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**The Infection of Science by Public Choice:
Steven Schneider vs. Bjørn Lomborg and
*The Skeptical Environmentalist***

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Introduction

Most everyone who cares about the environment in general and global warming in particular has heard of Danish statistician Bjørn Lomborg and his book, *The Skeptical Environmentalist*, which argues that environmental threats, particularly those from global warming, are largely overblown. Furthermore, most people know Lomborg has sent “Big Science” into a tizzy, prompting some scientists to pen shrill screeds against him in publications such as *Nature*, *Science*, and *Scientific American*. Lomborg was even kangaroo-courted by something called the Danish “Committees [sic] on Scientific Dishonesty,” which accused him of (surprise!) “scientific dishonesty.”

The Danish “Committees” attacked Lomborg based on a series of unrefereed (non-peer reviewed) essays published in *Scientific American*, which hired four well-worn guns to shoot poor Bjørn full of holes. They included

- John Holdren, a Harvard University energy analyst who, along with his mentor, Paul Ehrlich, lost a \$10,000 bet to economist Julian Simon in 1990 when shortages of five metals that Ehrlich and Holdren had forecast ten years earlier failed to materialize.
- Tom Lovejoy, who used to run the World Wildlife Fund, the biggest environmental lobbying organization in history,
- John Bongaarts, vice president of the Population Council, an organization that is chagrined that estimates of future population keep going down, and
- Steve Schneider, Department of Biology, Stanford University.

Both the “Committees” and Lomborg give the most credence to Schneider’s essay, largely because it is the most literate (and vituperative) of the four, and because it concentrates on the core environmental and lifestyle issue of our time, global warming.

It’s not surprising that Schneider’s review is the nastiest. He represents academia, which has the most to lose if the global warming hysteria somehow dies—about \$16 billion over the next four years, the sum of money in future federal budgets proposed by President Bush to study this issue.

While the major science journals like *Science* and *Scientific American* serve some noble purposes, they are also susceptible to the kind of incentives explained by public choice theory.

It is no accident that the publisher of *Science*, the American Association for the Advancement of Science (AAAS), is headquartered in Washington, D.C. AAAS lobbies on behalf of the research community, as do *Nature* and *Scientific American*. All three have editorialized on behalf of the Kyoto Protocol or against President Bush’s opposition, and all have published remarkably vitriolic reviews of *The Skeptical Environmentalist*.

Consequently, Schneider is not alone; rather, he represents a community that recognizes substantial economic gain from an alarmist view of global warming, a view that is simply not warranted by scientific facts.

Schneider gives his motives away in his final paragraph:

“Unfortunately, angry reviews such as this one will be the result [of Lomborg’s putatively poor scholarship]. Worse still, many laypeople and policymakers won’t see the reviews and will be tricked into thinking [Lomborg’s book] constitutes valid scholarship.”

The last paragraph of a review is ideally a coda summarizing the core ideas the writer wants to leave with the reader. Schneider’s concern is clearly that Lomborg will convince the political community of the validity of his view, and this is why he has written such an “angry review.” Translation: I’m mad at you because you have your hand on my wallet.

Schneider has a history of lacking objectivity, and a certain pride (bordering on hubris) to go with it. In 1989, concerning global warming, he told *Discover* magazine:

“On the one hand we are ethically bound to the scientific method, in effect promising to tell the truth, the whole truth, and nothing but...which means that we must include all the doubts, caveats, ifs and buts.

“On the other hand, we are not just scientists, but human beings as well. And like most people we’d like to see the world a better place, which in this context translates into our working to reduce the risk of potentially disastrous climate change. To do that we have to get some broad-based support, to capture the public’s imagination. That, of course, entails getting loads of media coverage. *So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have.* This “double ethical bind” which we frequently find ourselves in cannot be solved by any formula. Each of us has to decide what the right balance is between *being effective and being honest.* I hope that means being both.” [emphases added]

It is staggering that *Scientific American* would choose Schneider as its “objective” witness against Lomborg, unless its editors were somehow unaware of this statement, which is widely cited. Everyone who has studied this issue knows this quotation.

Whatever the motivation, Schneider’s record clearly makes his will “to tell the truth, the whole truth, and nothing but” concerning Lomborg somewhat suspect. What did he leave out? What, if left in, would have lost “broad based support,” and “the public’s imagination?” The latter is a remarkable choice of words: Does Schneider feel is it the role of a scientist to stoke fearful fantasies of the untrained?

Here is the salient fact that Schneider chooses to ignore: *The most consistent assemblage of observed and modeled temperatures, along with real emission rates of greenhouse gases, predicts that 21st century warming is likely to be modest.*

Schneider's main complaint is Lomborg's insistence that 21st century warming will be at or near the low end of the IPCC's range of 1.5 to 4.5°C. Earlier, Schneider acknowledges that the low end is "relatively adaptable."

Pangloss's Climate?

Do we live in "the best of all possible climates?" If people could choose, what mean surface temperature of the planet would they select?

This issue is not far beyond the horizon. J. Craig Venter, the fellow who decoded five human genomes, recently was granted \$3 million by the U.S. Department of Energy to create a bacterium designed to chew carbon dioxide out of the air.

Assume that Venter is successful and that people can then select the Earth's mean surface temperature.

Figure 1 shows the Argentiere Glacier in the French Alps in 1966. The photo is copied from *Times of Feast, Times of Famine: Climate Since the Year 1000* by Emmanuel Le Roy Ladurie, the first modern book to popularize the notion that European climate is hardly stable. Figure 2 shows a woodcut of the same scene in 1850, with the glacier clearly threatening the bucolic village at its toe. This was the European (and largely global) climate condition as the industrial revolution began to mature.

It is doubtful that most of us would elect to go back to that climate—the one that existed before humans had put much carbon dioxide in the air.

What about today's climate? The winter of 2002-03 was very cold in the northeastern U.S.; therefore, the prices of heating energy and gasoline increased (the two being somewhat interchangeable in the refining process). In contrast, the very warm, El-Niño-driven winter of 1997-98 resulted, according to an article published by this author and by climatologist Stanley Changnon, in a saving of roughly \$15 billion and the prevention of approximately 850 deaths.

As will be shown below, greenhouse warming primarily affects winter temperatures. Consequently, we would argue that because winters more like 1997-98 (rather than 2002-3) should become more likely, fewer people would choose the extreme temperatures we experienced this past winter.

It seems more likely that, after considering all the positives and negatives, humans would select a climate more like that of 4,000-7,000 years ago, when the Earth's mean temperature was approximately 1.5°C warmer than it is today. That period was known in climatic textbooks (before the current climate hysteria) as the "climatic optimum" because it accompanied the rise of civilization. Only the most radical of ecologists think that was a bad thing.

Most of the plants that we live with and depend upon, the Angiosperms (flowering plants), evolved on a planet that was several degrees warmer than it is today. It is therefore not surprising that, in general, biological productivity increases with mean surface temperature as long as sufficient moisture is available.

In conclusion, it seems as if people, and what people depend upon, want things a bit warmer than they are today.

Virtually every line of evidence concerning the amount of warming points in Lomborg's direction and away from Schneider's. One of the most important factors in global warming is the projected change in atmospheric carbon dioxide. According to Schneider:

“Emissions scenarios, according to the IPCC [United Nations' Intergovernmental Panel on Climate Change] fall into six “equally sound” alternative paths. These paths span a doubling in carbon dioxide concentrations in 2100 up to more than tripling... Lomborg, however, dismisses all but the lowest of the scenarios.”

Lomborg is much more likely to be correct than the IPCC high scenarios. In general, IPCC scenarios assume some type of exponential growth in carbon dioxide, and, even more importantly, an increase in per capita carbon dioxide emissions on a worldwide scale.

Both of these assumptions—and they are the core assumptions undergirding theories of rapid warming—have been wrong for the last quarter-century. This can be determined by examining CO₂ emissions data for increasingly long periods prior to the current year. An exponential increase fits the data no better than a simple linear increase for the last 25 years.

Even more telling, carbon dioxide emissions per capita peaked in the mid-1980s and are now declining. Statistically speaking, the downward trend, shown in Figure 3, has only a one-in-10,000 chance of being due to random variation.

The six “equally sound” emissions scenarios used by the IPCC and defended by Schneider in his arguments against Lomborg produce the shaded range of warming in Figure 4. In a recently published paper in the journal *Climate Research*, I adjusted these six scenarios, using the United Nations' own climate model and observed emission trends in the last quarter-century. The mean expected warming for the next 100 years dropped by 40 percent, or very close to the value of 1.5 to 2.0°C championed by Lomborg.

In *Scientific American*, Schneider complains about Lomborg's assertion that the “Kyoto Protocol...would reduce warming in 2100 by only a few tenths of a degree,” and goes on:

“This number, though is based on a straw-man policy that nobody has seriously proposed: Lomborg extrapolates the Kyoto Protocol, which is applicable only up to 2012, as the world's sole climate policy for another nine decades.”

Lomborg gives Kyoto too much, not too little credit. Schneider is fully aware that the most important and widely accepted study about Kyoto's climate impacts appeared in a 1998 edition of the journal *Geophysical Research Letters* in response to a request from then Vice President Al Gore to federal scientists about Kyoto's efficacy in mitigating global warming. The paper by Tom Wigley, an outspoken advocate of restricting carbon dioxide emissions, concluded that U.S. participation in Kyoto would only prevent 0.07°C increase in temperature in 50 years and 0.14°C by 2100 (see Figure 5). With the U.S. out of the Protocol, these numbers drop to 0.02°C and 0.06°C, respectively.

“Straw man” has become an increasingly abused term of the environmental Left when they really have no argument to make. Schneider's statement that Lomborg is describing, “a straw-man policy that no one has seriously proposed,” has syntactical meaning. Schneider is saying that there are serious, politically viable proposals out there made by large numbers of people that go far beyond the Kyoto Protocol. To that we say: Show us! There aren't any.

Why the Lowest Warming Projections Are Most Likely

Figure 5, taken from a comprehensive analysis of a large suite of climate models called the CMIP1 study (which stands for “Climate Model Intercomparison Project”—an analysis of 15 climate models), demonstrates that the central tendency of all of these models is to a constant rate of warming, once a human-induced greenhouse warming is initiated.

There's a very simple reason for this behavior. Laboratory experiments dating back to the 19th Century demonstrate that the response of temperature to a change in a given greenhouse gas is logarithmic—meaning that the first responses are the greatest, and then the warming begins to damp off at higher concentrations. But all the CMIP1 models assume an exponential increase in carbon dioxide, or an increasing rate of growth with time.

Addition of a logarithm and an exponent can yield straight line. It is a shame that so many billions of research dollars were spent only to prove a result that an intelligent high school junior learns in pre-calculus.

Consequently, if it can be demonstrated that human warming indeed has started, the rate becomes defined, and we then know the amount of 21st Century warming within a small margin of error.

In a 2000 paper in the journal *Climate Research*, I tested the hypothesis that human-induced warming is occurring by examining warming rates in dry versus moist air. Greenhouse theory predicts much more warming in dry air than wet air, largely because carbon dioxide and water vapor absorb radiation in many of the same wavelengths in the electromagnetic spectrum. In other words, they are largely mimics of each other, and

behaving the same, produce the logarithmic warming effect, which creates the greatest warming when either is added to an atmosphere devoid of both.

The driest places for which we have good temperature data in the last 100 years are Siberia and North America in the winter and around the Sahara Desert in the summer. Indeed, the warming is by far most pronounced in these regions, and we proved the link to greenhouse warming in that paper by demonstrating that the more dry air there is, the more it warms. It turns out that over two thirds of the planetary warming of the last half of the 20th century is in the winter half-year, and three quarters of that warming is in the coldest air of Siberia and western North America.

Having now established human-induced warming, how do we discriminate between all those models in the CMIP1 study? Simple: *Look out the window!* We can show that the recent warming era began about three decades ago. As shown in figure 6, the observed warming indeed is highly linear, and therefore the trend for the next 100 years is well established, unless the functional form of the central tendency of all of those CMIP1 models is wrong!

That warming works out to about 1.6°C over the next 100 years.

This calculation first appeared in public in my 2000 book, *The Satanic Gases: Clearing the Air about Global Warming*. Six months after its publication, Myles Allen and two other co-workers from the Hadley Center, Britain's premier climate modeling institution, adjusted their climate model with observed temperatures and produced a warming of 0.75°C in the next 50 years, or virtually the same number. Finally, in December 2001, James Hansen, the NASA scientist who is thought to have initially lit the bonfire of the greenhouse vanities with his 1988 congressional testimony, wrote that we know "that future global warming can be predicted much accurately than is generally realized." Hansen predicted a 0.15 +/- 0.05°C increase per decade over the next 50 years, precisely the same number calculated independently by Myles Allen and me.

Why didn't Schneider note this? One is left to hypothesize as to his motivation, not Lomborg's. But our last section may provide some insights.

Public Choice and the Lomborg Controversy

Public choice theory offers some interesting insights into the vehemence of the *Scientific American* responses to *The Skeptical Environmentalist*.

Schneider's rhetoric goes far beyond the contention that he simply feels that Lomborg is wrong, or is just another misinformed expert with an erroneously synthesized view of climate change.

Instead, three paragraphs in, he describes Lomborg as a "young Danish statistician in a political science department." "Young" clearly implies "inexperienced" or "naïve,"

“Statistician” has long been a pejorative among “hard” scientists, a community Schneider believes he belongs to, and “political science” is about as dirty an aphorism as can be given to anyone who in fact is writing about science.

In the next paragraph, Schneider cannot resist a similar personal line: “And who is Lomborg, I wondered, and why haven’t I come across him...?” The obvious translation is that because a serious scientist like Stephen Schneider had never met Bjørn Lomborg, Lomborg must be a marginal, scientifically inconsequential figure.

So, from the outset, Schneider chooses not to argue factually, and resorts immediately to the personal pejorative. He is more interested in destroying Lomborg’s credibility than he is in deconstructing his arguments.

Public choice theory offers a theoretical concept explaining patterns of behavior in such cases. Scientists covet job security. If policy makers and the public failed to see global warming as a threat, then who would pay scientists for their efforts to “solve” the problem? Simply put, public choice theory predicts that everyone responds to his or her own incentives. Scientists are no exception. After all, in Schneider’s words: “We’re not just scientists, but human beings as well.”

Scientists maintain the crucial characteristics of any interest group. Environmental science is an exclusive field. The community is small, and over 99.5 percent of research funding comes from the federal government. The community knows that there are many other scientific research communities—cancer, heart disease, etc.—competing for that money. Communities also require a shared ethic, however mythical. So, Schneider claims that it is up to them to make “the world a better place.”

For the environmental science community, the price of such virtue is the \$4.2 billion per year proposed in the current federal budget for research on global environmental change. Competition requires that this community prove that its problem is much bigger, more urgent, and needs more financial support than problems other interest groups want to solve to also make the world “a better place.” The competition is not limited to other science and technology enterprises, but includes all federal discretionary spending, such as housing for the homeless, another federal facility in West Virginia, and fixing the Space Shuttle—all virtuous, all competing. Lomborg and a few other scientists (who are about equally as popular!) threaten to derail the global warming gravy train.

Public choice theory does not judge someone’s honesty or dishonesty. It simply implies that the structure of incentives that scientists—indeed, all individuals—face creates a bias of distortion, in which problems must be exaggerated in order to garner funding. Public choice is a political process—based upon rhetoric as much as fact—and Schneider’s language is wholly rhetorical.

This political process creates a symbiotic relationship between politicians and scientists that works to both their advantage. Scientists get resources for their research, and responsive politicians can tout their funding of virtuous causes. Protecting nature and

children sounds pretty virtuous. To capture \$4 billion per year for climate change research, it pays to scare the public a little bit. It is no accident that all of *Scientific American's* critics of Lomborg have considerable experience in and with Washington!

We are not implying that Schneider's intentions are bad. Regardless of intentions, scientists are still merely "sectoral experts" trying to pursue their narrow interest through the political process, and Schneider was behaving as a member of his interest community.

Thus Schneider's statement that there is a need to "offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have" is eminently predictable. He is a "human being," after all!

Interestingly, the developers of public choice theory have held that science is immune to its distortions. Geoffrey Brennan and James Buchanan, in *The Reason of Rules: Constitutional Political Economy*, write,

"Science is a social activity pursued by persons who acknowledge the existence of a nonindividualistic, mutually agreed-on value, namely *truth* (Italics in original).

"Science cannot, therefore, be modeled (sic) in the contractarian, or exchange, paradigm."

However, the vitriolic response to *The Skeptical Environmentalist* suggests that public choice theory explains much more than its very inventors envisioned.

Argentiere Glacier - 1966



Figure 1. The Argentiere Glacier in 1966, as published in *Times of Feast, Times of Famine*, by Ladurie.

Argentiere Glacier - 1850

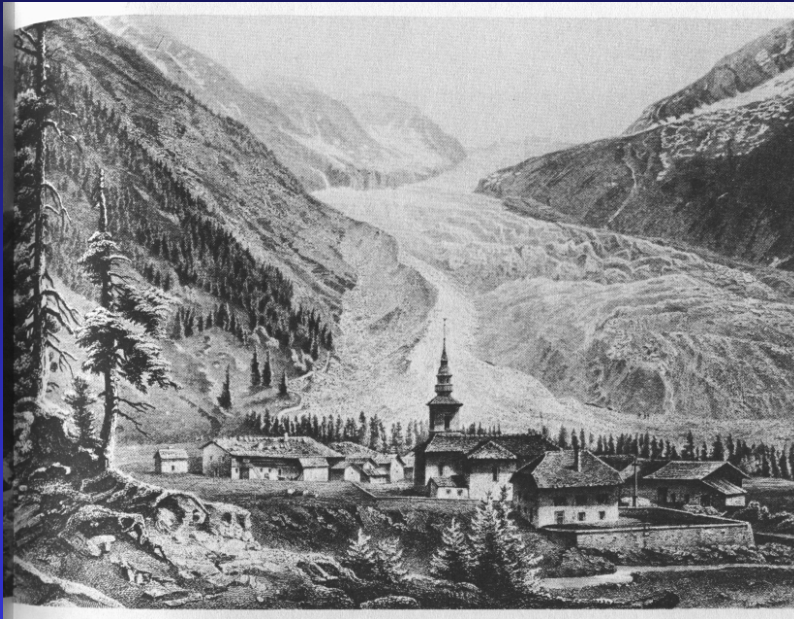


Figure 2. Same as Figure 1, except for 1850, in which the glacier clearly threatens the nearby village. It seems doubtful that humans would elect to return to this pre-greenhouse climate.

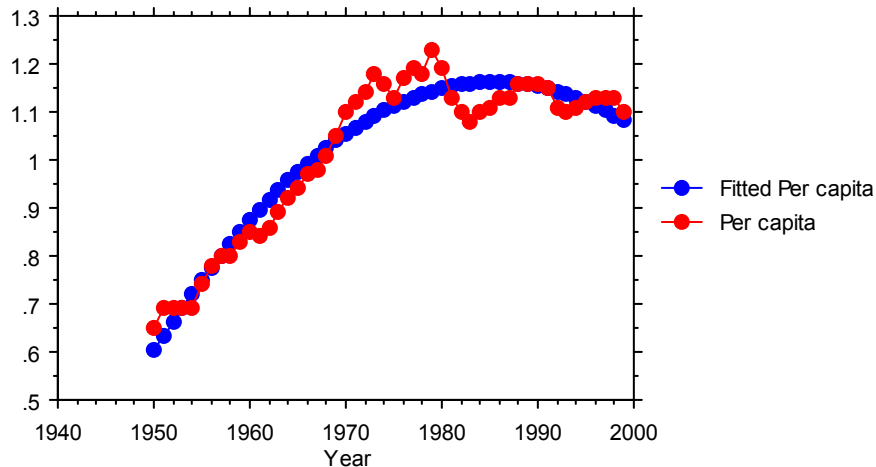


Figure 3. Global per-capita carbon dioxide emissions have been in decline for over 20 years (metric tons/person). The United Nations' Intergovernmental Panel on Climate Change (IPCC), which Schneider claims is more authoritative on this matter than Lomborg, assume that they have been and will continue to increase significantly. The statistical likelihood that the downturn is spurious is less than one in 10,000.

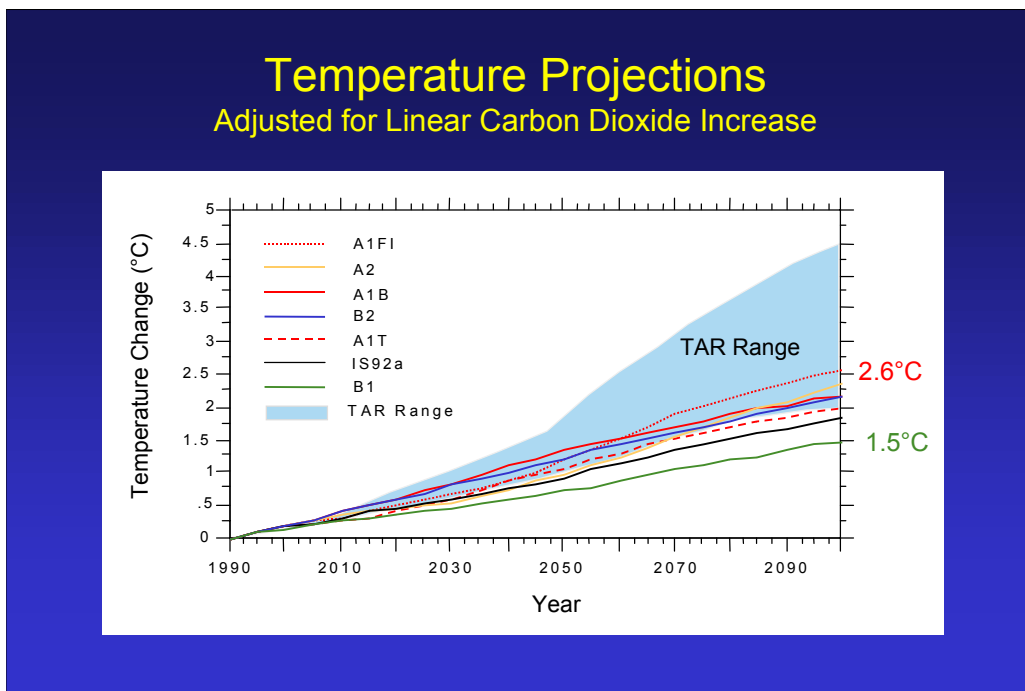


Figure 4. The shaded region is the IPCC range of estimates for 21st Century warming, based upon obviously wrong assumptions about increasing carbon dioxide. This graphic, taken from a recent publication in the journal *Climate Research*, adjusts the U.N. scenarios to emissions realities (colored lines), using their own warming model.

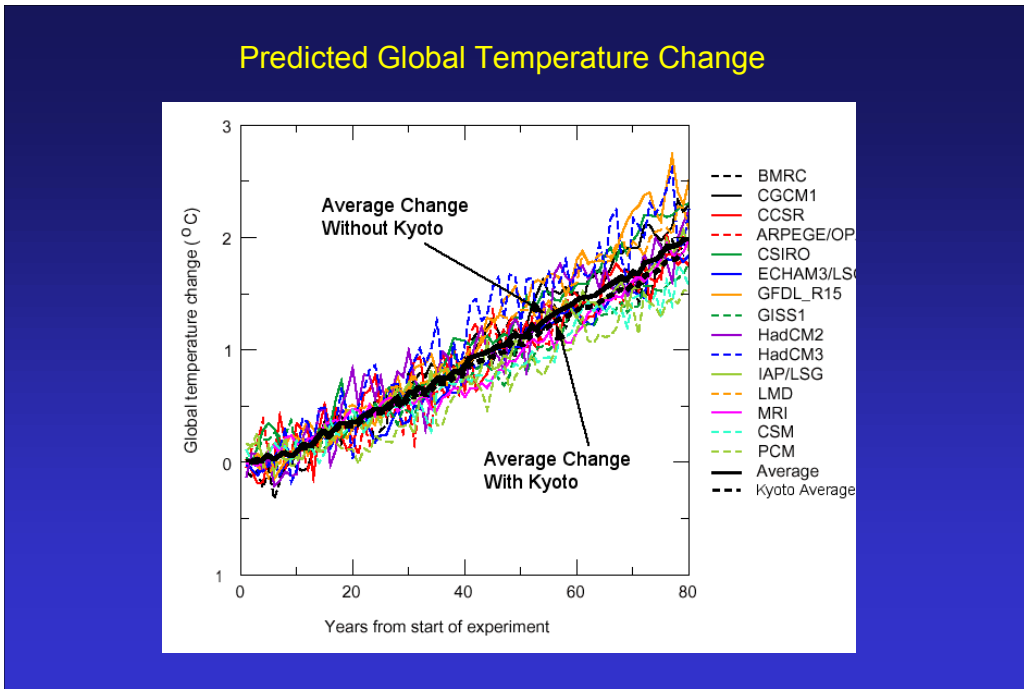


Figure 5. Central tendency of all of the climate models in the CMIP1 study, as well as the mean warming projected by these models, if all nations of the world adopted the Kyoto Protocol. The Kyoto response is taken from Wigley (1998).

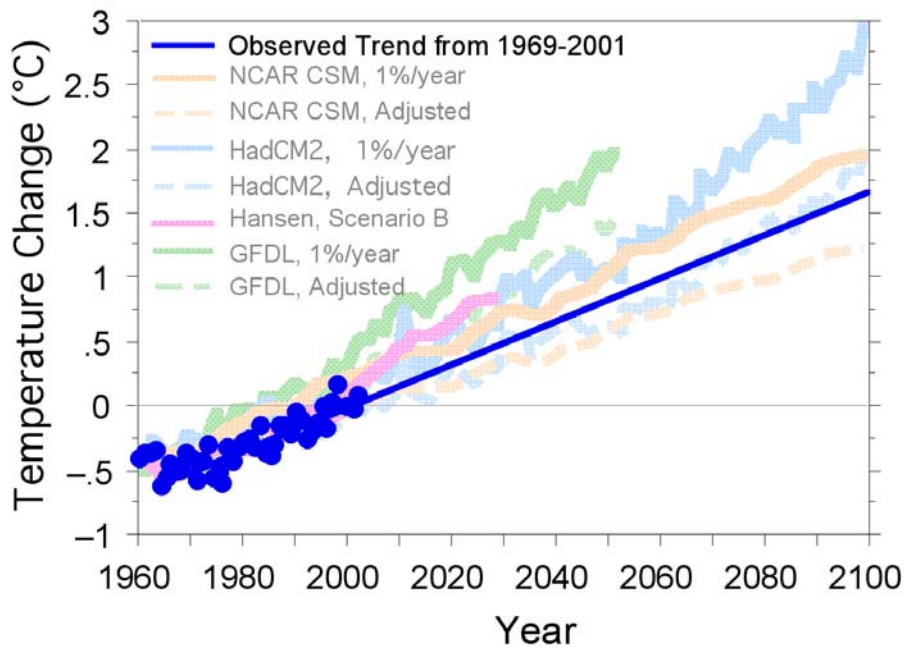


Figure 6. The linear warming since 1969 provides strong guidance concerning future warming, when compared to various model calculations. The rate works out to 1.6°C for the next century.

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