

Some Comments on the Global Warming Section of John Stossel's *Myths Lies, And Downright Stupidity* Mitch Golden, Feb 2007

John Stossel's *Myths, Lies, And Downright Stupidity*¹ is a book that purports to set the record straight about commonly-held beliefs. A “myth” is stated, and in reply a “truth” is given, followed by an explanation. The book contains a brief discussion of global warming. The purpose of this essay is to perform a careful evaluation of the scientific merit of that part of the book. Though technical matters are discussed, the target audience is a lay reader. My hope is that by steering clear of polemical verbiage and focusing on the science and history, the reader can gain the best possible insight into the arguments. The indented text in courier font is reproduced verbatim from pages 201-205 of the book.

MYTH #1: The earth is warming!

TRUTH: The earth is warming!

It's true. The Intergovernmental Panel on Climate Change (IPCC) says the global average surface temperature increased about 0.6 degrees Celsius over the twentieth century.

One interesting aspect about evaluating a popular discussion of a scientific matter is its choice of cited authority. In this as in many popular books, there are no footnotes, so it is often difficult to assess where a quote came from or why it should be accepted. Here, the cited authority is best choice, the IPCC. The reference is to the IPCC's Third Assessment Report² (TAR), from 2001, which presented 0.6 ± 0.2 degrees Celsius. (The IPCC's Fourth Assessment Report³ (AR4) from 2007 cites 0.76 ± 0.18 degrees Celsius for the total warming since the 19th century through 2005. However, since the AR4 wasn't available when the book was written, the discussion here will largely focus on the presentations in the TAR.)

Everyone now agrees – the earth is warming.

MYTH #2: The earth is warming because of us!

TRUTH: Maybe.

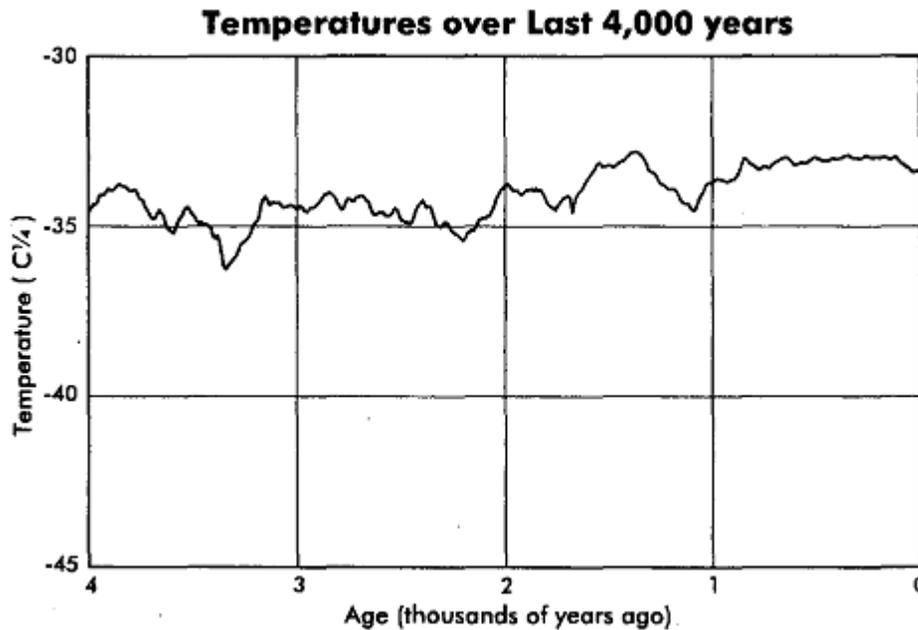
If our fossil-fuel burning is responsible for the warming, something doesn't add up. Half of the global warming of the past century happened from 1900 to 1945. If man is responsible, why wasn't there much more warming in the second half of the century. We burned much more fossil fuel during that time. What about that? Huh? You don't hear the environmental alarmists talking about it...

The planet is just in a gradual warming trend, coming out of what scientists call the “Little Ice Age”, which ended in the 1800s. Our climate has always undergone changes, and it's presumptuous to think humans' impact matters so much in comparison to the frightening geologic history of the earth. A graph of temperatures over the last four thousand years shows today's warming isn't such a big deal.

1 Hyperion, New York, 2006.

2 http://www.grida.no/climate/ipcc_tar/wg1/index.htm

3 <http://www.ipcc.ch/SPM2feb07.pdf>



Source: NOAA Paleoclimatology Program and World Data Center for Paleoclimatology, Boulder

Figure 1 – Temperature chart from *Myths...* p 202

Let's unpack this discussion and analyze the different points separately.

Given the implicit endorsement of the authority of the IPCC in the first “myth”, it is surprising that the IPCC's conclusions on this subject of this second “myth” are not mentioned. The IPCC was pretty categorical: “In light of new evidence and taking into account remaining uncertainties, most of the observed warming over the last 50 years is [60-90%] likely to have been due to the increase in greenhouse gas emissions.” It is important to recall that the TAR was written in 2001, five years before this book came out. In the intervening years, the research had only strengthened this finding, as was evident by the long list of scientific and professional organizations⁴ that issued statements confirming the consensus. By 2007, the AR4 stated that the conclusion was now “very likely”, defined as 90-95% certain.

The conclusion of the scientific mainstream is quite definitive, and it already was in 2001 – the earth is warming, and it is warming because of greenhouse gas emissions.

What about the particular point being raised - why did the climate warm some in the early 20th century, then cool just a bit in the mid part, then start warming again?

4 American Association for the Advancement of Science <http://www.ourplanet.com/aaas/pages/atmos02.html> - American Geophysical Union http://www.agu.org/sci_soc/policy/positions/climate_change.shtml - American Meteorological Society, http://www.ametsoc.org/policy/climatechangeresearch_2003.html <http://www.ametsoc.org/policy/jointacademies.html> - The Academies of Science of Brazil, Canada, China, France, German, India, Italy, Japan, Russia, UK and US (joint statement) <http://nationalacademies.org/onpi/06072005.pdf> – The Academies of Science of Australia, Belgium, Brazil, Canada, Caribbean states, China, France, Germany, India, Indonesia, Ireland, Italy, Malaysia, New Zealand, Sweden, and UK (joint statement) <http://www.royalsociety.org/displaypagedoc.asp?id=13619> – among others.

Part of the answer is that different things that humans do have different effects on the climate. The term the climate scientists use is a “forcing” - defined as an effect from outside a system that pushes it in one direction or another. Human activities create both heating (positive) and cooling (negative) forcings on the climate. Greenhouse gases are a positive forcing. As an example of a negative forcing, consider what happens when a forest is cut down. The forest is dark and therefore absorbs sunlight - and replacing it with a much lighter-colored field of crops. That would tend to cool the planet.

This is the chart from the TAR that shows the sizes of the effects⁶.

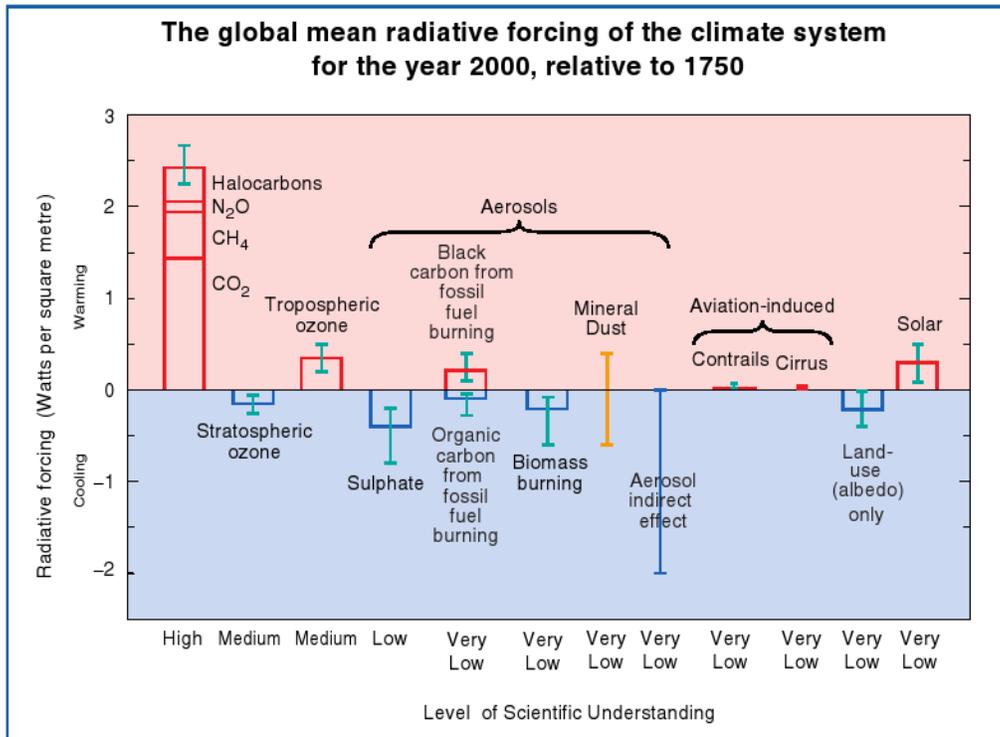


Fig 2 – Chart from the TAR showing climate forcings

(Greenhouse gases are shown at the left, while the Land-use bar is second from the right.) There is a significant negative forcing from sulphate aerosols, sulphur dust mostly emitted from burning coal, which acts to block sunlight and keep it from reaching the surface. In addition, it's believed that the sulphur aerosols also can seed the formation of clouds, which reflect sunlight back into space and therefore lead to an additional cooling. It's important to realize, however, that while aerosols last for weeks in the atmosphere, CO₂ increases persist for centuries.

All told, it appears that what went on during the 20th century is that there was for a long time essentially a rough balance between the human-caused positive and negative forcings. This period ended because (a) CO₂ is long lived, levels grew more rapidly than those of the aerosols, and (b) during the 1970s efforts to

5 If you burn the forest, you'll raise the CO₂ level in the atmosphere, which is a positive forcing. What is being considered here is just the change in the reflectivity (albedo) of the planet.

6 There is an improved chart in the AR4, on page 16.

reduce acid rain had actually reduced sulphates.

Nature has forcings too: the sun changes intensity a little bit over the years. Plus, there are eruptions of volcanoes, which spew dust into the atmosphere and thereby block sunlight.

Figure 3, taken from the TAR, illustrates the point:

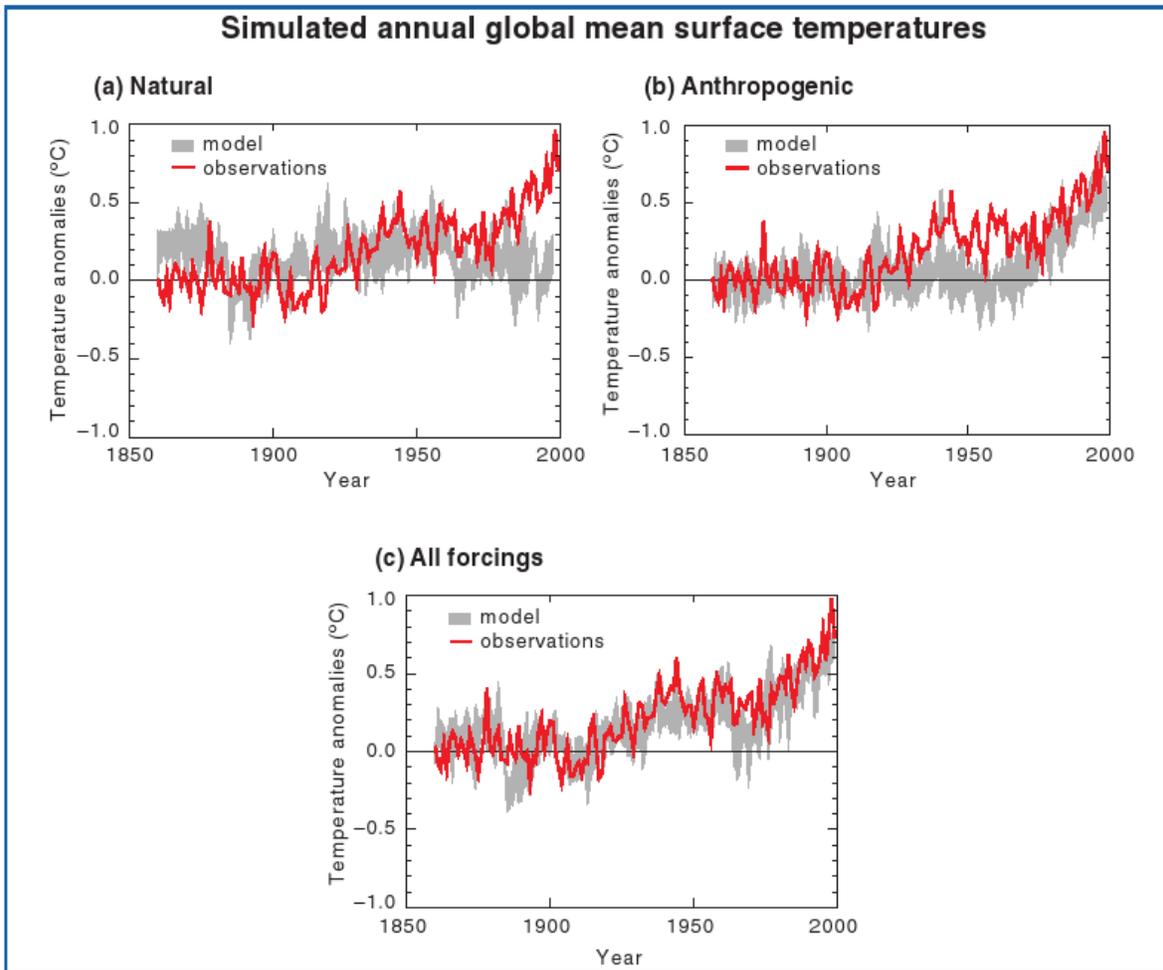


Figure 3 a, b, c – Climate Model Outputs from the TAR

In all three of these graphs, the red line is the observed global temperature, while the gray band represents a range of estimates from a climate model. The first graph shows an attempt to match the observed temperature data with just the natural forcings. The fit is not very good, but notice that the model shows a bit of a natural warming in the early to mid part of the century. The second graph shows the same model run with just the human-induced forcings. Here, the gray band matches the strong temperature increase at the end of the century, but not any of the earlier variability. This is indicative of the point explained above – until the second half of the 20th century, the various human effects were more-or-less balancing out. When all the forcings, natural and human, are included as in graph (c), the model fits the data the best.

This discussion is not to imply that any particular faith should be put in this computer model, or that any

of the details here are important. There's a much more limited point: the non-existence of a temperature rise (and a slight cooling) the middle of the century isn't unexplained, and doesn't indicate that that “something doesn't add up”.

It's likely that some of the warming in the 20th century was natural. Presumably, the reason that the unnamed “environmental alarmists” don't talk about the warming in the first half of the 20th century it is that the scientists aren't claiming it's relevant.

The most perplexing part of discussion of this “myth”, however, is actually the graph. Look again at Figure 1, shown above. It purports to show “Temperatures over the last 4,000 years”. The question is, temperatures of what? Given the way in which the graph is used in the discussion, it's clear that the lay reader is supposed to come away with the impression that this is some sort of average surface temperature of the earth. However, the extremely cold range on the vertical axis, 45 to -30 Celsius⁷, indicates that something else is going on. The bibliography states that the data was supplied by Richard B. Alley, following his analysis of central Greenland ice cores, but no specific paper is cited. Possibly these represent some sort of reconstructed temperature over some part of Greenland.

Given that Figure 1 is evidently supposed to be representative of the climate as a whole, it's odd that no mention is made of the fact that it shows a distinct *cooling* during the 20th century. In fact, it doesn't show a “Little Ice Age” either – the longest extended period of high temperatures during the 4,000 year period was from about 1200-1900.

The graph in Figure 1 directly contradicts both what was said in Myth #1 and in the very paragraph it's supposed to be supporting.

What does the IPCC have to say about this subject? The TAR showed these two graphs for the history of the mean temperature of the earth's surface.

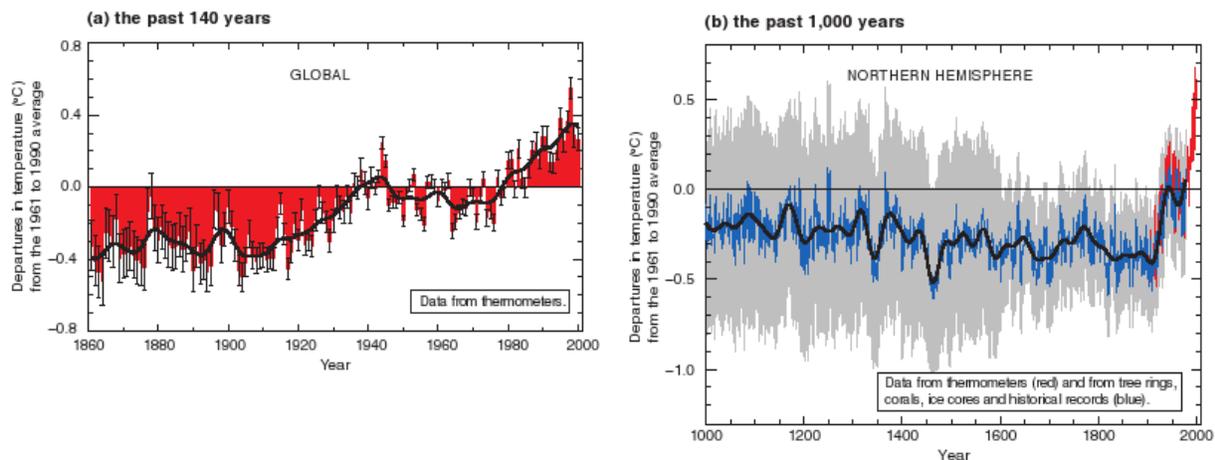


Figure 4 a, b – Surface temperatures of the earth (from the IPCC TAR)

Figure 4a shows the records of the last 150 years, taken from actual historical readings of thermometers. The second was a reconstruction based on “temperature proxies”, tree rings, corals, ice cores and the like. Indeed, it does show a “Little Ice Age” cooling from about 1300-1900, interrupted by

⁷ It appears to be Celsius. The vertical axis is actually labeled “Temperature (C ¹/₄)”.

a sudden upturn beginning at about 1900. It was deemed the “hockey stick” and was widely discussed in the popular press.

Producing Figure 4a is not entirely trivial, but it's relatively uncontroversial, at least nowadays⁸. The issues involved in making the second graph are far more complex, and interestingly, the hockey stick was subject to a sustained challenge from statisticians outside of climate science⁹. Full discussion of this story is beyond the scope of this document, but suffice it to say that the most authoritative recent look at the subject by the National Research Council¹⁰ confirms that the graph is more or less this shape, though the handle of the stick may not be as straight as shown and the maximum around year 1000 may be somewhat higher. At any rate, similar graphs appear in the AR4.

It is odd that the “hockey stick” chart is neither displayed nor mentioned, especially given its prominence in climate discussions. The graph that is presented in its stead is unexplained, is misleading at best, and actually contradicts the points it's trying to illustrate. No work has demonstrated that the recent temperature rise is normal or usual - “not a big deal”. The vast majority of scientists believe the reverse is true.

One final point about this “myth”: this discussion reinforces a common misconception among the public and journalists - that the greenhouse effect was a theory put forth in order to explain observed 20th century warming. Actually, the history is that global warming was a *prediction of future warming* that gained currency in the late 1970s and early 1980s. In 1979, the National Research Council, a branch of the National Academy of Sciences, put out a report estimating the effects of a doubling of atmospheric CO₂¹¹. It is important to recall that this was at the end a few decades of declining global temperatures, and was long before the issue of climate became politicized. Based on the science as it was at that time, the report concluded that “... the more realistic of the modeling efforts predict a global surface warming of between 2C and 3.5C, with greater increases at higher latitudes. ... It is significant, however, that none of the model calculations predicts negligible warming.” This conclusion is essentially unchanged and significantly strengthened by nearly 30 years of further research.

It wasn't until the mid to late 1990s that most climate scientists agreed that the warming actually being seen was due to human effects. In the 1980s most climate scientists still believed that the observed climate changes could possibly be explained by natural causes –though there were a few exceptions¹². In 1990, in the First Assessment Report, the IPCC reported "The size of this warming is broadly consistent with prediction of climate models, but it is also of the same magnitude as natural climate variability. Thus the observed increase could be largely due to this natural variability; alternatively this variability and other human factors could have offset a still larger human-induced greenhouse warming. The

8 For several years, climate change deniers often pointed out certain discrepancies between the temperature readings on earth-based thermometers and those made in balloons and satellites. Further research resolved these in favor of the earth-based measurements, and that has persuaded at least some of the deniers that climate change is real. (See here for an example: <http://www.reason.com/news/show/34079.html>) One will, however, sometimes see the older, mistaken data quoted by deniers (e.g. <http://boortz.com/nuze/200702/02022007.html> fourth bullet from the bottom).

9 McIntyre and McKittrick, *Geophysical Research Letters*, vol. 32 [12 Feb 2005]. See also McIntyre's blog, <http://www.climateaudit.org/>

10 See “Surface Temperature Reconstructions for the Last 2000 Years”, National Academies Press, 2006. <http://books.nap.edu/catalog/11676.html>

11 Charney *et al*, *Carbon Dioxide and Climate, A Scientific Assessment*. National Academy of Sciences, Washington, DC, 1979. http://www.atmos.ucla.edu/~brianpm/download/charney_report.pdf

12 NASA Climate Scientist James Hansen was one. In the January/February 2007 issue of the *Boston Review*, MIT Meteorologist Kerry Emanuel writes that “most scientists were deeply skeptical of Hansen's claims” before Congress that the then-recent warmth had clearly exhibited a human origin. <http://bostonreview.net/BR32.1/emanuel.html>

unequivocal detection of the enhanced greenhouse effect is not likely for a decade or more." This language stands in stark contrast to that of the AR4, quoted above.

One reason scientists have been persuaded of the theory of human-caused global warming is that the theory made predictions that the climate was going to warm, and it did.

MYTH #3: There will be storms, flooded coasts, and huge disruptions in climate!

TRUTH: Probably not.

Schoolchildren I've interviewed were convinced that America is "dying" in a sea of pollution and "cities will soon be under water!" Lawyers from the Natural Resources Defense Council (another environmental group with more lawyers than scientists) warn that "sea levels will rise, flooding coastal areas. Heat waves will be more frequent and more intense. Droughts and wildfires will occur more often."

Wow.

But many scientists laugh at the panic.

Dr. John Christy, professor of Atmospheric Science at the University of Alabama at Huntsville says: "I remember as a college student at the first Earth Day being told it was a certainty that by the year 2000, the world would be starving and out of energy. Such doomsday prophecies grabbed headlines, but have proven to be completely false. Similar pronouncements today about catastrophes due to human-induced climate change sound all too familiar and all too exaggerated to me as someone who actually produces and analyzes climate information."

But the media like the exaggerated claims.

The Washington Post reported "The End Is Near!" because of melting ice caps and glaciers.

But Dr. Patrick Michaels, author of the Association of American Geographers' 2003 Climate Paper of the Year, points out that melting Arctic ice won't raise sea levels any more than the melting ice in your drink makes your glass overflow. "The Arctic ice cap is just floating ice. . . if it melted . . . it's not a land mass adding to water."

Much of the discussion in this section appears to be a criticism of the press. It is certainly true that, as with many issues, media coverage often does not give a good picture of the state of scientific knowledge. It is quite frequent to see quotations of the high end of range of scientific estimates given in press reports and in statements by activist groups, without a clear explanation of the uncertainties or mention of the less-frightening low estimates.

But to review this discussion we need to take these points one at a time.

First: the National Resources Defense Council (NRDC) is admittedly an activist group, and makes no claim to participation in research¹³. The appropriate question therefore is whether they are correctly representing the scientific consensus. In this regard, it is instructive to compare the NRDC's statements

13 Full disclosure: I am a supporting member of NRDC.

to those of the scientific bodies. As mentioned above, the National Academies of Science of the G8 industrialized countries, plus Brazil, China, and India put out a joint statement on Climate Change in June 2005¹⁴. In it they declared “Increasing temperatures are likely to increase the frequency and severity of weather events such as heat waves and heavy rainfall. Increasing temperatures could lead to large-scale effects such as melting of large ice sheets (with major impacts on low-lying regions throughout the world). The IPCC estimates that the combined effects of ice melting and sea water expansion from ocean warming are projected to cause the global mean sea-level to rise by between 0.1 and 0.9 metres between 1990 and 2100. In Bangladesh alone, a 0.5 metre sea-level rise would place about 6 million people at risk from flooding.”

The NRDC synopsis accurately represents the position of the scientists.

Next, is it fair to say that “many scientists laugh at the panic”? The scientists quoted in this section are all, to a person, so-called “climate skeptics”. It is true that there are *some* scientists who stand outside the consensus on climate change, and believe either that the climate is not warming or that it won't warm very much more. But to give a sense of the relative size of the group, there are about 100 skeptics listed on the Wikipedia page listing such groups and individuals¹⁵ - most non-scientific. All of the people quoted in this section are listed (and so is John Stossel). In contrast, there were hundreds of authors of the IPCC report. The contrarian view is essentially a fringe position among scientists. The usual reportorial mistake is to “balance” a contrarian with a believer in the consensus.

The extreme minority view among scientists is presented here as though it were the only one.

Many popular discussions that I have seen make it reasonably clear that melting floating ice doesn't raise the sea level. How well it penetrates the popular consciousness is of course an interesting question. Obviously, scientists working on the climate are well aware of this elementary fact.

The Washington Post article¹⁶ referred to discusses the effect of global warming on tourism, and the contribution tourism makes to greenhouse gas emission. It doesn't mention melting icecaps at all, only melting glaciers, and those only in the context of their becoming unsuitable tourist destinations. It does discuss rising sea levels, but makes no attempt to explain them, simply citing the IPCC estimates – the high end only, unfortunately. The title “The End Is Near” refers to the effect of warming on pleasant tourist spots, not some other global catastrophe.

It's important to note that even if no polar ice melts, there is significant sea level rise forecast just from the warming of the oceans in the lower latitudes. Like most substances, water expands as its temperature is raised. From this effect alone several inches to more than a foot of sea-level rise are predicted before 2100.

Though the Washington Post article mentions mostly worst case scenarios, the discussion here seriously misrepresents what it says. Furthermore, as the IPCC reports discuss, scientists have concluded that further sea-level rise is inevitable.

14 Joint science academies' statement: Global response to climate change – accessible here:

<http://www.royalsoc.ac.uk/displaypagedoc.asp?id=20742>

15 http://en.wikipedia.org/wiki/Category:Global_warming_skeptics There were 101 entries as of 2/12/2007. Penn and Teller were listed twice. There is also a Wikipedia page specifically for scientist climate skeptics, with 22 entries.

http://en.wikipedia.org/wiki/List_of_scientists_opposing_global_warming_consensus

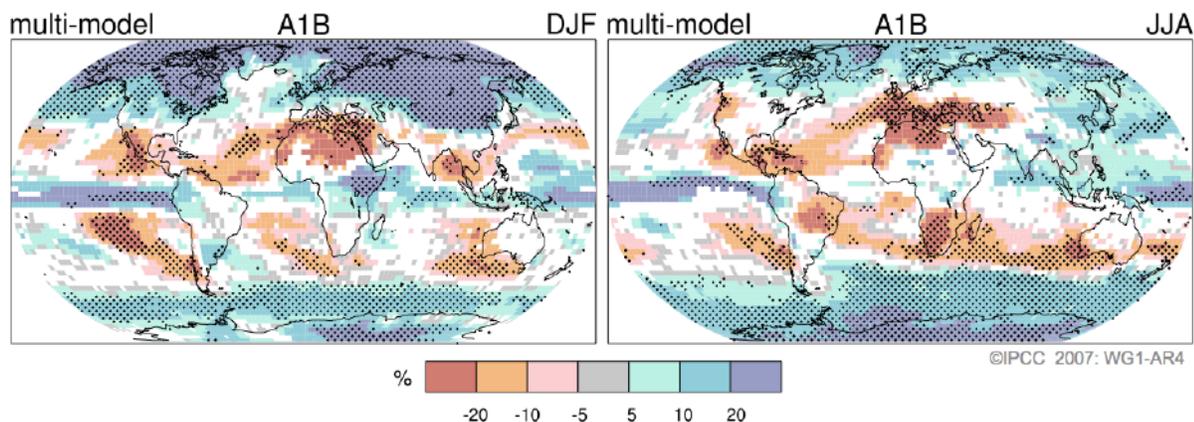
16 No reference is given, but this appears to refer to Mike Tidwell, “The End Is Near”, *Washington Post*, Sept 9, 2001 p A1

Of late, melting glaciers have become the issue. MSNBC and the BBC ran stories on the coming calamity from Greenland's melting glaciers. Unlike Arctic ice, say the alarmists, those melting glaciers *will* raise sea levels around the globe.

But only Greenland's southern glaciers are melting. The northern ones are not. And in October 2005, Norwegian, Russian, and American scientists issued a report that said Greenland's ice was thickening, not melting.

Obviously, when looking into sea level rise, the scientists have always focused on the melting of land-bound ice, since indeed it is the only kind to raise sea level. Unfortunately, the news here is not good. Recently, it was discovered that the ice in Greenland is sliding toward the sea about twice as fast as previously thought¹⁷. Contrary to earlier expectation, water from melting glaciers on Greenland doesn't merely flow off the top, it actually penetrates all the way down to the bottom of the ice, lubricating the sliding of the glacier off the rocks below. This may mean that the disintegration of the Greenland ice may happen more quickly than previously forecast. The AR4 considered this possibility sufficiently serious that it took out the TAR's previous estimate of melting dynamics, and stated that it was no longer possible to give a reasonable upper limit on the estimates of sea-level rise.

Climate effects are often not so simple to interpret as it may appear. It is true that in the north of Greenland the glaciers are growing. This is actually a *prediction* of the climate models. As the temperature warms, the air over northern Greenland contains more moisture, and therefore there's an increase in snow. Here, to illustrate, is a diagram in the AR4 that shows the prediction for precipitation of a climate model for the period 2090-2099 (the left diagram is for the winter months, the right is the summer). As you can see, Greenland is expected to see an increase in precipitation, especially in the North.



Unfortunately, of all the places in the world, the Arctic region is the area predicted to warm the most – more than twice as much as the globe's average warming. This is easy to understand – as the temperature goes up, bright-colored, reflective ice will be replaced by dark-colored open ocean. The ocean absorbs more sunlight, and the temperature mounts. The best current prediction is that by the middle of this century or thereabouts (depending partially on how much greenhouse gas emission is curtailed) the Arctic Ocean will be free of ice in the summer. As the temperature increases, the ice on the north of Greenland is expected eventually to melt as well.

17 Rignot and Kanagaratnam, *Science* **311**, 5763, 986 – 990 (17 February 2006)
<http://www.sciencemag.org/cgi/content/abstract/311/5763/986>

The observed thickening of the ice in the north of Greenland can actually strengthen confidence in the climate models. It is not a reason to doubt that global warming is happening, or to believe that it is not dangerous.

It is unfortunate that one will frequently see a factoid from climate science pulled out of context in order to discredit predictions made by scientific analysis. Like the ice in Greenland, the thickness of the ice in parts of Antarctica is thickening – and the authors of the studies showing this found their research misrepresented in order to claim that it cast doubt on global warming. One put out a press release decrying the misuse of his work¹⁸, while another felt obligated to write a NY Times Op-Ed to remove himself explicitly from the list of climate change skeptics¹⁹.

A scientific approach to understanding climate requires examining all the observed phenomena and seeing how they fit together to form a complete picture – cooling in some spots or thickening of glaciers somewhere does not imply that the planet is not warming or that sea levels will not rise.

Lastly, it's important to note one depressing point in all of the analysis - including the TAR and AR4 - the myopic focus on the current century. Time will not end in the year 2100, and Greenland will continue to melt for long after our great grandchildren have ushered in the next century

If it takes 250 years rather than 100 to raise the sea level 2 meters, it seems rather cold comfort.

Most scary claims about heat waves and droughts are based on computer models that purport to predict future climates. But computer models are lousy at predicting climate because water vapor and cloud effects cause changes that computers fail to predict. In the mid-1970s, computer models told us we should prepare for global *cooling*.

Scientists tell reporters that computer models should "be viewed with great skepticism."

Well, why *aren't* they?

Without a specific reference, it's not possible to attach a meaning to what the scientist was telling the reporter. It is certainly true that all theoretical explanations, computer based or otherwise, have to be verified by matching model outputs onto observation. Every prediction depends on a model, and any model of a system as complex as the earth's climate will depend on making approximations. Accordingly, it's important to understand the difference between detailed predictions and general ones. A climate model may be completely correct in its forecast of the average temperature of the earth, but it might get the precipitation over Australia quite wrong.

It is a task for research to validate the successes and shortcomings of models. Every summary work since the 1979 NRC report mentioned above has found the broad picture, if not the details, painted by the climate models compelling. The models are known to get some of the details of the climate correct, such as the planet's cooling in response to eruptions of volcanoes²⁰. They've also been broadly correct in

18 *Missouri University Professor Refutes National Television Ads Downplaying Global Warming - Engineering Professor Curt Davis says TV Spots are Misrepresenting His Research*, Missouri University press release, May 19, 2006
<https://cf.iats.missouri.edu/news/NewsBureauSingleNews.cfm?newsid=9842>

19 *Cold, Hard Facts*, NY Times, Peter Doran, July 27, 2006. <http://www.nytimes.com/2006/07/27/opinion/27doran.html>

forecasting *in advance* the amount of warming of the last 20 years¹.

While it is a good idea to treat the models with skepticism, it's a bad idea to ignore them completely.

Regarding the 1970s predictions of global cooling: this is quite commonly brought up, but almost always the wrong lessons are drawn from it.

The predictions of global cooling in the 1970s were not based on computer models. It has long been known that the ice ages are caused by astronomical effects, as the orientation of the earth relative to the sun changes over thousands of years. The earth is currently in a warm cycle, and eventually, had it been left to its own devices, our pleasant climate would have come to an end with another ice age. The concern being expressed in the 1970s was that the cooling then being observed was possibly the beginning part of that pattern. To the extent that humans were involved in it at all, the question was whether the aerosol effects discussed above could be making the situation worse. The greenhouse properties of CO₂ were also appreciated, but the sizes of the effects had not yet been well estimated. The state of science was in flux, and no certainty existed. A National Academy of Sciences Report²² from 1975 (just four years before the report quoted above) concluded "The climates of the earth have always been changing, and they will doubtless continue to do so in the future. How large these future changes will be, and where and how rapidly they will occur, we do not know." No such doubt exists today.

In the 1970s, scientists were not claiming to have a good understanding of the climate. Any tentative predictions of cooling made by some scientists at that time should not be taken to mean that scientific consensus is fickle and that in 30 more years science will conclude that human activity is unimportant or reduces temperature.

The fundamentalist doom mongers also ignore scientists who say the effects of global warming may be benign. Harvard astrophysicist Sallie Baliunas says added CO₂ in the atmosphere may actually benefit the world because more CO₂ *helps* plants grow. Warmer winters would give farmers a longer harvest season, and might end the droughts in the Sahara desert.

Why don't we hear about this part of the global warming argument?

"It's the money!" says Dr. Baliunas. "Twenty-five billion dollars in government funding has been spent since 1990 to research global warming. If scientists and researchers were coming out releasing reports that global warming has little to do with man, and most to do with just how the planet works, there wouldn't be as much money to study it."

First, it is worth noting that Baliunas is an astrophysicist, and has no particular expertise on plant biology in general or food crops in particular. There has in fact been some real research into whether increased CO₂ improves the growth of crops, and the results are thus far are not encouraging²³. It appears that any benefits the plants will receive from increased CO₂ will be offset by increased temperature and decreased

20 A nice article for a lay audience is *The physics of climate modeling*, Gavin A. Schmidt, *Physics Today*, **60** (Jan 2007) http://www.physicstoday.org/vol-60/iss-1/72_1.html

21 See James Hansen's discussion of his 1988 testimony and its subsequent distortions here: http://www.columbia.edu/~jeh1/hansen_re-crichton.pdf

22 *Understanding Climate Change: A Program for Action*. United States Committee for the Global Atmospheric Research Program. National Academy of Sciences, Washington, DC 1975 ISBN 0-309-02323-8.

23 Long *et al*, *Science* **312**, 5782, 1918 – 1921 (30 June 2006)

soil moisture, both of which restrict plant growth.

There certainly are regions where increased rainfall will improve the growing season. Canada appears to be a likely beneficiary²⁴ and possibly parts of the US as well. As can be seen from the chart above, the future for farming in the Sahara doesn't look bright.

Casting aspersions on the motives of scientists is not particularly persuasive. The arguments scientists make have to stand or fall on their own validity; trying to assess people's reasons for saying things in the end yields little more than *ad hominem* attacks.

MYTH #4: Signing the Kyoto Treaty would stop the warning.

TRUTH: Hardly.

In 1997, the United Nations met in Kyoto, Japan, and asked the developed nations of the world to cut CO2 emission to below 1990 levels.

And even advocates of Kyoto admit that if all the nations signed the Kyoto agreement and obeyed it, global temperatures would still increase. The difference by 2050 would be less than a tenth of a degree! The fuss over Kyoto is so absurd. Even if Kyoto would have an impact, do you think all the signers are going to honor what they signed? China is predicted to out-emit us in five to ten years. India will soon follow. What incentive do they have to stop burning fossil fuels? Get the shovel.

It is true that no one should regard the Kyoto Protocol²⁵ as a panacea. It is also true that even the signatory nations are not doing what they promised. Kyoto is, in the end, the result of a political negotiation among states, and as such is a compromise. The position of the supporters, who generally acknowledge the agreement's limits, is that it is a reasonable first step. Before greenhouse gas emissions can be cut, we at least have to stop emissions from growing.

It is true that if the world implements Kyoto and then nothing else, the difference in temperature in 2050 will be small. But there are two points that must be considered: First, Kyoto was never intended as more than the first in a series of agreements. It expires in 2012, and it was always intended that there would be a follow-on agreement that would include China and India. Second: 2050 is actually quite close. As stated above, CO2 accumulates in the atmosphere, and the changes it causes take decades to become evident. Therefore, a .1 degree improvement in 2050 might be .3 degree in 2100, and more later.

What is interesting is that the mechanism established by the Protocol is quite market-oriented – it establishes a trading regime in which the right to emit CO2 can be traded.

Kyoto is far from perfect, but if nothing is done, climate change will affect all of us.

The fundamentalist Greens imply if we just conserved energy, and switched from fossil fuels to wind and solar power (they rarely mention nuclear power – the most practical alternative), we would live in a non-global-warming fairyland of happiness. But their proposals are hopelessly impractical. Building solar panels burns energy, as does

24 Amusingly, the Washington Post article referenced above actually discusses the improvement warming could have on Canada's tourism.

25 <http://unfccc.int/resource/docs/convkp/kpeng.html>

trucking them and installing them-then taking them down again to repair them.

To think that solar energy could stop the predicted temperature increase is absurd. EPCOT, a theme park with a solar energy ride, consumes about 395,000 kilowatt-hours per day. The Department of Energy says you'd need around a thousand acres of solar panels to generate that much electricity. EPCOT itself sits on only three hundred acres, so you'd have to triple the size of the park just to operate it!

Windmills are no panacea either. They are giant bird-killing Cuisinarts, and we'd have to build lots of them to produce significant energy.

Everyone agrees that to seriously combat greenhouse gas emission, current technologies are insufficient. It is reasonable to expect that if a market-based approach such as the one established by the Kyoto Protocol is ever really implemented, there will be a great deal of money for research into carbon-free energy generation. There may even be resources to solve the security and waste disposal problems that still bedevil nuclear power. One can reasonably expect the problems with solar and wind power to be mitigated with improved technology – as is happening already in any case.

One note about windmills and birds – the problems appear to have been overestimated. Recently, the Audubon Society reviewed the Cape Wind project discussed below, and found that it is safe for birds²⁶.

A combination of actions is needed to combat greenhouse gas emission; solar power alone is not likely to be sufficient. The market can make this choice under the right conditions.

In 2000, a group called Cape Wind proposed to erect 130 windmills in Nantucket Sound, off the coast of Massachusetts. I think the drawings make them look interesting, but – horrors! – they would be visible from the Kennedy family vacation compound in Hyannis Port. Robert Kennedy Jr., high poo-bah of the environmental zealotry movement, is leading a campaign to ban the windmills from Nantucket Sound. The group he leads, the Waterkeeper Alliance, says it supports wind farms – but Kennedy fights the one near his home. What a hypocrite.

Robert Kennedy was also criticized by environmentalists for his stand. For example, the National Resources Defense Council was a supporter of the project²⁷. Interestingly, there was substantial Republican opposition. The state's former governor Mitt Romney, was opposed, as was his Lt. Governor Kerry Healey, the GOP candidate for governor in 2006. The current governor, Democrat Deval Patrick, supports the project.

Ninety percent of the world's energy comes from fossil fuels. Kyoto would decimate just about every Third World country's economy, and deliver a catastrophic blow to our own. So what *should* we do about the threat of global warming?

First, calm down.

Second, if the world is warming, it is much more reasonable to adjust to it, rather than try to stop it: If sea levels rise, we can build dykes

²⁶ *Audubon review supports wind farm - Threat to birds is less than feared, group finds* Boston Globe, March 29, 2006
http://www.boston.com/news/local/massachusetts/articles/2006/03/29/audubon_review_supports_wind_farm/

²⁷ An initial position paper may be found here: <http://www.nrdc.org/media/docs/050225.pdf>

and move back from the coasts. It worked for Holland. Farmers can plant different crops or move north.

Russian farmers farmed northern Siberia for centuries. When the area became cold and desolate, the farmers moved south.

Far better to keep studying global warming, let the science develop, and adjust to it if it happens, rather than wreck life as we know it by trying to stop it.

There are two sides to the argument, only one of which is mentioned here. There will doubtless be costs to reducing greenhouse gas emissions. If the reductions are made in a rational, market-oriented manner, resources will be spent only on the most effective technologies. It is doubtless true that it will not be cheap - but there's no reason to assume that merely by starting to do these things, we will "wreck life as we know it".

It may be true that the Russian farmers adapted well to climate changes – again no reference is given so it's difficult to assess. However, there are lots of examples in history of civilizations that failed to do so. It is believed that the collapse of the Mayan society (which happened before the Spaniards arrived) may have been brought about by reduced rainfall. Environmental depletion and climate change may have played a role in the decline of the population of Easter Island.

It's important to consider the costs of what is being advocated here. Moving back from the coasts, in particular, is likely to be quite pricey, since it could eventually mean abandoning some of the world's most expensive real estate. Dykes are not going to be cheap, and as the residents of New Orleans learned in 2005, they can play havoc if they fail during a storm. Huge, populated areas may be unsalvageable. It's not unreasonable to speculate that there will be civil conflict or even war brought on by migrations – certainly massive population shifts have had such effects in the past. The worst part it is that no one really knows how quickly adaptation will be needed. As mentioned above, knowledge about sea level rise is quite uncertain, and not encouraging.

Clearly, there are unknowns in the science of global warming, and many more in the economics. Yet a recent study, the Stern Review²⁸, undertaken by the U.K. Treasury, concluded that "if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. In contrast, the costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of global GDP each year."

Is the Stern Report the last word on the economics of global warming? No – that study is very much still in its infancy²⁹. But it's clear that the numbers on the cost side of the ledger should not be ignored.

Doing nothing about global warming will actually be quite expensive.

Unfortunately, there will always be a Sallie Baliunas who will stand outside any consensus. Studying shouldn't come at the expense of acting on what we do know. The vast majority of researchers agree that

28 http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

29 The Stern Report has been criticized for its use of a very low discount rate for future costs from environmental damage. See e.g. William Nordhaus, "The Stern Review on the Economics of Climate Change" <http://nordhaus.econ.yale.edu/SternReviewD2.pdf>. Amusingly, economists use computer models that include both the economy and the environment, including their interactions. Presumably, those should be taken with great skepticism.

the science is actually fairly well developed.

Letting science develop is naturally a good idea, but there are things we already know. The voice of the scientific community is represented in the IPCC reports – we ignore what they say at our peril.

Sorry to go on so long about global warming. I got carried away because the global warming myth-makers are so sanctimonious and insistent. On to simpler myths.

Unfortunately, there's a common myth prevalent on the American political right that there's some sort of coherent scientific anti-global warming argument out there, just struggling to get heard against the biases of the "liberal press". In fact, the reverse is actually closer to the truth. In a community of hundreds or thousands of qualified scientists, there are *maybe* a few tens – to be generous – who stand outside of the consensus. Aside from rejecting the mainstream view, these individuals don't in general agree with each other about scientific matters – they all propose different mechanisms to explain climate observations³⁰. The press features these outliers far more frequently than mainstream researchers - either to provide a false "balance" or simply because the author prefers to agree with them, as in this book.

The normal scientific process works. The reason that the skeptics are in such a distinct minority is not "media bias" or the political views of other researchers. Evidence for the skeptics' scientific positions is lacking, while there is abundant support for the mainstream position.

On to simpler myths.

30 For example, Patrick Michaels believes that greenhouse gases warm the planet, but in a "linear" manner; he claims that the positive feedbacks in the climate models (increased water vapor and melting arctic ice) have no effect. (He explains this point of view in a *Washington Times* commentary here: <http://washingtontimes.com/commentary/20031015-085235-5134r.htm>) Baliunas, in contrast, does not believe that CO₂ has warmed the planet at all, and that all observed climate changes are due to solar variability. See Baliunas and Soon, *Climate History and the Sun*, Marshall Institute, June 5, 2001 <http://www.marshall.org/pdf/materials/90.pdf>