is grossly misleading about climate change. Nearly every major statement made in the movie is one-sided, exaggerated, or plainly false. This movie has had a large effect on public opinion even though most scientists agree it is misleading.

Some of the problems with AIT are:

Implies that, during the past 650,000 years, changes in carbon dioxide levels largely caused changes in global temperature, whereas the causality mostly runs the other way, with CO2 changes trailing global temperature changes by hundreds to thousands of years. Never mentions that global temperatures were warmer than the present during each of the past four interglacial periods, even though CO2 levels were lower.

Presents images showing what 20 feet of sea level rise would do to the world's major coastal communities. There is no credible evidence of an impending collapse of the great ice sheets. We do have fairly good data on ice mass balance changes and their effects on sea level. NASA scientist Jay Zwally and colleagues found a combined Greenland/Antarctica ice loss sea level rise equivalent of 0.05 mm per year during 1992-2002. At that rate, it would take a full century to raise sea level by just 5 mm.

Presents the “hockey stick” reconstruction of Northern Hemisphere temperature history used by the IPCC, according to which the 1990s were likely the warmest decade of the past millennium. It is now widely acknowledged that the hockey stick was built on a flawed methodology and inappropriate data.

Assumes a linear relationship between CO2 levels and global temperatures, whereas the actual CO2-warming effect is logarithmic, meaning that the next 100 ppm increase in CO2 levels adds only half as much heat as the previous 100 ppm increase.

Claims that the rate of global warming is accelerating, whereas the rate has been constant for the past 30 years to 2002—roughly 0.17°C per decade, and no warming from 2002 through 2006.

Claims that Lake Chad in Northern Africa is drying up due to global warming. The lake is the water source for 20 million people, and it has an average depth of only 1.5 to 4.5 meters. It has actually been dry multiple times in the past: in 8500 BC, 5500 BC, 2000 BC and 100 BC. The lake has shrunk in size due to a rapidly expanding population drawing water from the lake, the introduction of irrigation technologies and local overgrazing. These causes are neither global nor warming, and are utterly independent of CO2. In addition, Africa as a continent experienced a dramatic shift towards dryer weather in the end of the 19th century that is not generally attributed to CO2.

Distracts views from the main hurricane problem facing the United States: the ever-growing concentration of population and wealth in vulnerable coastal regions, which is partly a consequence of federal flood insurance and other political subsidies.

Blames global warming for the decline “since the 1960s” of the emperor penguin population in Antarctica, implying that the penguins are in peril, their numbers dwindling as the world warms. In fact, the population declined in the 1970s and has been stable since the late 1980s.

Never explains why anyone should be alarmed about the current Arctic warming, considering that our stone-age ancestors survived—and likely benefited from—the much stronger and longer Arctic warming known as the Holocene Climate Optimum.

Presents one climate model’s projection of increased U.S. drought as authoritative even though another leading model forecasts increased wetness. Climate model hydrology forecasts on regional scales are notoriously unreliable. Most of the United States, outside the Southwest, became wetter during 1925-2003.

Blames global warming for the record number of typhoons hitting Japan in 2004. Local meteorological conditions, not average global temperatures, determine the trajectory of particular storms, and data going back to 1950 show no correlation between North Pacific storm activity and global temperatures.

Claims that global warming endangers polar bears even though polar bear populations are increasing in Arctic areas where it is warming and declining in Arctic areas where it is cooling. In fact 11 of the 13 main groups in Canada are thriving, and there is evidence that the only groups that are not thriving are in a region of the Arctic that has cooled. Polar bears have survived the Holocene Climate Optimum and the Medieval Warm Period, both periods were significantly warmer than today's climate.

Warns that a doubling of pre-industrial CO2 levels to 560 ppm will so acidify sea water that all optimal areas for coral reef construction will disappear by 2050. This is not plausible. Coral calcification rates have increased as ocean temperatures and CO2 levels have risen, and today’s main reef builders evolved and thrived during the Mesozoic Period, when atmospheric CO2 levels hovered above 1,000 ppm for 150 million years and exceeded 2,000 ppm for several million years.

Blames global warming for the resurgence of malaria in Kenya, even though several studies have found no climate link and attribute the problem to decreased spraying of homes with DDT and anti-malarial drug resistance.

Claims that 2004 set an all-time record for the number of tornadoes in the United States. Tornado frequency has not increased; rather, the detection of smaller tornadoes has increased. If we consider the tornadoes that have been detectable for many decades (category F-3 or greater), there actually has been a downward trend since 1950.

Cites Tuvalu, Polynesia, as a place where rising sea levels force residents to evacuate their homes. In reality, sea levels at Tuvalu fell during the latter half of the 20th century and even during the 1990s.

Neglects to mention that global warming could reduce the severity of winter storms—also called frontal storms because their energy comes from colliding air masses (fronts)—by decreasing the temperature differential between colliding air masses.

Ignores the large role of natural variability in Arctic climate, never mentioning either that Arctic temperatures during the 1930s equalled or exceeded those of the late 20th century, or that the Arctic during the early- to mid-Holocene was significantly warmer than it is today.

Ignores a study by University of Missouri professor Curt Davis that found an overall Antarctic ice mass gain during 1992-2003.

Neglects to mention that NASA satellites show an Antarctic cooling trend of 0.11°C per decade since 1978.

Calls carbon dioxide the “most important greenhouse gas.” Water vapour and clouds are the leading contributors and account for over 70% of the greenhouse effect.

Claimed that ice cap on Mt. Kilimanjaro is disappearing due to global warming, though satellite measurements show no temperature change at the summit.

This is only a partial list of errors, omissions and exaggerations.

See [here](#) from the Competitive Enterprise Institute.

See [here](#) for an article listing 35 errors in AIT by Christopher Monckton of Brenchley.

The decision by the British government to distribute the film "An Inconvenient Truth" to schools has been the subject of a legal action. The British High Court found that the film was false or misleading in 11 respects.

In order for the film to be shown, the High Court ruled in October, 2007 that teachers must make it clear to their students that:

- 1.) The film is a political work and promotes only one side of the argument.
- 2.) Nine inaccuracies have to be specifically drawn to the attention of school children.

The inaccuracies are listed [here](#).

### ***Warnings of Global Cooling***

Several authorities are now warning of global cooling because the sun is expected to soon enter a quiet period.

Nigel Weiss, Professor Emeritus at the Department of Applied Mathematics and Theoretical Physics at the University of Cambridge says that the world is about to enter a cooling period. Dr. Weiss believes that man-made greenhouse gases have recently had a role in warming the earth, although the extent of that role, he says, cannot yet be known. What is known, however, is that throughout earth's history climate change has been driven by factors other than man: "Variable



behaviour of the sun is an obvious explanation," says Dr. Weiss, "and there is increasing evidence that Earth's climate responds to changing patterns of solar magnetic activity." The sun's most obvious magnetic features are sunspots, formed as magnetic fields rip through the sun's surface. "If you look back into the sun's past, you find that we live in a period of abnormally high solar activity," Dr. Weiss states. These hyperactive periods do not last long, "perhaps 50 to 100 years, then you get a crash," says Dr. Weiss. "It's a boom-bust system, and I would expect a crash soon."

In addition to the 11-year cycle, sunspots almost entirely "crash," or die out, every 200 years or so as solar activity diminishes. When the crash occurs, the Earth can cool dramatically. Dr. Weiss knows because these phenomenon, known as "Grand minima," have recurred over the past 10,000 years, if not longer. "The deeper the crash, the longer it will last," Dr. Weiss explains. In the 17th century, sunspots almost completely disappeared for 70 years. That was the coldest interval of the Little Ice Age, when New York Harbour froze, allowing walkers to journey from Manhattan to Staten Island, and when Viking colonies abandoned Greenland, a once verdant land that became tundra.

In contrast, when the sun is very active, such as the period we're now in, the Earth can warm dramatically. This was the case during the Medieval Warm Period, when the Vikings first colonized Greenland and when Britain was wine-growing country.

No one knows precisely when a crash will occur but some expect it soon, because the sun's polar field is now at its weakest since measurements began in the early 1950s. Some predict the crash within five years, and many speculate about its effect on global warming.

A Russian Academy of Sciences report in August 2006 warns that global cooling could develop on Earth in 50 years and have serious consequences.

David Archibal presentation titled "[The Past and Future of Climate](#)" here presented to the Lavoisier Group's [2007 Workshop](#) in Melbourne, Australia, shows a forecast of global temperatures based on a detailed analysis of sunspot cycles. He expects the next sunspot cycle (24) to be weak resulting in the start of a long cooling trend. The forecast shows a 1.5 °C drop in global temperature from 2007 to 2025. He warns "...this will have a large and negative effect on Canadian grain production..."

---