The Facts and Science of Climate Change

By United States Senator James M. Inhofe

- Chairman -

Committee on Environment and Public Works

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The climate is constantly changing, and has done so throughout history. The challenge is to understand the natural changes in the climate and whether humans are contributing significantly to those changes. The larger challenge is to separate the politics from the discussion of the science, in order to better understand the state of knowledge of climate change science.

Today, even saying there is scientific disagreement over global warming is itself controversial. But anyone who pays even cursory attention to the issue understands that scientists vigorously disagree over whether human activities are responsible for global warming, or whether those activities will precipitate apocalyptic natural disasters.

It is extremely important for the future of this country that the facts and the science get a fair hearing. Without proper knowledge and understanding, alarmists will scare the country into enacting their ultimate goal: making energy suppression, in the form of harmful mandatory restrictions on carbon dioxide and other greenhouse emissions, the official policy of the United States.

Such a policy would induce serious economic harm, especially for low income and minority populations. Energy suppression, as official government and nonpartisan private analyses have amply confirmed, means higher prices for food, medical care, and electricity, as well as massive job losses and drastic reductions in gross domestic product, all the while providing virtually no environmental benefit. In other words: a raw deal for the American people.

Unfortunately, much of the debate over global warming is predicated on fear, rather than science. Global warming alarmists see a future plagued by catastrophic flooding, war, terrorism, economic dislocations, droughts, crop failures, mosquitoborne diseases, and harsh weather all caused by manmade greenhouse gas emissions.

The Alarmists

Alarmists have routinely used fear in the climate change debate to confuse the issues and avoid discussing the scientific realities and uncertainties. Some try to capitalize on the fear associated with supposed catastrophic changes to the climate to advance other goals such as anti-growth measures and extremist environmental viewpoints. Many of these alarmists' comments are then repeated in the general media and find their way into the public conscience without regard to the veracity of the statements, becoming urban legend.

Hans Blix, chief U.N. weapons inspector, sounded both ridiculous and alarmist when he said in March 2003, "I'm more worried about global warming than I am of any major military conflict."

Science writer David Appell, who has written for such publications as the New Scientist and Scientific American, parroted Blix when he said global warming would "threaten fundamental food and water sources. It would lead to displacement of billions of people and huge waves of refugees, spawn terrorism and topple governments, spread disease across the globe."

Appell's next point deserves special emphasis, because it demonstrates the sheer lunacy of environmental extremists:

"[Global warming] would be chaos by any measure, far greater even than the sum total of chaos of the global wars of the 20th century, and so in this sense Blix is right to be concerned. Sounds like a weapon of mass destruction to me." No wonder the late political scientist Aaron Wildavsky called global warming alarmism the "mother of all environmental scares."

Appell and Blix sound very much like those who warned us in the 1970s that the planet was headed for a catastrophic global cooling. On April 28, 1975, *Newsweek* printed an article titled, "The Cooling World", in which the magazine warned: "There are ominous signs that the earth's weather patterns have begun to change dramatically and that these changes may portend a drastic decline in food production with serious political implications for just about every nation on earth."

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In a similar refrain, *Time* magazine for June 24, 1974 declared: "However widely the weather varies from place to place and time to time, when meteorologists take an average of temperatures around the globe they find that the atmosphere has been growing gradually cooler for the past three decades."

In 1974 the National Science Board, the governing body of the National Science Foundation, stated: "During the last 20 to 30 years, world temperature has fallen, irregularly at first but more sharply over the last decade." Two years earlier, the board had observed: "Judging from the record of the past interglacial ages, the present time of high temperatures should be drawing to an end leading into the next glacial age."

How quickly things change. Fear of the coming ice age is old hat, but fear that manmade greenhouse gases are causing temperatures to rise to unsustainable levels is in vogue. Alarmists brazenly assert that this phenomenon is fact, and that the science of climate change is settled.

To cite just one example, Ian Bowles, former senior science director on environmental issues for the Clinton National Security Council, said in the April 22, 2001 edition of the *Boston Globe*: "the basic link between carbon emissions, accumulation of greenhouse gases in the atmosphere, and the phenomenon of climate change is not seriously disputed in the scientific community."

But in fact the issue is far from settled, and indeed is seriously disputed. In a July 2003 editorial, Carter Administration Energy Secretary James Schlesinger took issue with alarmists who assert there is a scientific consensus supporting their views. There is an idea among the public that "the science is settled," Dr. Schlesinger wrote. "That remains far from the truth."

Furthermore, not only is there a debate, but the debate is shifting away from those who subscribe to global warming alarmism. In fact, the balance of the evidence offers strong proof that natural variability is the overwhelming factor influencing climate.

It's also important to question whether global warming, assuming it's occurring or going to occur, is even a problem for human existence. Thus far no one has seriously demonstrated any scientific proof that increased global temperatures would lead to the catastrophes predicted by alarmists. In fact, it appears that just the opposite is true: that increases in global temperatures may have a beneficial effect on how we live our lives.

THE KYOTO PROTOCOL

The issue of global warming has garnered significant international attention through the Kyoto Protocol, a treaty which requires signatories to reduce their greenhouse gas emissions by considerable amounts below 1990 levels.

The Clinton Administration, led by former Vice President Al Gore, signed the Kyoto Protocol on November 12, 1998, but never submitted it to the Senate for ratification.

The treaty explicitly acknowledges as true that manmade emissions, principally from the use of fossil fuels, are causing global temperatures to rise, eventually to catastrophic levels. Kyoto enthusiasts believe that if we dramatically cut back, or even eliminate, fossil fuels, the climate system will respond by sending global temperatures back to "normal" levels.

In 1997, the Senate sent a powerful signal that Kyoto was unacceptable. By a vote of 95 to 0, the Senate passed the Byrd/Hagel resolution, which stated that the Senate would not ratify Kyoto if it were to cause substantial economic harm and if developing countries were not required to participate on the same timetable.

The treaty would have required the U.S. to reduce its emissions 31% below the level otherwise predicted for 2010. Put another way, the U.S. would have had to cut 552 million metric tons of CO2 per year by 2008-2012. As the Business Roundtable pointed out, that target is "the equivalent of having to eliminate all current emissions from either the U.S. transportation sector, or the utilities sector (residential and commercial sources), or industry."

According to WEFA economists, Kyoto would cost 2.4 million US jobs and reduce GDP by 3.2%, or about $300 billion annually, an amount greater than the total expenditure on primary and secondary education.

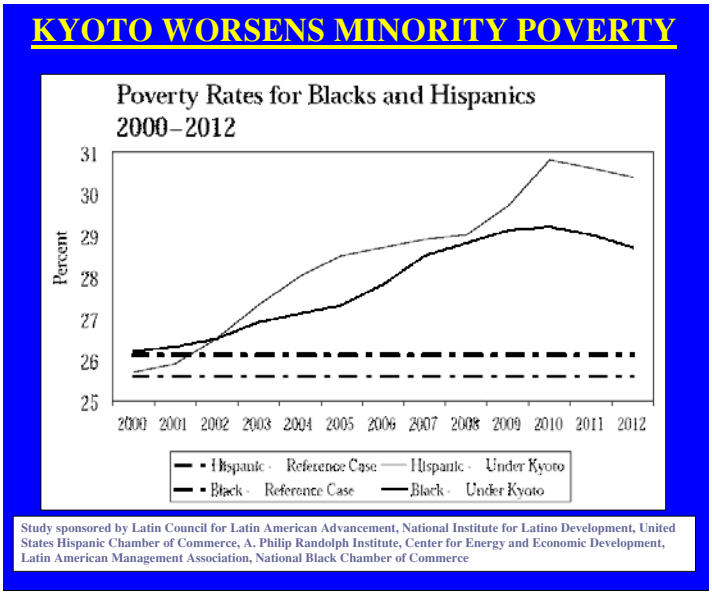
The most widely cited and most definitive economic analysis of Kyoto came from Wharton Econometric Forecasting Associates, or WEFA, (a private consulting company founded by professors from the University of Pennsylvania's Wharton Business School). According to WEFA economists, Kyoto would cost 2.4 million US jobs and reduce GDP by 3.2%, or about $300 billion annually, an amount greater than the total expenditure on primary and secondary education.

Because of Kyoto, American consumers would face higher food, medical, and housing costs: for food, an increase of 11%; medicine, an increase of 14%; and housing, an increase of 7%. At the same time an average household of four would see its real income drop by $2,700 in 2010, and each year thereafter.

Under Kyoto, energy and electricity prices would nearly double, and gasoline prices would go up an additional 65 cents per gallon.

Some in the environmental community have dismissed the WEFA report as a tainted product of "industry"; however, a 1998 analysis by the Clinton Energy Information Administration, the statistical arm of the Department of Energy, largely confirmed WEFA's analysis.

Despite these facts, radical groups such as Greenpeace blindly assert that Kyoto "will not impose significant costs" and "will not be an economic burden."



Among the many questions this provokes, one might ask: Won't be a burden on whom, exactly? Greenpeace doesn't elaborate, but according to a recent study by the Center for Energy and Economic Development, sponsored by the National Black Chamber of Commerce and the United States Hispanic Chamber of Commerce, if the U.S. ratifies Kyoto, or passes domestic climate policies effectively implementing the treaty, the result would "disproportionately harm America's minority communities, and place the economic advancement of millions of U.S. Blacks and Hispanics at risk."

Among the study's key findings: Kyoto will cost 511,000 jobs held by Hispanic workers and 864,000 jobs held by Black workers; poverty rates for minority families will increase dramatically; and, because Kyoto will bring about higher energy prices, many minority businesses will be lost.

It is interesting to note that the environmental left purports to advocate policies based on their alleged good for humanity, especially for the most vulnerable. Kyoto is no exception. Yet Kyoto, and Kyoto-like policies would cause the greatest harm to the poorest among us.

Environmental alarmists, as an article of faith, peddle the notion that climate change is, as Greenpeace put it, "the biggest environmental threat facing developing countries." For one, such thinking runs contrary to the public declaration of the 2002 World Summit on Sustainable Development - a program sponsored by the United Nations - which found that *poverty* is the number one threat facing developing countries.

Dr. John Christy, director of the Earth System Science Center at the University of Alabama, Huntsville, passionately reiterated that point in a May 22 letter to House Resources Committee Chairman Richard Pombo (R. Calif.). As an addendum to his testimony during the committee's hearing on the Kyoto Protocol, Christy, an Alabama State climatologist, wrote eloquently about his service as a missionary in Africa.

For Christy, "poverty is the worst polluter," and as he noted, bringing modern, inexpensive electricity to developing countries would raise living standards and lead to a cleaner environment. Kyoto, he said, would be counterproductive for Kyoto would divert precious resources away from helping those truly in need to a problem that doesn't exist, and a solution that would have no environmental benefit.

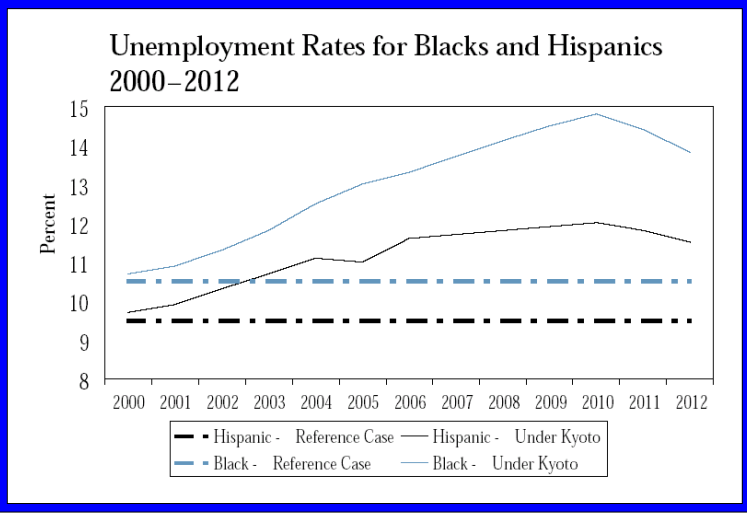
Some Senators have introduced Kyoto-like legislation that would hurt low income and minority populations. Last year, Tom Mullen, president of Cleveland Catholic Charities, testified against S. 556, the Clean Power Act, which would impose onerous, unrealistic restrictions, including a Kyoto-like cap on carbon dioxide emissions, on electric utilities. He noted that this regime would mean higher electricity prices for the poorest citizens of Cleveland.

For those on fixed incomes, as Mr. Mullen pointed out, higher electricity prices present a choice between eating and staying warm in winter or cool in summer. As Mr. Mullen said, "The overall impact on the economy in Northeast Ohio would be overwhelming, and the needs that we address at Catholic Charities in Ohio with the

elderly and poor would be well beyond our capacity and that of our current partners in government and the private sector."

In addition to its negative economic impacts, Kyoto still does not satisfy Byrd/Hagel's concerns about developing countries. Though such countries as China, India, Brazil, South Korea, and Mexico are signatories to Kyoto, they are not required to reduce their emissions, even though they emit nearly 30 percent of the world's greenhouse gases. And within a generation they will be the world's largest emitters of carbon, methane and other such greenhouse gases.

KYOTO POLICIES HARM MINORITIES



Study sponsored by Latin Council for Latin American Advancement, National Institute for Latino Development, United States Hispanic Chamber of Commerce, A. Philip Randolph Institute, Center for Energy and Economic Development, Latin American Management Association, National Black Chamber of Commerce

Despite the fact that neither of Byrd/Hagel's conditions has been met, environmentalists have bitterly criticized President Bush for abandoning Kyoto. But one wonders: why don't they assail the 95 senators, both Democrats and Republicans, who, according to Byrd/Hagel, oppose Kyoto as it stands today, and who would, presumably, oppose ratification if the treaty came up on the Senate floor? Neither do they assail former President Clinton, or former Vice President Gore, who signed the treaty but never submitted it to the Senate for ratification.

Remember, Byrd/Hagel said the Senate would not ratify Kyoto if it caused substantial economic harm and if developing countries were not required to participate on the same timetable. So, if the Bryd/Hagel conditions are ever satisfied, should the United States ratify Kyoto?

Answering that question depends on several factors, including whether Kyoto would provide significant, needed environmental benefits.

First, we should ask what Kyoto is designed to accomplish. According to the U.N.'s Intergovernmental Panel on Climate Change, Kyoto will achieve "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

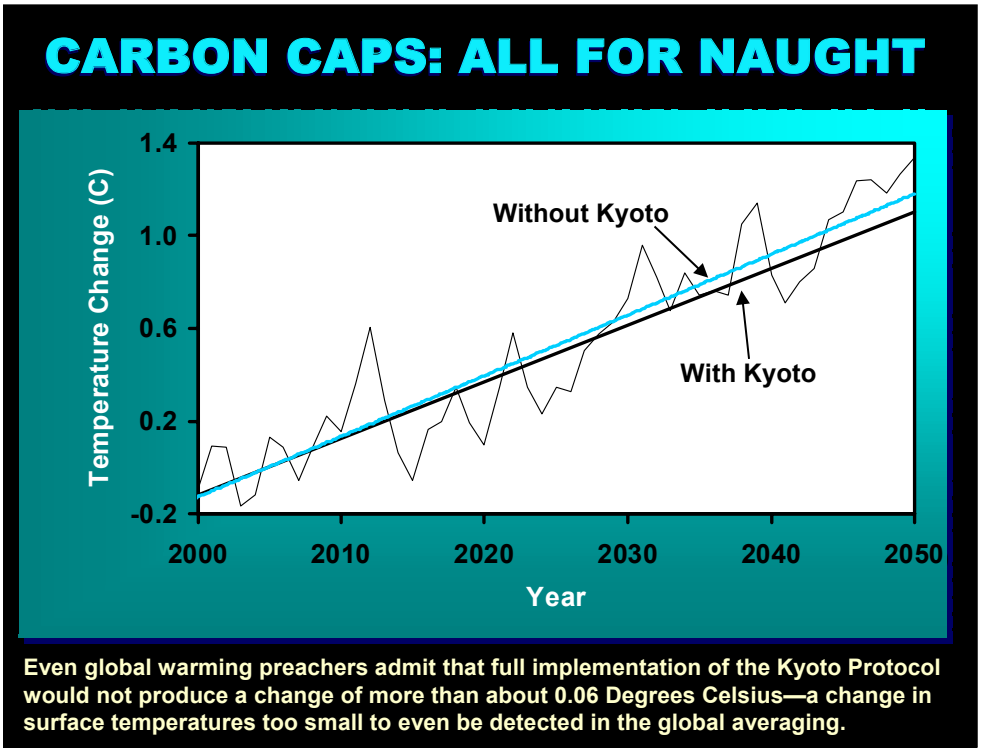
What does this statement mean? The IPCC offers no elaboration and doesn't provide any scientific explanation about what that level would be. Why? The answer is simple: thus far no one has found a definitive scientific answer.

Dr. S. Fred Singer, an atmospheric scientist at the University of Virginia, who served as the first Director of the US Weather Satellite Service (which is now in the Department of Commerce) and more recently as a member and vice chairman of the National Advisory Committee on Oceans and Atmosphere (NACOA), said that "No one knows what constitutes a 'dangerous' concentration. There exists, as yet, no scientific basis for defining such a concentration, or even of knowing whether it is more or less than current levels of carbon dioxide."

One might pose the question: if we had the ability to set the global thermostat, what temperature would we pick? Would we set it colder or warmer than it is today? What would the optimal temperature be? The

actual dawn of civilization occurred in a period climatologists call the "climatic optimum" when the mean surface temperature was 121 Celsius warmer than today. Why not go 1 to 2 degrees Celsius higher? Or 1 to 2 degrees lower for that matter?

The Kyoto emissions reduction targets are arbitrary, lacking in any real scientific basis. Kyoto therefore will have virtually no impact on global temperatures. This is not merely an opinion, but the conclusion reached by the country's top climate scientists.



Dr. Tom Wigley, a senior scientist at the National Center for Atmospheric Research, found that if the Kyoto Protocol were fully implemented by all signatories, it would reduce temperatures by a mere 0.07 degrees Celsius by 2050, and 0.13 degrees Celsius by 2100. What does this mean? Such an amount is so small that groundbased thermometers cannot reliably measure it.

Dr. Richard Lindzen, an MIT scientist and member of the National Academy of Sciences, who has specialized in climate issues for over 30 years, told the Committee on Environment and Public on May 2, 2001 that there is a "definitive disconnect between Kyoto and science. Should a catastrophic scenario prove correct, Kyoto will not prevent it."

Similarly, Dr. James Hansen of NASA, considered the father of global warming theory, said that Kyoto Protocol "will have little effect" on global temperature in the 21st century. In a rather stunning followup, Hansen said it would take *30 Kyotos* to reduce warming to an acceptable level. If one Kyoto devastates the American economy, what would 30 do?

So this leads to another question: if there is consensus that the measures in the Kyoto Protocol do little or nothing measurable to influence global temperatures, what does this tell us about the scientific basis of Kyoto?

Answering that question requires a thorough examination of the scientific work conducted by the U.N.'s Intergovernmental Panel on Climate Change, which provides the scientific basis for Kyoto, international climate negotiations, and the substance of claims made by alarmists.

IPCC Assessment Reports

In 1992, several nations from around the globe gathered in Rio de Janiero for the United Nations Framework Convention on Climate Change. The meeting was premised on the concern that global warming was becoming a problem. The U.S., along with many others, signed the Framework Convention, committing them to making voluntary reductions in greenhouse gases.

Over time, it became clear that signatories were not achieving their reduction targets as stipulated under Rio. This realization led to the Kyoto Protocol in 1997, which was an amendment to the Framework Convention, and which prescribed mandatory reductions only for developed nations.

The science of Kyoto is based on the "Assessment Reports" conducted by the Intergovernmental Panel on Climate Change, or IPCC. Over the last 13 years, the IPCC has published 3 assessments, with each one over time growing more and more politically alarmist.

The first IPCC Assessment Report in 1990 found that the climate record of the past century was "broadly consistent" with the expected temperature rise, as calculated by climate models that incorporated the observed increase in greenhouse gases.

This conclusion, however, appears suspect considering the climate warmed before 1940, before human industrial activity grew rapidly after World War II. It has been difficult to correlate this warming with greenhouse gases.

After its initial publication, the IPCC's Second Assessment report in 1995 attracted widespread international attention, particularly among scientists who believed that human activities were causing global warming. In their view, the report provided the proverbial smoking gun.

The most widely cited phrase from the report actually came from the report summary, as few in the media actually read the entire report, which was that "the balance of the evidence suggests a discernible human influence on global climate." This of course is so vague that it's essentially meaningless.

What do they mean by "suggests?" And, for that matter, what, in this particular context, does "discernible" mean? How much human influence is discernible? Is it a positive or negative influence? Where is the precise scientific quantification?

Unfortunately the media created the impression that human-induced global warming was fact. On August 10, 1995, the *New York Times* published an article titled "Experts Confirm Human Role in Global Warming." According to the Times account, the IPCC showed that global warming "is unlikely to be entirely due to natural causes."

Of course, when parsed, this account means fairly little. Not entirely due to natural causes? Well, how much, then? 1 percent? 20 percent? 85 percent?

The IPCC report was replete with caveats and qualifications, providing little evidence to support anthropogenic theories of global warming. The preceding paragraph in which the "balance of evidence" quote appears makes exactly that point.

It reads: "Our ability to quantify the human influence on global climate is currently limited because the expected signal is still emerging from the noise of natural variability, and because there are uncertainties in key factors. These include the magnitude and patterns of longterm variability and the time-evolving pattern of forcing by, and response to, changes in concentrations of greenhouse gases and aerosols, and land surface changes."

"...much of what passes for common knowledge in the press regarding climate change is "inaccurate, incomplete or viewed out of context."

Moreover, the IPCC report was quite explicit about the uncertainties surrounding a link between human actions and global warming. "Although these global mean results suggest that there is some anthropogenic component in the observed temperature record, *they cannot be considered compelling evidence of a clear* cause and effect link between anthropogenic forcing and changes in the Earth's surface temperature."

Dr. John Christy, professor of Atmospheric Science and Director of the Earth System Science Center at the University of Alabama in Huntsville, and a key contributor to the 1995 IPCC report, participated with the lead authors in the drafting sessions, and in the detailed review of the scientific text. He wrote in the *Montgomery Advertiser* on February 22, 1998 that much of what passes for common knowledge in the press regarding climate change is "inaccurate, incomplete or viewed out of context."

Many of the misconceptions about climate change, Christy contends, originated from the IPCC's six-page executive summary. It was the most widely read and quoted of the three documents published by the IPCC's Working Group, but, Christy said - and this point is crucial - it had the "least input from scientists and the greatest input from nonscientists."

IPCC Releases Third Assessment on Climate Change

Five years later, the IPCC was back again, this time with the Third Assessment Report on Climate Change. In a politically timed release during October of 2000, the IPCC "Summary for Policymakers" was leaked to the media, which once again accepted the IPCC's conclusions as fact.

Based on the summary, the *Washington Post* wrote on October 30, "The consensus on global warming keeps strengthening." In a similar vein, the *New York Times* confidently declared on October 28, "The international panel of climate scientists considered the most authoritative voice on global warming has now concluded that mankind's contribution to the problem is greater than originally believed."

Note again, look at how these accounts are couched: they are worded to maximize the fear factor. But upon closer inspection, it's clear that such statements have no compelling intellectual content. "Greater than originally believed"? What is the baseline from which the *Times* makes such a judgment? Is it .01 percent, or 25 percent? And how much is greater? Double? Triple? An order of magnitude greater?

Such reporting prompted testimony by Dr. Richard Lindzen before the Senate Committee on Environment and Public Works, in May of 2001. Lindzen said, "Nearly all reading and coverage of the IPCC is restricted to the highly publicized Summaries for Policymakers, which are written by representatives from governments, NGO's and business; the full reports, written by participating scientists, are largely ignored."

As it turned out, the Policymaker's Summary was politicized and radically differed from an earlier draft. For example, the draft concluded the following concerning the driving causes of climate change:

"From the body of evidence since IPCC (1996), we conclude that there has been a discernible human influence on global climate. Studies are beginning to separate the contributions to observed climate change attributable to individual external influences, both anthropogenic and natural. This work suggests that anthropogenic greenhouse gases are a substantial contributor to the observed warming, especially over the past 30 years. *However, the accuracy of these estimates continues to be limited by uncertainties in estimates of internal variability, natural and anthropogenic forcing, and the climate response to external forcing."*

The final version looks quite different, and concluded instead: "In the light of new evidence and taking into account the remaining uncertainties, most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations."

This kind of distortion was not unintentional, as Dr. Lindzen explained before the Environment Committee. He said, "I personally witnessed coauthors forced to assert their 'green' credentials in defense of their statements." In short, some parts of the IPCC process resembled a Soviet-style trial, in which the facts are predetermined, and ideological purity trumps technical and scientific rigor.

Dr. Lindzen explained before the Environment Committee. He said, "I personally witnessed coauthors forced to assert their 'green' credentials in defense of their statements." In short, some parts of the IPCC process resembled a Soviet-style trial, in which the facts are predetermined, and ideological purity trumps technical and scientific rigor.

The predictions in the summary went far beyond those in the IPCC's 1995 report. In the Second Assessment, the IPCC predicted that the earth could warm by 1 to 3.5 degrees Celsius by the year 2100. The "best estimate" was a 2 degree Celsius warming by 2100. Both are highly questionable at best.

In the Third Assessment, the IPCC dramatically increased that estimate to a range of 1.4 to 5.8 degrees Celsius, even though no new evidence had come to light to justify such a dramatic change.

In fact, the IPCC's median projected warming actually declined from 1990 to 1995. The IPCC 1990 initial estimate was 3.2°C, then the IPCC revised 1992 estimate was 2.6°C, followed by the IPCC revised 1995 estimate of 2.0°C.

What changed? As it turned out, the new prediction was based on faulty, politically charged assumptions about trends in population growth, economic growth, and fossil fuel use.

The extreme case scenario of a 5.8-degree warming, for instance, rests on an assumption that the whole world will raise its level of economic activity and per capita energy use to that of the United States, and that energy use will be carbon intensive. This scenario is simply ludicrous. This essentially contradicts the experience of the industrialized world over the last 30 years. Yet the 5.8-degree figure featured prominently in news stories because it produced the biggest fear effect.

Moreover, when regional climate models, of the kind relied upon by the IPCC, attempt to incorporate such factors as population growth "the details of future climate recede toward unintelligibility," according to Jerry Mahlman, Director of NOAA's Geophysical Fluid Dynamics Laboratory.

Even Dr. Stephen Schneider, an outspoken believer in catastrophic global warming, criticized the IPCC's assumptions in the journal *Nature* on May 3, 2001. In his article, Schneider asks, "How likely is it that the world will get 6 degrees Celsius hotter by 2100?" That, he said, "depends on the likelihood of the assumptions underlying the projections."

The assumptions, he wrote, are " 'storylines' about future worlds from which population, affluence and technology drivers could be inferred." These storylines, he wrote, "gave rise to radically different families of emission profiles up to 2100 — from below current CO_2 emissions to five times current emissions."

Schneider says that he "strongly argued at the time that policy analysts needed probability estimates to assess the seriousness of the implied impacts." In other words, how likely is it that temperatures would go up by 5.8 degrees Celsius, or 1.4 degrees Celsius, which represent the IPCC's respective upper and lower bounds?

But as Schneider wrote, the group drafting the IPCC report decided to express "no preference" for each temperature scenario.

In effect, this created the assumption that the higher bound of 5.8 degrees Celsius appeared to be just as likely as the lower of 1.4 degrees Celsius. "But this inference would be incorrect," said Schneider, "because uncertainties compound through a series of modeling steps."

Schneider's own calculations, which cast serious doubt on the IPCC's extreme prediction, broadly agree with an MIT study published in April of 2001. It found that there is a "far less" than one percent chance that temperatures would rise to 5.8 degrees C or higher, while there is a 17 percent chance the temperature rise would be lower than 1.4 degrees.

Gerald North of Texas A&M University agrees that the IPCC's predictions are baseless, in part because climate models are highly imperfect instruments. As he said after the IPCC report came out: "It's extremely hard to tell whether the models have improved" since the last IPCC report. "The uncertainties are large." Similarly, Peter Stone, an MIT climate modeler, said in reference to the IPCC, "The major [climate prediction] uncertainties have not been reduced at all."

Dr. David Wojick, an expert in climate science, recently wrote in Canada's *National Post*, "The computer models cannot decide among the variable drivers, like solar versus lunar change, or chaos versus ocean circulation versus greenhouse gas increases. Unless and until they can explain these things, the models cannot be taken seriously as a basis for public policy."

In short, these general circulation models, or GCMs as they're known, create simulations that must track over 5 million parameters. These simulations require accurate information on two natural greenhouse gas factors - water vapor and clouds - the effects of which scientists still do not understand.

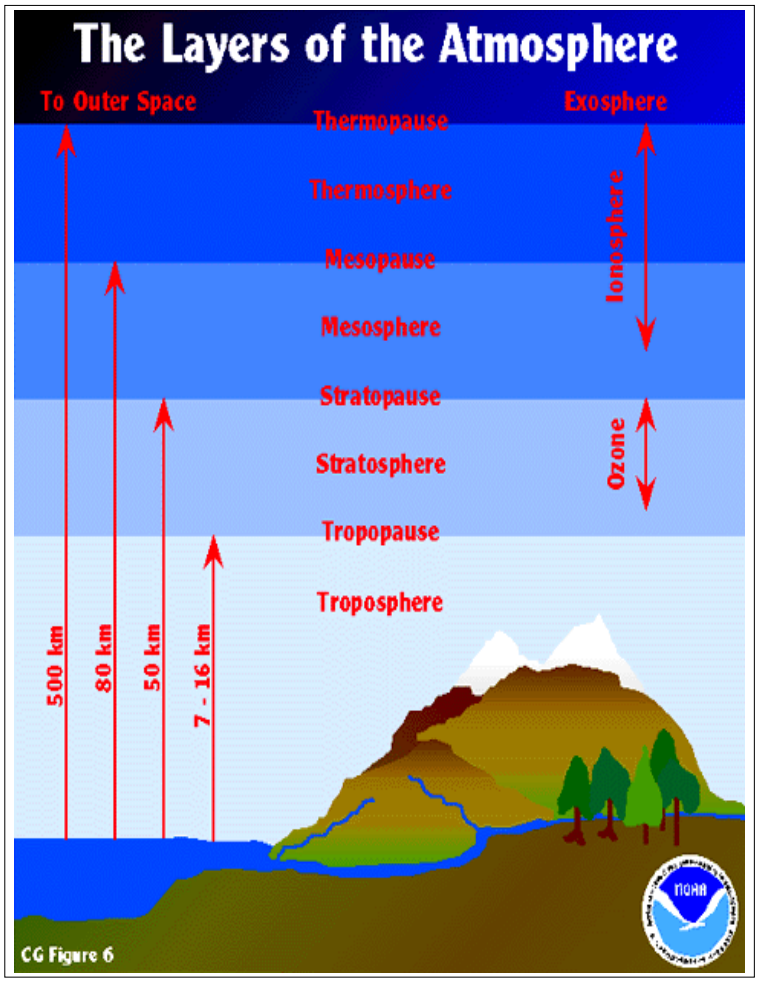
Even the IPCC conceded as much: "The single largest uncertainty in determining the climate sensitivity to either natural or anthropogenic changes are clouds and their effects on radiation and their role in the hydrological cycle...at the present time, weaknesses in the parameterization of cloud formation and dissipation

are probably the main impediment to improvements in the simulation of cloud effects on climate."

Because of these and other uncertainties, climate modelers from four separate climate modeling centers wrote in the October 2000 edition of Nature that, "Forecasts of climate change are inevitably uncertain." They go on to explain that, "A basic problem with all such predictions to date has been the difficulty of providing any systematic estimate of uncertainty," a problem that stems from the fact that "these [climate] models do not necessarily span the full range of known climate system behavior." This means the models do not account for key variables that influence the climate system.

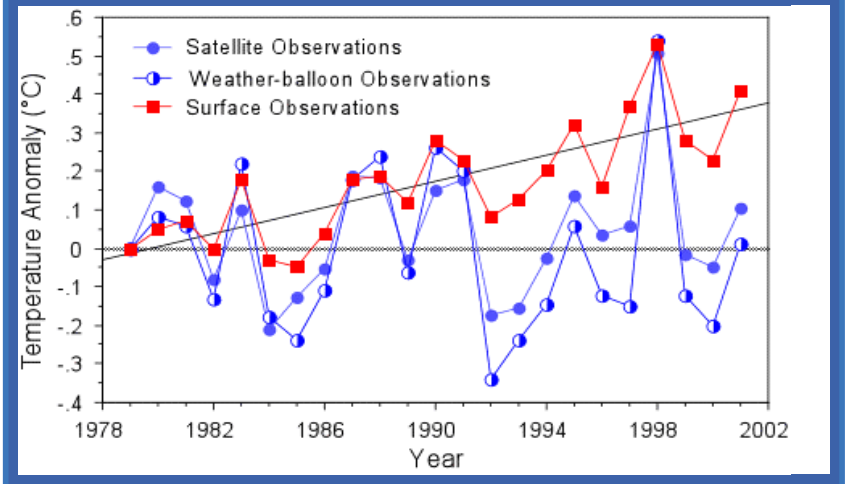
The 20th Century: Satellite data, Weather balloons, CO2, and Glaciers

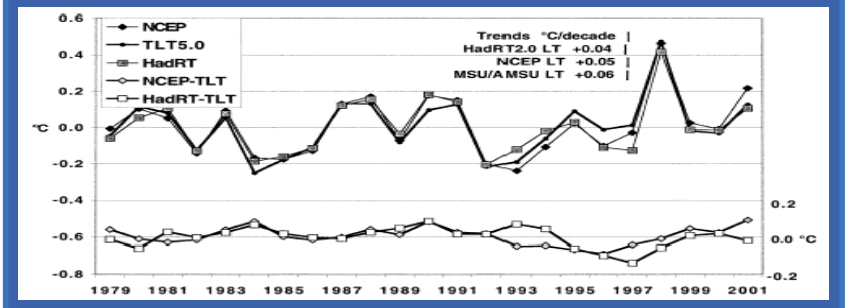
Now, turning to temperature trends in the 20th Century: GCMs predict that rising atmospheric CO2 concentrations will cause temperatures in the troposphere, the layer from 5,000 to 30,000 feet, to rise faster than surface temperatures—a critical fact supporting the alarmist hypothesis. But in fact, there is no meaningful warming trend in the troposphere, and weather satellites, widely considered the most accurate measure of global temperatures, have confirmed this.



Satellite measurements are validated independently by measurements from NOAA balloon radiosonde instruments, whose records extend back over 40 years. A recent detailed comparison of atmospheric temperature data gathered by satellites with widely used data gathered by weather balloons corroborates both the accuracy of the satellite data and the rate of global warming seen in that data. Using NOAA satellite readings of temperatures in the lower atmosphere, scientists at the University of Alabama in Huntsville (UAH) produced a dataset that shows global atmospheric warming at the rate of about 0.07 degrees C (about 0.13 degrees Fahrenheit) per decade since November 1978.

"That works out to a global warming trend of about one and a quarter degrees Fahrenheit over 100 years," said Dr. John Christy, who compiled the comparison data. Christy concedes that such a trend "is probably due in part to human influences," but adds that "it's substantially less than the warming forecast by most climate





The graphic shows surface temperature as well as tropospheric temperature measured by satellite and balloon.

Tropospheric warming is substantially less than climate models forecast.

models, and it isn't entirely out of the range of climate change we might expect from natural causes."

To reiterate: the best data collected from satellites validated by balloons to test the hypothesis of a human-induced global warming from the release of C02 into the atmosphere shows no meaningful trend of increasing temperatures, even as the climate models exaggerated the warmth that ought to have occurred from a buildup in C02.

Some critics of satellite measurements contend that they don't square with the ground-based temperature record. But some of this difference is due to the so-called "urban heat island effect." This occurs when concrete and asphalt in cities absorb rather than reflect the sun's heat, causing surface temperatures and overall ambient temperatures to rise. Scientists have shown that this strongly influences the surface-based temperature record.

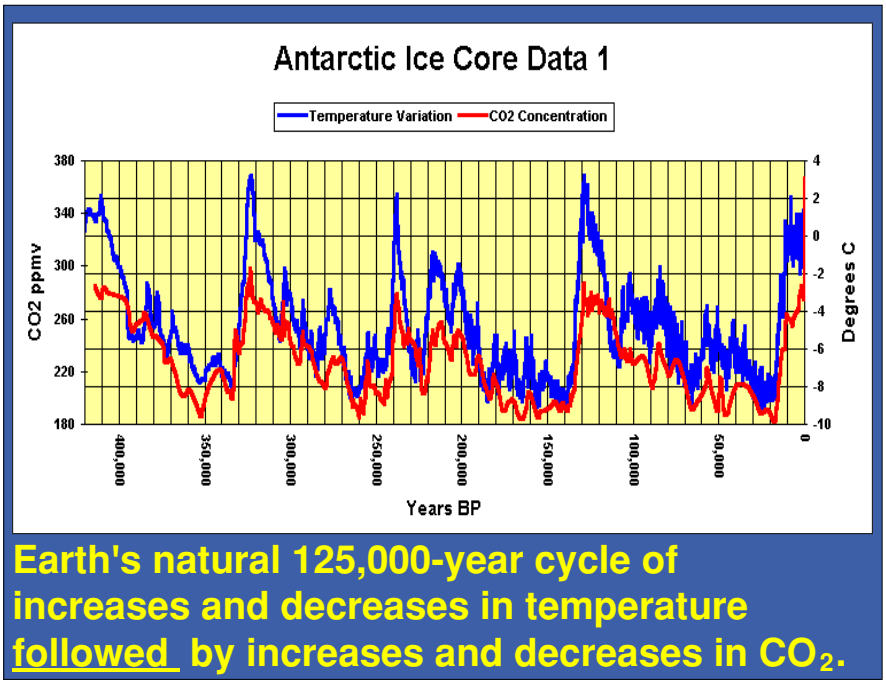
In a paper published in the *Bulletin of the American Meteorological Society* in 1989, Dr. Thomas R. Karl, senior scientist at the National Climate Data Center, corrected the U.S. surface temperatures for the urban heat island effect and found that there has been a downward temperature trend since 1940. This suggests a strong warming bias in the surfacebased temperature record.

Even the IPCC finds that the urban heat island effect is significant. According to the IPCC's calculations, the effect could account for up to 0.12 degrees Celsius of the 20th century temperature rise, one-fifth of the total observed.

When we look at the 20th century as a whole, we see some distinct phases that question anthropogenic theories of global warming. First, a strong warming trend of about 0.5 C began in the late 19th century and peaked around 1940. Next, the temperature decreased from 1940 until the late 1970s.

Why is that decrease significant? Because about 80% of the carbon dioxide from human activities was added to the air after 1940, meaning the early 20th Century warming trend had to be largely natural. Scientists from the Scripps Institution for Oceanography confirmed this phenomenon in the March 12, 1999 issue of the journal Science. They addressed the proverbial "chicken and egg" question of climate

science, namely: when the Earth shifts from glacial to warm periods, which comes first: an increase in atmospheric carbon dioxide levels, or an increase in global temperature? The team concluded that the temperature rise comes first, followed by a carbon dioxide boost 400 to 1,000 years later. This contradicts everything alarmists have been saying about manmade global warming in the 20th century.



Earth's natural 125,000-year cycle of increases and decreases in temperature followed by increases and decreases in CO_2.

Yet the doomsayers, undeterred by these facts, just won't quit. In February and March of 2002, the *New York Times* and the *Washington Post*, among others, reported on the collapse of the Larsen B ice shelf in the Antarctic Peninsula, causing quite a stir in the media, and providing alarmists with more propaganda to scare the public.

Although there was no link to global warming, the *Times* couldn't help but make that suggestion in its March 20 edition. "While it is too soon to say whether the changes there are related to a buildup of the 'greenhouse' gas emissions that scientists believe are warming the planet, many experts said it was getting harder to find any other explanation."

The Times, however, simply ignored a recent study in the journal *Nature*, which found the Antarctic has been cooling since 1966. And another study in *Science* recently found the West Antarctic Ice Sheet has been thickening rather than thinning.

University of Illinois researchers also reported "a net cooling on the Antarctic continent between 1966 and 2000." In some regions, like the McMurdo Dry Valleys, temperatures cooled between 1986 and 1999 by as much as two degrees centigrade per decade.

In perhaps the most devastating critique of glacier alarmism, the American Geophysical Union found that the Arctic was warmer in 1935 than it is now. "Two distinct warming periods from 1920 to 1945, and from 1975 to the present, are clearly evident compared with the global and hemispheric temperature rise, the highlatitude temperature increase was stronger in the late 1930s to early 1940's than in recent decades."

So, not only is glacier alarmism flawed, but there is no evidence, as shown by measurements from satellites and weather balloons, of any meaningful warming trends in the 20th Century.

Global Warming Health Risks/Benefits

Even as we discuss whether temperatures will go up or down, we should ask whether global warming would actually produce the catastrophic effects its adherents so confidently predict. What gets obscured in the global warming debate is the fact that carbon dioxide is not a pollutant. It is necessary for life. Numerous studies have shown that global warming can actually be beneficial to mankind.

Most plants, especially wheat and rice, grow considerably better when there is more CO2 in the atmosphere. CO2 works like a fertilizer and higher temperatures usually further enhance the CO2 fertilizer effect. In fact the average crop, according to Dr. John Reilly, of the MIT Joint Program on the Science and Policy of Global Change, is 30 percent higher in a CO2 enhanced world. This is not just a matter of opinion, but a well established phenomenon.

With regard to the impact of global warming on human health, it is assumed that higher temperatures will induce more deaths and massive outbreaks of deadly diseases. In particular, a frequent scare tactic by alarmists is that warmer temperatures will spark malaria outbreaks. Dr. Paul Reiter convincingly debunks this claim in a 2000 study for the Center for Disease Control. As Reiter found, "Until the second half of the 20th century, malaria was endemic and widespread in many temperate regions, - this next point is critical—with major epidemics as far north as the Arctic Circle."

Reiter also published a second study in the March 2001 issue of *Environmental Health Perspectives* showing that "despite spectacular cooling [of the Little Ice Age], malaria persisted throughout Europe."

Another myth is that warming increases morbidity rates. This isn't the case, according to Dr. Robert Mendelsohn, an environmental economist from Yale University. Mendelsohn argues that heat stress deaths are caused by temperature variability and not warming. Those deaths grow in number not as climates warm but as the variability in climate increases.

The IPCC Plays Hockey

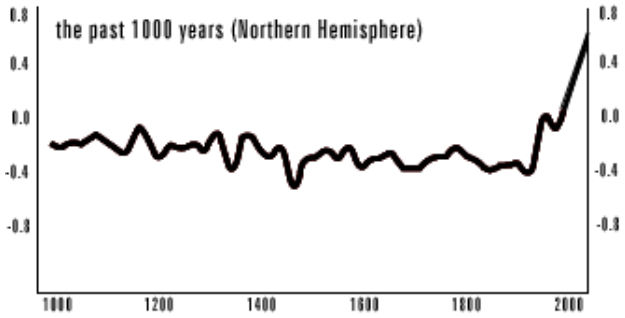
In addition to trying to predict the future, the Third Assessment report looked back into the past. The IPCC released a graph depicting global temperatures trending slightly downward over the last ten centuries, and then rather dramatically increasing beginning around 1900. The cause for such a shift, of course, is attributed to industrialization and manmade greenhouse gas emissions.

The now-infamous "hockey stick" graph was enthusiastically embraced by the IPCC, which used it as a basis of the Third Assessment. Dr. Michael Mann of the University of Virginia was its principal author. The study, which Mann and others conducted, examines climate trends over the past 1,000 years. As many scientists have pointed out since its publication, it contains many flaws.

First, Mann's study focuses on temperature trends only in the Northern Hemisphere. Mann extrapolated that data to reach the conclusion that global temperatures remained relatively stable and then dramatically increased at the beginning of the 20th century. That leads to Mann's conclusion that the 20th century has been the warmest in the last 1000 years. As is obvious, however, such an extrapolation cannot provide a reliable global perspective of long-term climate trends.

Moreover, Mann's conclusions were drawn mainly from 12 sets of climate proxy data, of which nine were tree rings, while the remaining three came from ice cores. Notably, some of the ice core data was drawn from the Southern Hemisphere Cone from Greenland and two from Peru. What's left is a picture of the Northern Hemisphere based on 8 sets of tree ring data again, hardly a convincing global picture of the last 1,000 years.

Revisionist "Hockey Stick" Graph



Source: *First Assessment Report,* Intergovernmental Panel on Climate Change, 1990 (top graph); *Third Assessment Report,* Intergovernmental Panel on Climate Change, 2001 (bottom graph); uncertainty estimates omitted.

Mann's hockey stick dismisses both the Medieval Warm Period (800 to 1300) and the Little Ice Age (1300 to 1900), two climate events that are widely recognized in the scientific literature. Mann believes that the 20th Century is "nominally the warmest" of the past millennium and that the decade of the 1990s was the warmest decade on record.

The Medieval Warm Period and Little Ice Age are replaced by a largely benign and slightly cooling linear trend in climate until 1900. But as is clear from a close analysis of Mann's methods, the hockey stick is formed by crudely grafting the surface temperature record of the 20th century onto a pre-1900 tree ring record.

This is a highly controversial and scientifically flawed approach. As is widely recognized in the scientific community, two data series representing radically different variables (temperature and tree rings) cannot be grafted together credibly to create a single series. In simple terms, as Dr. Patrick Michaels of the University of Virginia explained, this is like comparing apples to oranges. Even Mann and his coauthors admit that if the tree ring data set were removed from their climate reconstruction, the calibration and verification procedures they used would undermine their conclusions.

A new study from the Harvard Smithsonian Center for Astrophysics strongly disputes Mann's methods and hypotheses. As coauthor Dr. David Legates wrote, "Although [Mann's work] is now widely used as proof of anthropogenic global warming, we've become concerned that such an analysis is in direct contradiction to most of the research and written histories available," Legates said. "Our paper shows this contradiction and argues that the results of Mann...are out of step with the preponderance of the evidence."

More Scientists Reject Kyoto

Based in part on the data supporting the IPCC's key reports, thousands of scientists have rejected the scientific basis of Kyoto. Recently, 46 leading climate experts wrote an open letter to Canada's *National Post* on June 3 claiming that the Kyoto Protocol "lacks credible science."

The scientists wrote that the Canadian Prime Minister essentially ignored an earlier letter they drafted in 2001. In it, they wrote: "Many climate science experts from Canada and around the world, while still

strongly supporting environmental protection, equally strongly disagree with the scientific rationale for the Kyoto Accord."

In their June 3 letter, the group wrote to Paul Martin, a Canadian Member of Parliament, urging him to consider the consequences of Kyoto ratification:

"Although ratification has already taken place, we believe that the government of Canada needs a far more comprehensive understanding of what climate science really says if environmental policy is to be developed that will truly benefit the environment while maintaining the economic prosperity so essential to social progress."

"...substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and animal environments of the Earth."

Many other scientists share the same view. In fact, over 4,000 scientists, 70 of whom are Nobel Prize winners, signed the socalled Heidelberg Appeal, which says that no compelling evidence exists to justify controls of anthropogenic greenhouse gas emissions.

In addition, a 1998 survey of state climatologists, reveals that a majority of respondents have serious doubts about whether anthropogenic emissions of greenhouse gases present a serious threat to climate stability.

Then there is Dr. Frederick Seitz, a past president of the National Academy of Sciences, and a professor emeritus at Rockefeller University, who compiled the Oregon Petition, which reads as follows:

"We urge the United States government to reject the global warming agreement that was written in Kyoto, Japan in December, 1997, and any other similar proposals. The proposed limits on greenhouse gases would harm the environment, hinder the advance of science and technology, and damage the health and welfare of mankind."

"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."

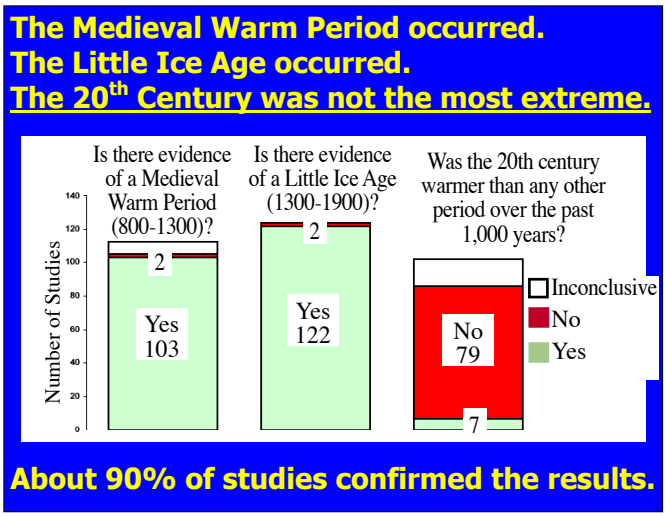
The petition has 17,800 independently verified signatures, and, for those signers holding the degree of PhD, 95% have now been independently verified. Environmental groups have attacked the credibility of this petition based on one false name sent in by green pranksters. Several names are still on the list even though biased press reports have ridiculed their identity with the names of famous personalities. They are actual signers. Perry Mason, for example, is a PhD Chemist.

Harvard Smithsonian 1,000-Year Climate Study

A new study by researchers from the Harvard Smithsonian Center for Astrophysics proves that the IPCC's hockey stick represents a radical departure from the well established scientific literature.

The study, titled "Proxy Climatic and Environmental Changes of the Past 1,000 Years," offers a devastating critique of Mann's hypothesis, calling into question the IPCC's Third Assessment, and indeed the entire intellectual foundation of the alarmists' views. It draws on extensive evidence showing that major changes in global temperatures largely result not from manmade emissions but from natural causes.

Smithsonian scientists Willie Soon and Sallie Baliunas, with coauthors Craig Idso, Sherwood Idso and David Legates, compiled and examined results from more than 240 peer-reviewed papers published by thousands of researchers over the past four decades. In contrast to Mann's flawed, limited research, the Harvard Smithsonian study covers a multitude of geophysical and biological climate indicators.



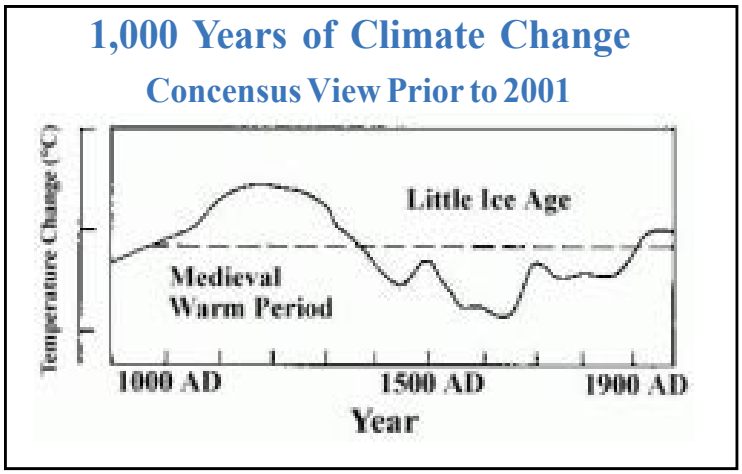
While Mann's analysis relied mostly on treering data from the Northern Hemisphere, the researchers offer a detailed look at climate changes that occurred in different regions around the world over the last 1000 years.

The range of climate proxies is impressive and worth recounting here. The authors examined borehole data; cultural data; glacier advances or retreats; geomorphology; isotopic analysis from lake sediments or ice cores, tree or peat celluloses (carbohydrates), corals, stalagmite or biological fossils; net ice accumulation rate, including dust or chemical counts; lake fossils and sediments; river sediments; melt layers in ice cores; phenological (recurring natural phenomena in relation to climate) and paleontological fossils; pollen; seafloor sediments; luminescent analysis; tree ring growth, including either ring width or maximum latewood density; and shifting tree line positions plus tree stumps in lakes, marshes and streams.

Based on this proxy data drawn from 240 peer-reviewed studies, the authors offer highly convincing evidence to support the Little Ice Age and the Medieval Warm Period. As coauthor Dr. Sallie Baliunas explained, "For a long time, researchers have possessed anecdotal evidence supporting the existence of these climate extremes."

Baliunas notes that, during the Medieval Warm Period, "the Vikings established colonies in Greenland at the beginning of the second millennium that died out several hundred years later when the climate turned colder." And in England, she found that, "vineyards had flourished during the medieval warmth." In their study, the authors accumulated reams of objective data to back up these cultural indicators.

The Medieval Warm Period, or Medieval Optimum, occurred between 800 to 1300. Among the studies surveyed by the authors, 112 contain information about the warm period. Of these, 103 showed evidence for the MWP. Looking just at the Southern Hemisphere, the authors analyzed 22 studies, 21 of which confirmed the warm period.



The authors also looked at the 20th century, and examined 102 studies to determine whether it was the warmest on record. A total of 79 studies showed periods of at least 50 years that were warmer than any 50-year period in the 20th century.

The conclusions of this study are based on 240 peer-reviewed studies. That means they were rigorously reviewed and critiqued by other scientists before they were published. This climate study, published in March of 2003, is the most comprehensive of its kind in history. According to the authors, some of the warming during the 20th century is attributable to the climate system recovering from the Little Ice Age. Global warming alarmists, however, vehemently disagree, and pull a scientific sleight-of-hand by pointing to the 140-year direct temperature record as evidence of warming caused by humans. But as the authors note, "The direct temperature measurement record is too short to provide good measures of natural variability in its full dynamic range."

This research begs an obvious question: if the earth was warmer during the Middle Ages than the age of coal-fired power plants and SUVs, what role do manmade emissions play in influencing climate?

How did the media report on the Harvard Smithsonian study? The big dailies, such as the *New York Times* and the *Washington Post*, ignored it. Unfortunately, some in the media couldn't resist playing the politics of personal destruction.

For example, a May 29, 2003 story by Jeff Nesmith of Cox News Service, was marred by errors and an alarmist bias. Rather than focusing on the scientific merits of the study, Nesmith reported that petroleum companies were behind it, thereby corrupting its conclusions.

Nesmith writes that the "research was underwritten by the American Petroleum Institute, the trade association of the world's largest oil companies." This is simply false. API funded less than 10 percent of the research. Had Nesmith read the Harvard Smithsonian press release announcing the study, he would have found that most of the funding came from federal grants through NASA, the Air Force Office of Scientific Research, and the National Oceanic and Atmospheric Administration.

Even so, what if API funded the whole study? If that automatically means, as it apparently does to Nesmith, that the science lacks credibility, then at least he could offer some proof to those who think differently. That is, no matter who funds such studies, their merits hinge on the quality of the science. Nesmith instead offers no proof and dismisses the science.

Moreover, is he suggesting that Harvard and the Smithsonian can be unduly influenced by oil companies, or by any organization for that matter?

Nesmith also attacks Dr. Sallie Baliunas and Dr. Willie Soon, two of the report's authors, because of their ties to the George C. Marshall Institute. Nesmith noted that the institute gets some of its funding from

ExxonMobil. Again, for Nesmith, this is proof positive that the Marshall Institute is inherently suspect, though he offers no evidence to support that case.

In another stunning sentence, Nesmith writes, "most climate scientists think the rise [of global temperatures] results from the atmospheric buildup of heat-trapping 'greenhouse gases,' especially released by the combustion of fossil fuels such as coal and petroleum." Most climate scientists? The extensive record of climate skeptics outlined above proves that statement is outlandish.

The Real Story Behind Kyoto

The science underlying the Kyoto Procotol has been thoroughly discredited. Yet for some reason the drive to implement Kyoto continues apace, both here in the United States and, most fervently, in Europe. What is going on here?

The Europeans continue to insist that the U.S. should honor its international responsibilities and ratify Kyoto. In June of 2001, Germany released a statement declaring that the world needs Kyoto because its greenhouse gas reduction targets "are indispensable."

Similarly, Swedish Prime Minister Goeran Persson in June 2001 said flatly, and without explanation, that "Kyoto is necessary." The question is: indispensable and necessary for what?

Certainly not for reducing greenhouse gas emissions, as Europe has proven. According to news reports earlier this year, the EU has failed to meet its Kyoto targets. And as we know, according to the best scientific evidence, Kyoto will do nothing to reduce global temperatures.

Margot Wallstrom, the EU's Environment Commissioner, asserted Kyoto is about the "economy, about leveling the playing field for big businesses worldwide."

As it turns out, Kyoto's objective has nothing to do with saving the globe. In fact it is purely political. A case in point: French President Jacques Chirac said during a speech at The Hague in November of 2000 that Kyoto represents "the first component of an authentic global governance."

Margot Wallstrom, the EU's Environment Commissioner, takes a slightly different view, but one that's instructive about the real motives of Kyoto proponents. She asserted that Kyoto is about "the economy, about leveling the playing field for big businesses worldwide."

Chirac's and Wallstrom's comments mean two things: 1) Kyoto represents an attempt by certain elements within the international community to restrain U.S. interests; and 2) Kyoto is an economic weapon designed to undermine the global competitiveness and economic superiority of the United States.

The Next Steps

It is mystifying that some people blithely assert that the science of global warming is settled - that fossil fuel emissions are the principal, driving cause of global warming.

In a recent letter concerning the next EPA administrator, two senators wrote that "the pressing problem of global warming" is now an "established scientific fact," and demanded that the new administrator commit to addressing it.

With all due respect, this statement is baseless, for several reasons. As outlined in detail above, the evidence is overwhelmingly in favor of those who don't see global warming posing grave harm to the planet and who don't think human beings have significant influence on the climate system.

Climate alarmists see an opportunity here to tax the American people. Consider a July 11 op-ed by J.W. Anderson in the *Washington Post*. In it, Anderson, a former editorial writer for the *Post*, and now a journalist in residence with Resources for the Future, concedes that climate science still confronts uncertainties, then argues for a fuel tax to prepare for a potentially catastrophic future. Such a course of action fits a particular ideological agenda, yet is entirely unwarranted.

Hopefully, Congress will reject prophets of doom who peddle propaganda masquerading as science in the name of saving the planet from catastrophic disaster. We must put stock in scientists who rely on the best, most objective scientific data and reject fear as a motivating basis for making public policy decisions. Alarmists are attempting to enact an agenda of energy suppression that is inconsistent with American values of freedom, prosperity, and environmental progress.

Conclusion

In the words of Dr. Frederick Seitz, a past president of the National Academy of Sciences, and a professor emeritus at Rockefeller University, who compiled the Oregon Petition:

"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."

With all of the hysteria, all of the fear, all of the phony science, could it be that manmade global warming is the greatest hoax ever perpetrated on the American people? It sure sounds like it.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