

# Global Temperature Change

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## Abstract

This study was initiated to review the existing technical literature regarding the possibility of anthropogenic carbon dioxide releases causing climate change. The literature search demonstrates no peer reviewed evidence exists, except computer climate simulations, supporting the concept of man-generated carbon dioxide or other greenhouse gases causing increased global temperature. Most reports contain statements, without technical support or reference, regarding the need to control carbon dioxide e.g., "The use of these fossil fuels results in the release of carbon dioxide (CO<sub>2</sub>), which is widely believed to contribute to global climate change." (USDOE, 2007). On the contrary, the existing technical literature report cyclic variations in climate temperature change for about 2 million years. In part, this conclusion is supported, by oxygen-28 to oxygen-16 gas ratios from analyses of ice cores covering a period of 250,000 years. The literature search leads to the conclusion anthropogenic carbon dioxide and other greenhouse gas emissions do not result in climate temperature increases.

## Introduction

The earth's climate forever changes in a predictable cyclic manner, apparently dictated by solar activity, Bond et al. (2001). We know Romans recorded climate warming between 200 BC and 600 AD, Lamb (1977a). In Europe, between 600 and 1300 AD, the Medieval Warming occurred. The Little Ice Age (1300 to 1850 AD) is dramatically documented by tax records of the abandonment of Greenland by the Norse population in about 1300 after nearly 300 years of moderate temperatures, when farming prospered.

## Weather History

### Ice Core Records

Millekseen and Kuijper (2001) suggest alternating ice and warming cycles existed about 2 million years ago. Dansgaard and Oeschger during 1983 cored the Greenland Ice Sheet. Dansgaard, et al. (1984) reported a link between climate cycles and sun activity. The ice core temperature analyses are based on the ratio of oxygen-18 to oxygen-16 at the time the snow was laid down. This ratio is not time impacted. Ice core analyses showed persistent temperature cycles within cycles, Singer and Avery (2007a). The link shows a moderate cyclic variation in ambient air temperature with time. The original analyses of ice cores gathered from coreholes spanning 250,000 years suggested a repeating cycle lasting about 2,500 years. Based on more research this periodicity was revised to 1,500 years ±500 years by Bond (1997). These cycles make weather modeling extremely difficult and complex, even with modern computers.

### Tree Ring Data

Tree ring analyses from long living Pakistani trees confirm ambient temperature warming from AD 800 to 1,000 and cold temperatures from AD 1,500 to 1,700, Esper, et al. (2002). These findings compare favorably with ice core data.

### Written History

Lamb (1977b) documented climate change history for a period of 1,000 years. Romans (30-60 AD) reported grape cultivation advancing slowly northward in Italy. This history shows both grapes and olives growth receded as the ambient temperature changed (decreased). Lamb (1977c) discusses the cold temperature history reported in Europe during the 1500's AD (Little Ice Age). This history correlates well with the severe change in Greenland temperature causing the Norsemen to evacuate Greenland.

### Sun's Irradiation

Perry and Hsu (2000) using a solar-luminosity model based solar-related isotopes-variations scanned 90,000-year glacial cycle. They observed excellent correlation using carbon-14 variations and carefully dated tree rings data as far back as the Medieval Warming (900-1300 AD). They extrapolated findings to 90,000 years using the correlated model. Soon (2005) shows how well solar activity correlates with arctic temperature during the past 130 years and how poorly CO<sub>2</sub> correlates arctic temperature, **Figure 1**. The temperature data comes from Polyakov et al. (2003) using arctic station measurements, while the solar activity data comes from five databases. Willson (2003) reports the sun's radiation increased by nearly 0.05 percent from the late 1970s based on 25-year record assembled by NASA. The cited trend is significant, because the total energy output of the sun is enormous. Willson cannot support the data before 1978, but he says, if the trend persisted during all of the 20<sup>th</sup> century, the increase in solar activity would produce "a substantial component" of the observed climate temperature increase.

### Global Warming

The Earth temperature has warmed since 1850, end of the Little Ice Age. The highest temperatures were recorded in the late 1930s, Figure 1. During the late 1930s, the increase in temperature was rapid, e.g., 2.5°C in 20 years in the Arctic region. No one

recognized the worldwide temperature increase, except the farmers, who took advantage of the warming, by expanding their agricultural areas to the north, just as the Romans did during the Roman Warming. Also, the population increased, because of the abundance of food.

Good correlation between solar activity and arctic temperature exists, Figure 1. Galileo first collected sun spot data in 1609. Therefore, we have sun-spot data substantiating Maunder Solar Minimum, the coldest period (1645-1710) of the Little Ice Age, when sunspots were at low ebb. EPA (2001) confirms these observations.

Currently, there is discussion regarding capturing and sequestering CO<sub>2</sub> as a means of mitigating climate temperature increase. Department of Energy (2007) states without support “The concern is that atmospheric GHG accumulations in excess of levels required to sustain the greenhouse effect introduce an external forcing factor leading to global temperature increases.” This true of all documents supporting reduction of greenhouse gases — there is no technical support for asserting greenhouse increases cause climate temperature increase. Sequestration or elimination of a carbon environment would be an expensive mistake if the climate change is the result of solar activity. In addition, having to compress CO<sub>2</sub> from atmospheric pressure to injection pressure (2200± psi) is energy intensive. The U.S. will have great difficulty providing the additional energy, if though the 25-year moratorium on domestic drilling and producing is discontinued. Compensating for 25 years without access to offshore exploration and drilling will require time. Further, objection to building nuclear generation plants may prevent providing the needed power. Lack of power could cause a repeat of the California rolling blackouts of 2001, but this time on a massive scale. Even wind turbines may not help, because the wind does not always blow (e.g., 20% utility factor) and an adequate power grids to move the electricity from remote areas are not available and are costly. We are experiencing this situation now (2008) in Texas, where wind turbine generated power cannot be introduced into the distribution system because of lack an adequate grid to serve the remote wind turbines.

Some concerned citizens raise the specter of sea level rise as a result of temperature increase. Singer and Avery (2007d) state the sea level for the last 5,000 years has risen at the rate of about seven feet per century. On the other hand, during the last century, tide gauges show the sea level has raised about six inches, in spite of the recorded high temperatures from 1916 to 1940, Figure 1. Accordingly, except in very low-lying areas, sea level rise does not appear to be a major concern.

## Global Cooling

The possibility of climate cooling raises interesting questions, e.g., what is the desired climate temperature, when do we know when the optimum temperature is attained, were the high temperatures of the late 1930s or low temperatures of the 1870s the desired levels? Warming produces abundant crops, increased area of agricultural viable land and moderate sea level rise. On the other hand climate cooling reduces crop yield, reduces useable land, and more importantly, climate cooling increases need for additional energy for home and building heating. Also, freezing weather kills far more humans and animals than warm weather. Interestingly, on 23 March 2008, the Hadley Climate Research Unit in Britain, the NASA Goddard Institute for Space Studies in New York, the Christy Group at the University of Alabama, and the Remote Sensing Systems, Inc. in California reported global temperatures decreased 0.7°C during 2007, The Australian, 2008. The reported lowered climate temperature is reflected in decrease solar activity, **Figure 2**.

## Lack of Experimentation

There are no scientific data, experiments or hypotheses demonstrating climate change results from greenhouse gases generation. IPCC modeling, Houghton, et al. (1995), demonstrates exaggerated computer predictions of climate change from 1978–1998 when compared with field measured temperatures for the same time period between latitudes 83 N and 83 S, Robinson (2007b). Shindell and Schmidt (2004), based on observed trends, predicted global warming would cause the Southern (Hemisphere) Annular Mode (SAM) to become neutral, thereby markedly reducing polar cooling. This situation has not occurred, in fact the highest Antarctic temperature occurred in the 1930s, Przybylak (2002), Polyakov (2002). Also, Antarctic temperatures are decreasing and the ice caps are thickening, Taylor (2006).

## Weather Predictions

### The Intergovernmental Panel on Climate Change (IPCC)

The Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 as a body of climate scientists interested in furthering knowledge of weather behavior. These scientists published peer reviewed technical weather assessments. For example, the 1996 IPCC “Second Assessment” provided a graph showing “The Last 1,000 Years of Earth Temperatures from Tree Rings, Ice Cores and Thermometers” (Figure 22, IPCC Climate Change, 1996).. This graph, **Figure 3**, clearly shows the Medieval Warming (900 – 1300 AD) and the Little Ice Age (1300 – 1850 AD).

The 2001 assessment prepared by the IPCC Executive Committee, a group of policymakers, rather than scientists [Horner (2007a)], displayed a totally new rendition of Figure 3. Instead of an accurate assessment of historical temperature trends, the new graph, **Figure 4**, modified the last 1000 years of temperature variations and historical records, Mann (1998). The 2001 version of the historical data, Figure 4, portrays the past 1,000 year of temperatures as a slightly undulating line having an obvious, consistent and abrupt upward curve starting at the end of the Little Ice Age, e.g., the so-called “hockey stick” graph (Figure 2.20, IPCC Climate Change, 2001), Mann, (1998), Figure 4. The hockey stick graph minimizes the Medieval Warming Period and the Little Ice Age.

## **2001 IPCC Data Review**

McIntyre and McKittrick (2003) reviewing the Mann (hockey stick) data observed critical data correlation errors, e.g., unjustified truncation of data, use of obsolete data, calculation errors and quality control deficiencies in the data and statistics. McIntyre and McKittrick using a corrected set of Mann data showed the “Hockey Stick” interpretation was wrong. Erroneous graphical data sponsored by IPCC Executive Committee and computer simulations by Houghton, et al. (1995) resulted in frightening the uninitiated public to near hysteria regarding global temperature change.

The IPCC (2001) included the Hockey Stick graph in their Executive Committee Assessments. Also, IPCC advocated the Kyoto Protocol even in the face of Ice Core data demonstrating long trending temperature cycles. In contrast, Robinson (2007a), reports obtaining signatures of 18,000 (now report to be 31,000) American university degreed physical science graduates in opposition to the Kyoto Protocol, which recommends limits on greenhouse emissions. IPCC report (2007) no longer includes the Hockey Stick graph.

A Global Warming Industry developed as a result of misinterpretation and misreporting of climate change by IPCC. This industry finds government financial assistance is readily available, if the research proposal, in some fashion, suggests the research findings could be a solution to the perceived Global Warming problem. Michaels (2006) reports “in the United States the taxpayer outlay for so-called global change science is now in excess of \$4 billion annually.”

Based on the scientific findings of persistent and repeated climate change cycles, the temperature records show the Little Ice Age stopped in 1850. After that date, the global temperature consistently increased, except for an anomalous high in 1940. Frohlich and Lean, (2002) show this temperature increase is due to solar irradiation. Further, the analysis shows no significant increase of CO<sub>2</sub> concentration occurred with increased temperature, Figure 1. Carbon dioxide is a lagging indicator of global warming, Singer and Avery (2007b). The observed CO<sub>2</sub> increase is due to the ocean warming, which releases more CO<sub>2</sub> as the water temperature increases. There is no question global temperature is increasing. However, this temperature change is likely to be small. Robinson et al. (2007b) estimate the increase will be about 4°C.

## **2007 IPCC Report**

The 2007 Intergovernmental Panel on Climate Change (IPCC) Climate Change report ([http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr\\_spm.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf)) generated considerable criticism from climate scientists, who claim the report provides grossly inaccurate information. For more information, refer to the U.S. Senate Committee on Environment and Public Works ([http://epw.senate.gov/public/index.cfm?FuseAction=Minority.Blogs&ContentRecord\\_id=f80a6386-802a-23ad-40c8-3c63dc2d02cb](http://epw.senate.gov/public/index.cfm?FuseAction=Minority.Blogs&ContentRecord_id=f80a6386-802a-23ad-40c8-3c63dc2d02cb)). The Senate Committee said “Over 400 prominent scientists from more than two dozen countries recently voiced significant objections to major aspects of the so-called “consensus” on man-made global warming. These scientists, many of whom are current and former participants in the UN IPCC (Intergovernmental Panel on Climate Change), criticized the climate claims made by the UN IPCC…”. This should raise concern regarding the validity of the newer IPCC reports.

## **Greenhouse Gases**

The greenhouse gas theory suggests emissions of greenhouse gases, especially CO<sub>2</sub>, from human activities are causing heating of the Earth beyond the levels of past climate variation, and creating serious danger for the planet’s ecosystems, IPCC (2007a). The theory has obvious flaws.

1. CO<sub>2</sub> changes do not account for the past climate variations, including the Roman Warming (200 BC – 900 AD), Medieval Warming and the Little Ice Age (1300 – 1850), Figures 1 and 3. If CO<sub>2</sub> is responsible for climate change, what would cause the presence or absence of CO<sub>2</sub> to result in these past documented temperature variation over time?
2. The CO<sub>2</sub> theory does not explain the recent temperature changes. Most of the observer climate warming occurred prior to 1940, Figure 1 (top) — before there was much anthropogenic CO<sub>2</sub> in the atmosphere. In fact, the CO<sub>2</sub> lags the temperature rise, Figure 1 (top); — no increase in CO<sub>2</sub> in the 1930s, when climate increase was observed. After 1940, climate temperature decreased until 1960, in spite of an increase in CO<sub>2</sub> emissions. On the other hand, solar activity tracks Arctic temperature well, Figure 1 (bottom). Bond (2001) states, “...over the last 12,000 years virtually every centennial time-scale increase in drift ice documented in our North Atlantic records was tied to a solar minimum.” The regularity and correlation of temperature increases and drift ice occurrences with solar activity demonstrate the interaction of these observations.
3. The increase in CO<sub>2</sub> concentration has not produced the increases in atmospheric temperature predicted by the computer models over a 20-year-period. The Earth’s surface temperature has warmed more rapidly than the temperature of the lower atmosphere up to 30,000 feet. The Greenhouse theory states the “lower atmosphere” will warm first. This disparity places the Greenhouse Theory in serious question.
4. CO<sub>2</sub> is a lagging indicator by about 600-800 years, of climate warming for the last 240,000 years, e.g., warming produces CO<sub>2</sub> rather than CO<sub>2</sub> producing warming, Singer and Avery (2007a).
5. The Greenhouse Theory predicts CO<sub>2</sub>-driven warming of the Earth’s surface will start, and be strongest at the polar regions. This is not happening. Horner (2007b), Taylor (2006). Polyakov (2002) supports lack of pole warming by showing no pole temperature increase and perhaps, a slight temperature decrease in the arctic since 1937.

One of the reasons the greenhouse gas theory being flawed is computer programs do not consider other greenhouse gases. For example, water vapor is a strong greenhouse gas, e.g., the atmosphere contains nearly 2 percent water (compared to 0.037% for CO<sub>2</sub>).

Water vapor is responsible for about two-thirds of the natural greenhouse effect. Modeling water vapor in climate-change models is very difficult and currently is rudimentary. In fact, the Environmental Protection Agency did not include water vapor in the 1990-2006 Inventory of U.S. Greenhouse Gas Emissions and Sinks, EPA (2008). EPA stated water vapor was too difficult to inventory.

## Discussion

IPCC Executive Committee abrogated its contract to provide useful, forward-looking climate information. Instead, the IPCC Executive Committee ignored peer-reviewed climate science and, in some cases, knowingly and willingly refused to correct erroneous data previously published, e.g., Hockey Stick Graph. The greenhouse gas misconception fostered by the IPCC Executive Committee led to the Kyoto Treaty. This treaty is now languishing because, most participating nations cannot, without causing havoc to their country's economy, achieve the greenhouse gases reductions proposed by the treaty. In July 2008, the major industrialized countries abandoned the Kyoto treaty by agreeing to half the greenhouse gas emission by 2050, <http://www.foxnews.com/story/0.2933.377622.00.html>.

The concept of reducing greenhouse gases to mitigate global temperature change is hopeless task, if temperature change is the result of solar radiation, as the scientific community shows. I observe energy and monetary wasting by well-meaning persons and companies trying to sequester CO<sub>2</sub> by underground injection, OSPAR, <http://www.ospar.org/eng/html/welcome.html>. Gas compression from atmospheric pressure to 2200± psi is energy intensive. CO<sub>2</sub> is a minor greenhouse gas compared with water vapor or methane. Elimination of CO<sub>2</sub> will not prevent global temperature increases. Svante Arrhenius (1895) showed a reduction in CO<sub>2</sub> down to about 60 percent of the concentration of atmospheric CO<sub>2</sub> existing at the time of his calculations, would have been necessary to cause the Little Ice Age. Ice core gas analyses show such a drastic reduction in CO<sub>2</sub> did not occur. Thus, we can conclude, CO<sub>2</sub> is not a major actor in global temperature change. On the other hand, good correlation exists between solar activity and climate change on earth, Figure 1.

The current climate-warming scare has fostered an entire industry seeking financial grants for weather related research. Also, there is developing a need by industry to show the public their commitment to mitigate global temperature increase by reducing greenhouse gases. There is a move towards emissions trading in Europe, and United States. Kyoto Annex I Parties can trade emission, at a price, to satisfy the protocol. Unfortunately, if a problem exists, emission trading simply allows the emissions to enter the atmosphere, rather than a reduced emissions quantity. This may no longer be a problem since, for the most part, the EU is unable to achieve the Kyoto prescribed reductions and the Kyoto protocol will most likely dissolve in 2012. The 2008 proposal to reduce CO<sub>2</sub> by 50 using unspecified methods will be substituted for Kyoto. Proposals to reduce greenhouse gases will result in increased cost of doing business, which will be passed onto the consumer without affecting global temperature change.

The carbon tax is another remedy being proposed to reduce CO<sub>2</sub> emissions. Collected taxes likely will be spent on ill-conceived alternate energy projects. Congress spent billions of dollars on Synfuel Projects during the 1970's, but provided no economic viable synthetic fuel. FutureGen, (<http://en.wikipedia.org/wiki/FutureGen>) clean burning of coal to generate electric power, is now shut down in June 2008 because of the excessive cost.

Even when politics is not involved, there is little agreement between opposing groups. In this regard, your attention is directed to Appendix A of the 1 October 2006 New Zealand Climate Science Coalition at <http://nzclimatescience.net2.php?option=content&do-pdf=1&id=20>. The report is a response from the Coalition to Dr. Wratt (listed author of IPCC Assessment Reports), who took issue with the Coalition's statement "the science [of climate change] is not settled" regarding the issue of anthropogenic activities. Further, The Oregon Institute for Science and Medicine (2008) announced 31,000 physical science university degree professionals, including 9,000 PhDs signed a petition stating climate change is not the result of anthropogenic greenhouse gasses. This demonstrates the magnitude of the disagreement.

There are no experimental data supporting CO<sub>2</sub> causes climate change. On the contrary, Jones et al. (1986) developed an 11 year running average of terrestrial Northern Hemisphere temperature as deviations from the 1951-1970 mean temperature for the period 1750-2000 AD. These data were compared by Baliunas and Soon (1995) with solar magnetic cycle length in years. The resulting match of climate change vs. solar cycle length is almost perfect, Robinson, (2007a, Figure 4), Figure 1. Also, two papers regarding anthropogenic carbon dioxide have appeared in the Journal of Petroleum Technology (see September 2008 issue) during 2008. I requested from each author a peer reviewed paper, not based on computer simulation, demonstrating anthropogenic greenhouses gasses cause global warming. In both cases, the author declined to respond to my requests. This does not instill confidence in the hypothesis that CO<sub>2</sub> causes global temperature increase.

## Conclusions

1. The earth's climate temperature is increasing.
2. The temperature change is a natural, cyclic occurrence driven by solar activity,
3. There are no experimental hypotheses and supporting data demonstrating greenhouse gases causes temperature change. On the contrary ice core and tree ring data show climate change is a long-term cyclic occurrence.
4. Controlling anthropogenic greenhouse gases, including CO<sub>2</sub>, will **not** stop temperature change, if the temperature change is due to solar activity.
5. The most convincing hypothesis and supporting data demonstrate the earth's cyclic temperature change results from solar activity

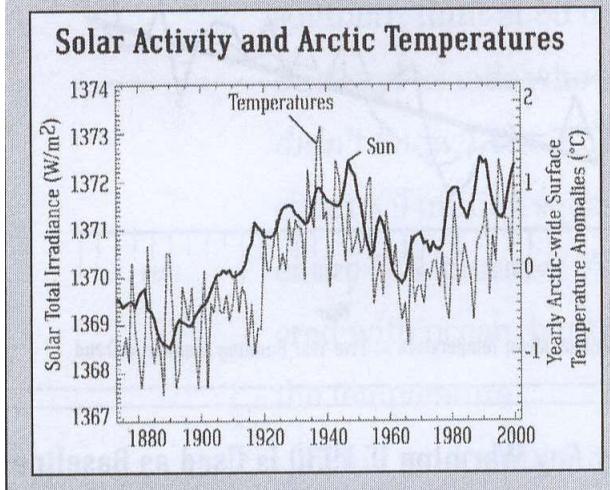
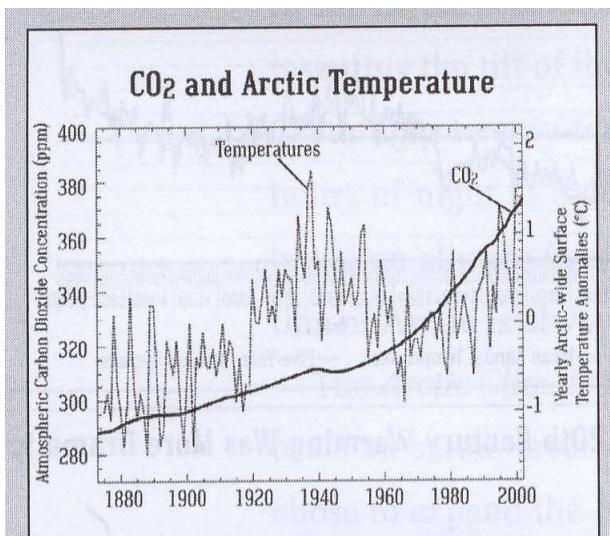
## **Recommendations**

1. Encourage governments to establish laws based on science.
2. Discourage governments and research groups appropriating and spending tax monies on inappropriate anthropogenic climate change experiments.

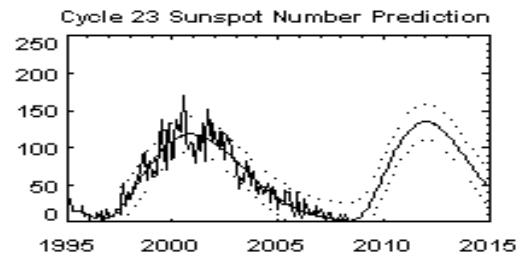
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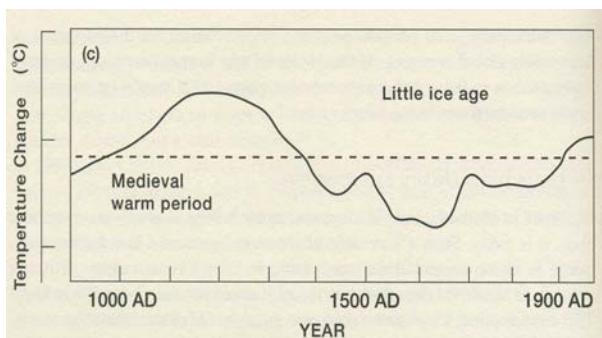
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**Figure 1.** Carbon Dioxide and Solar Activity correlations with Arctic Temperatures. Horner (2007b) p146. Courtesy of Dr. Willie Soon



**Figure 2. Solar Cycle Prediction**  
<http://solarscience.msfc.nasa.gov/predict.shtml>



**Figure 3. Climate history for the last 1,000 years.**

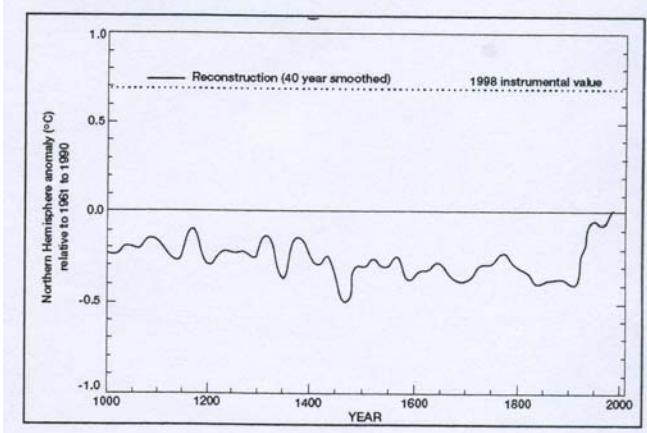


Figure 4. The 2001 IPCC Report “Hockey Stick”