Center for the Study of American Business

Global Deception: The Exaggeration of the Global Warming Threat

by Patrick J. Michaels

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Introduction

At the Rio de Janeiro "Earth Summit" in 1992, the United Nations proposed the "Framework Convention on Climate Change," since known as the "Rio Treaty," to slow emissions of greenhouse gases such as carbon dioxide. The stated goal was a reduction, by the industrialized and developed nations, of emission levels to 1990 levels by the year 2000. Only two nations, Britain and Germany, will reach this target, and both of them for reasons having nothing to do with climate change, but rather with industrial restructuring that would have occurred without the Rio Treaty. Emissions rose dramatically over the rest of the planet.

As a result of the failure to meet the goals of the treaty, United States negotiators agreed, at the United Nations climate change meeting in Kyoto in December 1997, to reduce carbon dioxide emissions to an average of 7 percent below 1990 levels during the period 2008-2012. These emission reductions would be legally binding, rather than simply a "goal." This portends a stunning reversal of energy consumption in the world's largest economy. If implemented, it will require a 41 percent reduction in U.S. emissions by 2010 from where they would have been under "business as usual."

This action was taken in the full knowledge that the forecasts that originally formed the basis for the Kyoto meeting were gross overestimates of the magnitude and impact of global warming. There is a strong internally consistent argument against the paradigm of dramatic climate change. Why the United states negotiating team proceeded as it did in Kyoto will surely be the subject of historical debate for decades to come.

In an attempt to convince Americans of the need for this dramatic reduction in fossil fuel consumption, the United States government has engaged in a continuing and relentless campaign of exaggeration of the threat from global warming. But, in reality, global temperatures have failed to warm as predicted.

This campaign is fueled largely by the perception that the American public has yet to be convinced of the severity of this potential environmental threat. Administration-sponsored "focus group" studies repeatedly conclude that the evidence against the

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forecast of a dramatic and destructive global warming is more convincing than the evidence in favor of it.

As a result of this lack of popular support, the administration anticipates considerable difficulty in mandating any legally binding reductions in greenhouse gas emissions in the next Congress. The U.S. Constitution requires that such a change to a treaty be approved by a two-thirds majority of the Senate if it is to have legal standing.

To add insult to injury, the Kyoto protocol to the Rio Treaty only applies to developed nations. But the non-participation of other nations, including China, Mexico, and India, is not acceptable to the U.S. Senate, which voted in June, 1997, by a 95-0 margin, that it would not entertain any changes in the Rio Treaty that did not include legally binding reductions on all signatories. The Senate also stated that it would not entertain any change to the treaty that would impose a net economic cost on the United States.

The administration has attempted to generate public support with a series of "town meetings" and "regional workshops" on climate change and its impact. The archetype of these was the "science summit" held at the White House on October 6, which clearly detailed the administration argument on climate change. The major points were that:

- Climate models — especially those that combine the effects of greenhouse effect warming with cooling from other human-generated emissions — are becoming more reliable. They are increasingly capable of simulating the climate variability of this century.

- Extreme events — notably flooding rains — are increasing in frequency, and this is consistent with global warming caused by changing the greenhouse effect.

This paper examines in detail these two assertions. It is very clear that they are central to the administration's attempt to convince the American people of a need to dramatically reduce energy consumption because of global warming. Further, they are a significant component of the United States effort to convince developing nations of the need to reduce emissions.

Predicted and Observed Climate Change

There has been a long and vociferous scientific debate on the magnitude and existence of global climate changes caused by hu-

man activity. The noted physicist Svante Arrhenius first calculated that doubling the natural carbon dioxide greenhouse effect, caused by the combustion of fossil fuels, would raise the surface temperature an average of 5.2 °C. He also calculated that going halfway to that point would raise the temperature 3.0 °C.[2]

The first 30 years of the 20th century warmed quite rapidly, and there was speculation by U.S. meteorologist J.B. Kincer in 1933 that this change may have been anthropogenic.[3] But, soon after that publication, temperatures began to decline. By 1976, some scientists were offering the explanation that a combination of greenhouse effect warming and a competing cooling due to reduced solar radiation reaching the earth because of dust particles produced by human activity was responsible for the slight net cooling.[4]

At nearly the same time, the first general circulation climate computer models (GCMs) were run in which changes in the greenhouse effect were specified. These GCMs estimated a warming of approximately 4.0 °C for a doubling of carbon dioxide.[5] GCMs were the first attempts to simultaneously model a number of atmospheric processes, including the complexity of the surface-atmosphere interaction, from first physical principals. Other, earlier, studies were either highly empirical in nature or assumed a uniform surface.

By 1990, there were five GCMs that received the bulk of scientific citations. The average warming predicted by them for a doubling of atmospheric carbon dioxide was 4.2 °C, and the lowest figure, from the U.S. National Center for Atmospheric Research model, was 3.2 °C.[6]

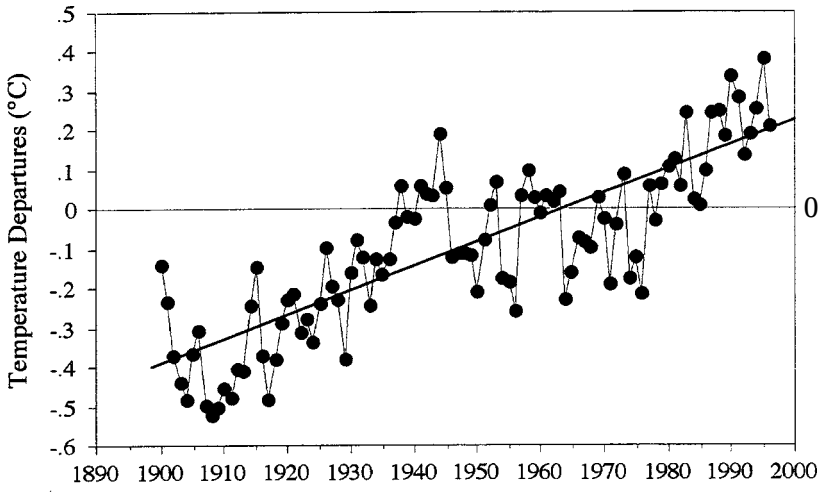
These models drove the first "consensus" document on this subject, the United Nations' "First Scientific Assessment," published in 1990 by the Intergovernmental Panel on Climate Change (IPCC). The key sentence in this report concerning predicted and observed climate change said, "When the latest atmospheric models are run with the present concentrations of greenhouse gases, their simulation of climate is generally realistic on large scales."[7]

In other words, computer models of the climate that incorporated greenhouse emissions that were similar to actual emissions produced climate changes that generally resembled what had been observed. A subsequent study calculated that these models predicted that the earth's mean surface temperature should have risen between 1.3 and 2.3 °C as a result of these changes.[8] Slightly revised versions of these models served as the technical background for the United Nations Framework Convention on Climate Change, first approved at the Rio de Janeiro "Earth Summit" in June 1992.

As shown in Figure 1, however, the observed surface warming

Figure 1

Observed Global Surface Warming, 1900-1996



Source: J.T. Houghton et al., *Climate Change 1995: The Science of Climate Change* (Cambridge, England: Cambridge University Press, 1996).

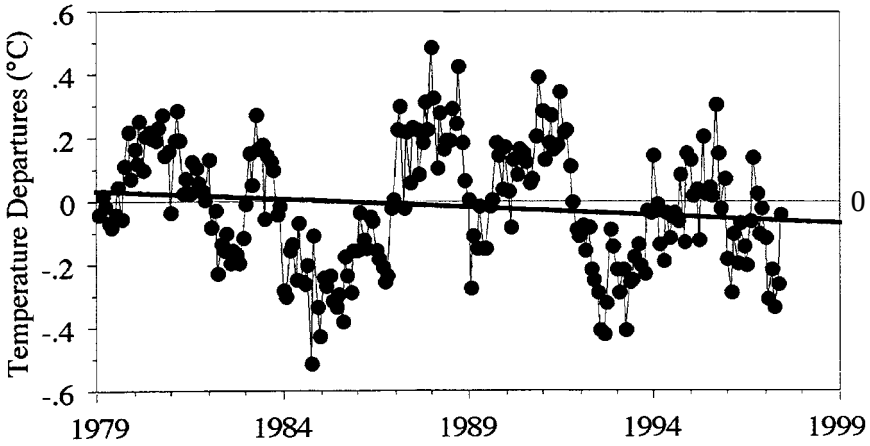
since the late 19th century has been about 0.6 °C, or *one-third*, of the predicted average. Critics argued, in congressional testimony (see, for example, my testimony of June 25, 1997, before the Senate Foreign Relations Committee) and elsewhere, that there would have to be a dramatic reduction in the forecast of future warming in order to reconcile facts with the models' results.

In 1990, NASA scientists Roy Spencer and John Christy published the 11-year history of temperatures measured by microwave sounding units on orbiting satellites.[9] While covering only a short time frame (beginning on January 1, 1979), the record showed *no warming whatsoever*, indicating some disparity with the ground-based thermometer record of Figure 1. Figure 2 shows the complete 18 years of global satellite temperature data. The bold line indicates the statistically significant negative (cooling) trend.

There also is a remarkable correspondence between annual temperatures measured by satellites to those measured by weather balloons between 5,000 and 30,000 feet. The balloons are launched

Figure 2

Global Satellite Temperatures, 1979-1997



Note: The coefficient of the temperature trend line is statistically significant at the p = 0.05 level.

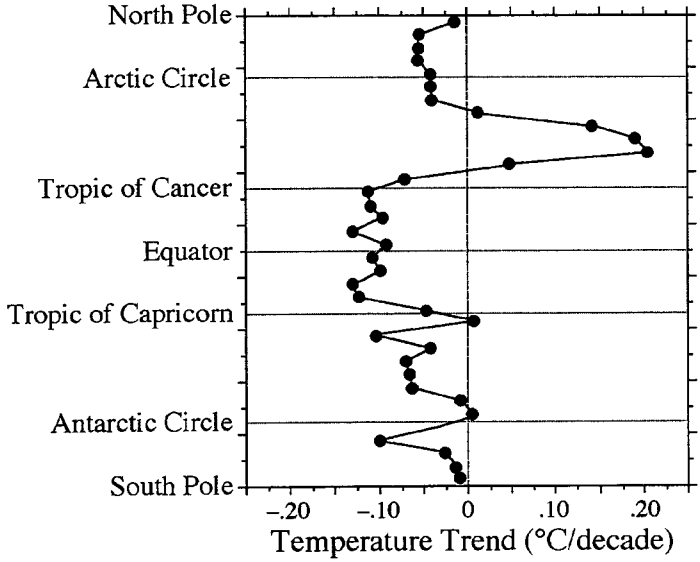
Source: R.W. Spencer and J.R. Christy, "Precise Monitoring of Global Temperature Trends from Satellites," *Science*, 247, pp. 1558-1562.

simultaneously twice daily to supply a global three-dimensional profile of the atmosphere for input to weather forecasting models. The balloons carry thermistors vertically through the atmosphere, while satellites look down on the planet recording temperatures with an instrument that measures the vibration of atmospheric oxygen. As such, these two methods represent entirely independent measures of atmospheric temperature and can be used to cross-validate each other. The high degree of correspondence between the two imparts a high level of confidence in their observations.

While, as is apparent from Figure 2, the overall temperature trend from 1979 to 1997 is slightly negative, there are pronounced areas of warming over central Eurasia and northwestern North America. Figure 3 divides the satellite record into latitudinal bands to better illustrate regional temperature trends. The warming of the midlatitudes of the northern hemisphere stands out in contrast against the cooling which shows up in nearly every other region. Thus, according to the satellite data, one might argue that

Figure 3

Temperature Trends by Latitude, 1979-1995



Source: Author's calculations; R.W. Spencer and J.R. Christy, "Precise Monitoring of Global Temperature Trends from Satellites," *Science*, 247, pp. 1558-1562; and J.T. Houghton et al., *Climate Change 1995: The Science of Climate Change* (Cambridge, England: Cambridge University Press, 1996).

the greenhouse effect has imposed a slight warming trend in the relatively dry regions of the Northern Hemisphere, where greenhouse theory argues that warming should be most pronounced (see appendix). But this warming appears to be superimposed upon a slight global *cooling* trend.

There is an obvious disparity between the satellite record, shown in Figure 2, and the surface-based record shown in Figure 1. Two causes are likely. First, a small amount of the difference is a result of "urbanization" of the ground-based record. It is a fact that cities tend to grow around our longest standing weather stations, which were placed at points of commerce in the 19th century. Scientists have long known this, and while they have taken great pains to eliminate this effect from most of the records — by comparing nearby stations and looking for spurious trends — such a method is highly

insensitive to urban warming in the most recent years.

The other systematic error is likely to be in the satellite data, under certain conditions. The satellite does not measure the true "surface" temperature, but rather integrates the temperature of the lower layers where oxygen is most plentiful. That's why it corresponds so well to the mean global layer temperatures between 5,000 and 30,000 feet as measured by weather balloons.

The assumption that temperatures at 5,000 to 30,000 feet are similar to those on the surface is true in a well mixed, homogenous atmosphere — a condition that is obtained much of the time over the world's land areas, which is also where most of the weather stations are. However, there are certain conditions in which the near-surface atmospheric temperature does not reflect the average temperature between 5,000 and 30,000 feet. This occurs often in the dead of winter, when, during the long polar and high-latitude nights, a shallow pool of very cold air "drains" down to the surface.

These very cold air masses are generally less than 5,000 feet deep. As discussed in the shaded box on the following page, these are the air masses that should show the most pronounced greenhouse warming. Thus, the satellite is likely to see only the top portion of these very sensitive air masses. At any rate, the differences between the satellite and the surface temperatures are still rather small.

The Last Decade

One of the most remarkable (and little noted) aspects of the last decade is that *none* of the three global measures of lower atmospheric and surface temperature shows any warming. This is shown in Figure 4 (taken from the 1995 IPCC report), which depicts the satellite record, the weather balloon readings (averaged from 5,000 to 30,000 feet), and the surface record.

By 1995, in its second full review of climate change, the IPCC reported:

> When increases in greenhouse gases only are taken into account...most [climate models] produce a greater mean warming than has been observed to date, unless a lower climate sensitivity [to the greenhouse effect] is used....There is growing evidence that increases in sulfate aerosols are partially counteracting the [warming] due to increases in greenhouse gases.[10]

The secular translation of this statement is that either it is

Human Greenhouse Warming in Frigid Air Masses

The very cold air masses that the satellite can't see all the way through are the ones that should warm the most from changes in the greenhouse effect. Similarly, air masses that are already very warm, in general, should warm very little.

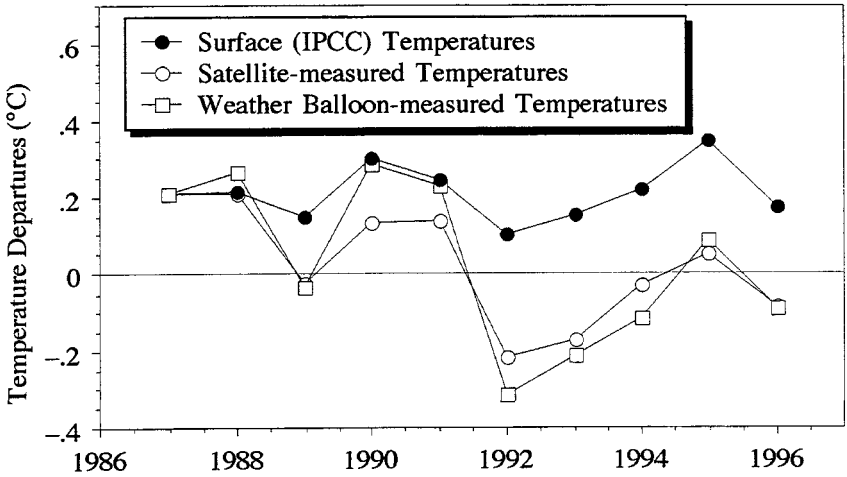
All of this has to do with the way that the greenhouse effect works to warm the lower layers of the atmosphere. Certain molecules, principally water vapor, absorb packets of the infrared energy that constantly radiates from the earth's surface. If they were not there, the radiation would go directly out to space. But because of their absorption, they will re-emit the radiation either out to space ("up"), and not changing the temperature, or back towards the ground ("down"), providing additional warming.

Over 95 percent of the earth's natural greenhouse effect is from water vapor, and about 3 percent of it is from carbon dioxide. But water vapor and carbon dioxide absorb many of the same types of energy packets coming from the surface, so it doesn't matter how much carbon dioxide is in the atmosphere if the total concentration of water vapor is high enough to catch much of the energy. This is the case for the wettest air masses on the planet, which are invariably the very warm ones (warm air holds many times more water molecules than cold air). The coldest air masses are incredibly dry, and so they have very little natural water vapor greenhouse effect. Putting carbon dioxide in these air masses is much the same as putting in water—the absorption of infrared radiation increases rapidly, resulting in a sharp warming.

The coldest driest air masses that normally affect humans are the great cold high-pressure systems that form in Siberia and northwestern North America in the winter. And these are the ones that show a warming signal; the magnitude and pervasiveness of this warming dwarfs anything that occurs in the summer. In other words, greenhouse warming is largely a warming of the coldest air masses that we know of. According to the satellites, the rest of the planet shows a slight cooling trend for the nearly two decades of satellite records. And none of the global temperature records that scientists commonly use shows any warming whatsoever in the last 10 years.

Figure 4

Surface, Satellite and Weather Balloon Temperature Measurements, 1987 to 1996



Sources: R.W. Spencer and J.R. Christy, "Precise Monitoring of Global Temperature Trends from Satellites," *Science*, 247, pp. 1558-1562; J.T. Houghton et al., *Climate Change 1995: The Science of Climate Change* (Cambridge, England: Cambridge University Press, 1996); and J.K. Angell, *Trends '93: A Compendium of Data on Global Change*, ORNL/CDIAC-65 (Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee).

not going to warm up as much as was previously forecast, or something is hiding the warming. Human nature dictates that every effort will be made to demonstrate the latter explanation.

The "something" hiding the warming is hypothesized to be increases in sulfates and has received considerable attention from the research community. Initial results, particularly those published in *Nature* on July 4, 1996, appeared to bolster the argument that sulfates were masking the expected warming.[11] That particular study used annual weather balloon data from 1963 through 1987. Most striking was a rapid warming of the middle of the Southern Hemisphere, where there are virtually no sulfates available to counter greenhouse warming.

However, when the entire record of weather balloon data, from 1958 through 1995, was used, this most pronounced region of warming turned out to show no change whatsoever.[12] According to the July 16, 1996, issue of *New Scientist* magazine, this criticism "drew blood" in the greenhouse controversy. In the context of an interview with B.D. Santer, the senior author of the July 4, 1996, *Nature* study, *New Scientist* reported, "Since 1987, the growing force of the greenhouse effect has reasserted itself and the north has again taken the lead."[13] As there was no net change in any of the temperature records in the last decade, this statement is clearly in error.

Clearly the default option — that it is simply not going to warm as much as the earlier projections indicated — is increasingly plausible. A new suite of climate models, which now seem to fit the observed history more accurately, bear witness to this conclusion.

Figure 5a shows the new result (1997) from the United Kingdom Meteorological Office (UKMO) model.[14] The published forecast is the higher value, which still shows considerable warming. But a careful read of the manuscript reveals that the changes in the greenhouse effect that were used are much greater than the observed and projected changes. When the more accepted values (as given by the IPCC) are used, the warming drops to the lower figure, or about 1.7 °C by the year 2100.

Figure 5b is an analogous new model from the U.S. National Center for Atmospheric Research (NCAR), as published in the May 16, 1997, issue of *Science*.[15] It, too, uses a change in the greenhouse effect at least 30 percent greater than the known and projected changes. The lower trend in Figure 5b is adjusted for that error and it produces only 1.3 °C of warming by 2100.

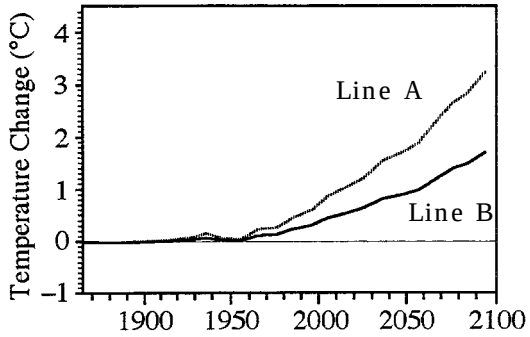
Notably, this model does not include any cooling from sulfates. While this effect was apparently overestimated, new, direct measurements indicate that it should reduce warming by about 0.3 °C over this period.[16] In contrast, the model of Taylor and Penner (1994), which forms much of the basis for the findings of Santer et al., in the now-infamous *Nature* article, assumes sulfate cooling that is over three times as strong.[17] Readers may want to speculate as to the need to put such unrealistic cooling into models of global warming.

A Culture of Exaggeration

The failure of GCMs that predict dramatic warming is now well known in scientific circles, as is the fact that newer models

Figure 5a

Temperatures Predicted by UKMO Model



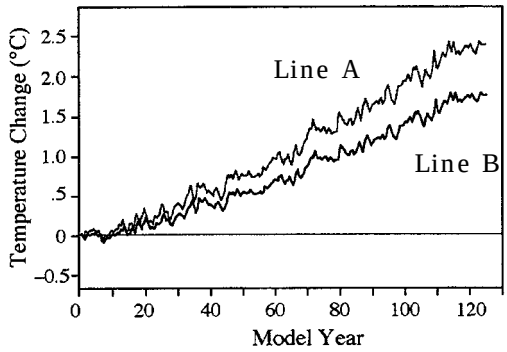
Line A = Unrealistic CO_2 concentration of 859 ppm by the year 2050.

Line B = Estimates warming if the most likely concentration, as given by IPCC 1995, is used.

Source: J.F.B. Mitchell and T.C. Collins, "On Modification of Global Warming by Sulfate Aerosols," *Journal of Climate*, 10, 1997, pp. 245-266.

Figure 5b

Temperatures Predicted by the New NCAR Model



Line A = Increases effective CO_2 by 1% per year (but a more realistic increase is 0.7% per year).

Line B = Estimates temperatures using the more realistic value. Nominal starting time around 1965.

Source: R.A. Kerr, "Model Gets It Right–Without Fudge Factors," *Science*, 276, 1997, p. 1041.

that are more physically realistic tend to forecast less warming. This has led to a change in rhetoric. The administration now speaks less of "global warming" than it does of "climate change."

The result is that the administration now positions itself in front of virtually every unusual weather event and blames it on human-induced climate change. Each of these assertions has been dramatically flawed, and the scientific inaccuracies and inconsistencies are beginning to harm credibility. Here are just a few of the recent exaggerations.

"Intense" Rains Increasing?

Increased threats of flooding were first noted in Vice President Al Gore's "Earth Day" speech in Washington D.C. in 1995, where he stated that "torrential rains have increased in the summer during agricultural growing seasons." He was referring to research that had yet to appear in the refereed scientific literature by federal climatologist Thomas Karl. Karl ultimately published a paper in *Nature* showing an increase of 2 percent in the amount of rain in the United States resulting from storms of between two and three inches in 24 hours.[18] There was no change in rains of three or more inches.

By January 1997, based upon the same study, the U.S. Department of Commerce produced a press release which stated that flooding rains had increased by 20 percent in the United States. How did 2 percent turn into 20 percent? Easily, if you choose to misrepresent data in order to create concern.

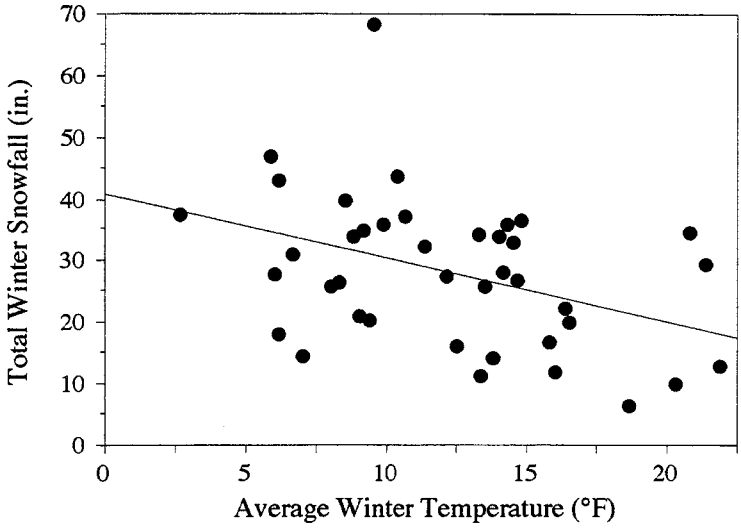
The United States averages approximately 30 inches of rain a year. In the beginning of this century, 9 percent, or 2.7 inches a year, fell, on average from storms of two inches or more in 24 hours. By the end of the century, the amount had increased to 11 percent, or 3.3 inches a year from such storms. If one divides 3.3 inches by 2.7 inches, one calculates a 22 percent increase in the amount of rainfall in this arbitrary categorization of rainfall. The reality still remains, however, that the amount of rain falling from these storms has increased by a mere 0.60 inches a year; 0.60 inches of rain has never caused a flood.

Does Global Warming Cause Blizzards?

The major flood in the Red River Valley in 1997 was caused by the spring melting of unusually heavy snows of the previous winter. On Earth Day, President Clinton proclaimed, "I think that every American has noticed a substantial increase in the last few

Figure 6

Relationship between Snowfall and Winter Temperatures in Grand Forks, North Dakota, 1948-1992



Source: National Climate Data Center, Asheville, North Carolina.

years of the kind of thing we're going to see in North Dakota today." Then-Assistant Secretary of State Eileen Claussen said, "We can expect that a continued warming of the Earth's atmosphere is likely to result in much more of such occurrences of severe weather.... I think we can say, with some confidence, that there will be more cases like [the Red River flood] as the Earth starts to warm."

The administration should have checked on the relationship between mean winter temperature and snowfall in North Dakota (Figure 6). As would seem obvious, the warmer it is, the *less* it snows. And, consistent with greenhouse theory, the very cold temperatures of winter have warmed up a bit in the dry atmosphere of the Red River Valley.

Are Humans Melting the Glaciers of Glacier National Park?

Vice President Gore's visit to Grinell Glacier in Montana's Glacier National Park in September 1997 was designed to create a

global warming photo op. At that time of the year, glaciers normally reach their lowest ebb and new snowfalls have not arrived. Gore pointed to the glacier, looked at the reporters and intoned somberly, "This glacier is melting." The vice president then conflated global warming and the melting of Grinell Glacier.

The fact is that park's glaciers have been melting for about 150 years, according to the park's own literature. The melting began in the mid-19th century as the global temperature recovered from the frigid "Little Ice Age." During this Little Ice Age (1450 to 1900), midlatitude mountain glaciers were expanded dramatically (in some cases, a mile or so) beyond their current termini, and the Thames River regularly froze, as Europe shivered in Dickensian misery.

Had Gore inspected the summer daytime temperature history of Western Montana, he would have discovered there's been no warming whatsoever in the last century. It is during summer days, of course, that glaciers melt, and if there is no summer warming, there is no acceleration of glacial melting. What Gore did was to purposefully mislead and confuse the public about a natural warming during the 19th century with a lack of warming in Western Montana in the 20th century.

Does Global Warming Make Hurricanes More Intense or Frequent?

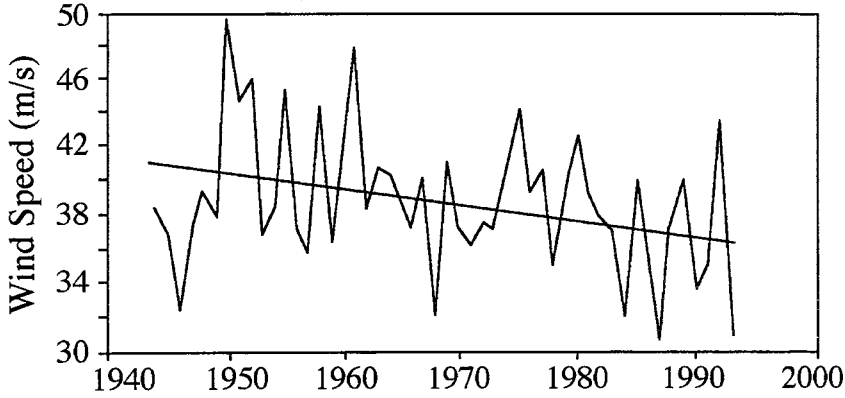
In March 1996, Eileen Claussen told a "Town Meeting on Global Warming" in Chapel Hill, North Carolina, that Hurricane Fran (1996) was typical of what one could expect from global warming. The fact is that Hurricane Fran was a purely average hurricane that did what average hurricanes do when they hit developed properties — it caused a few billion dollars in damage. As a result of careless statements such as this, some significant players in the insurance industry, namely Swiss Re, and to a lesser extent some American re-insurers, have seized upon global warming as an excuse to increase premiums. They cite increased exposure as a result of worsening hurricanes as the "need" for rate increases.

The basis for belief that increased global warming intensifies hurricanes is a single paper.[19] The assumptions in the paper were quite unrealistic — including the physically incorrect notion that hurricanes do not cool the oceans over which they pass. A subsequent review article found no basis for an expectation of major changes in hurricane severity.[20]

There is currently only one climate model that *explicitly*

Figure 7a

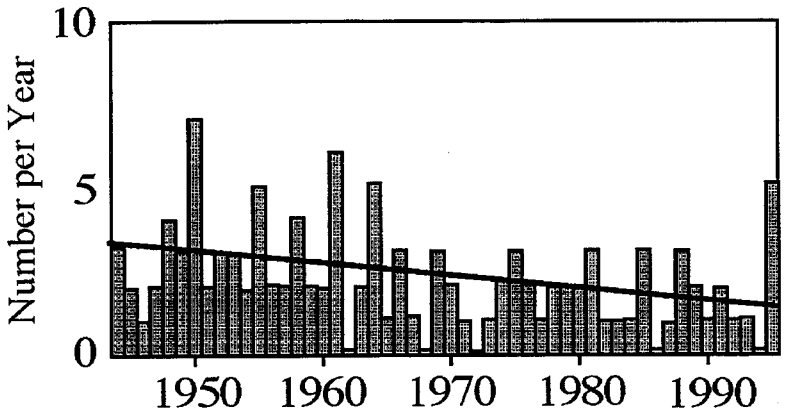
Annual Average Hurricane Winds in the Atlantic Basin



Source: J.T. Houghton et al., *Climate Change 1995: The Science of Climate Change* (Cambridge, England: Cambridge University Press 1996).

Figure 7b

Number of Intense Hurricanes in the Atlantic Ocean



Source: C.W. Landsea, et al., "Downward Trends in the Frequency of Intense Atlantic Hurricanes during the Past Five Decades," *Geophysical Research Letters*, 23; 1996, pp. 1697-1700.

calculates the frequency and intensity of hurricanes as the greenhouse effect enhances. The creators of this model wrote:

> The global distribution of storms ... agrees in geographical position and seasonal variability with that of the present climate, but the number of storms is significantly *reduced* [italics in original], particularly in the Southern Hemisphere. ... Most tropical storm regions indicate reduced *surface* wind speeds and a slightly *weaker* hydrological cycle [emphasis added].[21]

Figures 7a and 7b present some evidence that hurricane threats are lessening, not worsening. Figure 7a, taken from the second IPCC report, shows that annual average winds in hurricanes in the Atlantic Basin have been declining in a statistically significant fashion over the last 50 years. This is further supported by recent research showing a statistically significant decline in the number of intense hurricanes over the same period (Figure 7b).[22]

Conclusion

There is little doubt that the paradigm of moderate, and largely benign, climate change as a result of human activity enjoys the support of the data. The climate models that predicted large and dramatic warmings — including those that serve as the basis for the Rio Treaty on climate change — were wrong.

Further, the argument that the warming failed to materialize because it was being "hidden" by sulfate aerosols is also not supported by the data. Rather, it is more likely that the sensitivity of the climate to human greenhouse emissions was simply overestimated.

At the same time, the preponderance of warming in the coldest airmasses — which should be most sensitive to greenhouse changes — gives credence to the proposition that there has been *some* human influence on the climate. But the fact that the changes are small, primarily in the coldest air, and likely to remain small should spell the end of the global warming scare.

These findings call into question the proposals for stringent emissions reductions, such as those agreed to by United States negotiators in Kyoto in 1997. The current proposal, reducing U.S. emissions to 7 percent below 1990 levels early in the next century, will cost over 2 percent of Gross Domestic Product per year, according to an econometric model by Charles River Associates. Given

that climate change is not proceeding at the alarming rate that was forecast when the Rio Treaty was signed, might it not be wiser to save this enormous expenditure for ultimate investment in the energy technology of the future, rather than embarking upon a probably unsuccessful, expensive program to meet an emergency that does not exist?

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