

Climate Change: Insufficient Evidence for a Human Influence

Hearing before the Senate Committee on Commerce, Science, and Transportation

Testimony of Prof. S. Fred Singer

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Mr. Chairman, Ladies and Gentlemen,

My name is Fred Singer. I am Professor Emeritus of Environmental Sciences at the University of Virginia and the founder and president of The Science & Environmental Policy Project (SEPP) in Fairfax, Virginia, a non-partisan, non-profit research group of independent scientists. We work without salaries and are not beholden to anyone or any organization. SEPP does not solicit support from either government or industry but relies on contributions from individuals and foundations.

We hold a skeptical view on the climate science that forms the basis of the Summary of the latest (2001) IPCC report. We see no data or other evidence to back its findings; climate model exercises are NOT evidence. On the contrary, its three main pillars of evidence cited by the IPCC Summary are all without foundation – as I will try to demonstrate in my testimony.

Former Vice President Al Gore and others keep referring to scientific skeptics as a "tiny minority outside the mainstream." This position is hard to maintain when more than 17,000 US scientists have signed the Oregon Petition against the Kyoto Protocol because they see "no compelling evidence that humans are causing discernible climate change." More than 100 international climate specialists have signed the Leipzig Declaration.

Others try to discredit scientific skeptics by lumping them together with fringe political groups. Such *ad hominem* attacks are deplorable and have no place in a scientific debate. To counter such misrepresentations, I list here relevant qualifications.

Relevant Background

I hold a degree in electrical engineering from Ohio State and a Ph.D. in physics from Princeton University. For more than 40 years I have researched and published in atmospheric and space physics – most recently in 2004. Early in my career, I devised instruments to measure atmospheric parameters from satellites. I received a Special Commendation from President Eisenhower for pioneering design of instrumented satellites. In 1962, I established the U.S. Weather Satellite Service, served as its first director, and received a Gold Medal award from the Department of Commerce for this contribution.

In 1968, I organized the first AAAS symposium on global effects of environmental pollution and later published a volume with that title. In 1971, I proposed that human-related production of the greenhouse-gas methane would affect the climate system. This

was also the first publication to discuss an anthropogenic influence on stratospheric water vapor and ozone. In the late 1980s, I served as Chief Scientist of the Department of Transportation and also provided expert advice on climate issues to the White House.

THE IPCC “PILLARS” ARE WITHOUT FOUNDATION

I will present evidence from published peer-reviewed work to rectify some erroneous claims advanced by the Intergovernmental Panel on Climate Change (IPCC) Summary for Policymakers (SPM). Central to the findings of the IPCC third assessment report was this conclusion [1]:

“There is now new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.”

But, as we shall show, there is no such evidence. Nevertheless, this represents a significant strengthening of the analogous SPM conclusion issued by the IPCC in 1996:

“The balance of evidence suggests a discernible human influence on global climate.”

It is well known, however, that the SPM is a political document, produced by a handful of mainly government scientists. It is not based on any kind of “scientific consensus” and does not fairly summarize the IPCC report itself.

1. There Is NO Appreciable Climate Warming

Contrary to the conventional wisdom of the IPCC SPM and the predictions of computer models, the Earth’s climate has not warmed appreciably in the past quarter-century, and probably not since about 1940. The evidence for this is overwhelming:

- a) Satellite data show no appreciable warming of the global atmosphere since 1979. In fact, if one ignores the unusual El Nino year of 1998, one sees a cooling trend.
- b) Radiosonde data from balloons released regularly around the world confirm the satellite data in every respect. This fact has been confirmed in a detailed report of the National Research Council/National Academy of Sciences [2].
- c) The well-controlled and reliable thermometer record of surface temperatures for the continental United States shows no appreciable warming since about 1940, after corrections are applied. [See Figure 1]. The same is true for Western Europe. These results are in sharp contrast to the GLOBAL instrumental surface record, which shows substantial warming, mainly in NW Siberia and subpolar Alaska and Canada.
- d) But tree-ring records for Siberia and Alaska and published ice-core records that I have examined show NO warming since 1940. In fact, many show a cooling trend. I have not found ANY proxy data that show a recent warming trend [3].

Conclusion: The post-1980 global warming trend reported by surface thermometers is not credible. Our conclusion is that surface temperature observations are contaminated by local effects, such as urban heat islands and land-use changes, and from basic uncertainties in deriving sea-surface temperatures.

2. The 20th Century Is NOT The Warmest In The Past 1000 Years

The IPCC has used the widely touted “hockey-stick” graph (with its “unusual” temperature rise in the past 100 years) [see **Figure 2**] to suggest that the 20th century is the warmest in 1000 years -- presumably a human-induced warming. But a more complete analysis of proxy data clearly shows a Medieval Warm Period (around 1100 AD), followed by a colder period, termed “Little Ice Age” by climatologists. More important even, a detailed audit has shown that the underlying data for the Hockey-stick have been manhandled and subjected to arbitrary changes [4]. This is a serious matter, impinging on scientific ethics; it is currently under investigation.

3. Greenhouse climate models cannot explain observations

The third major IPCC claim is that climate models can reproduce accurately the global temperature record of the past century. It is claimed that natural forcings (solar, volcanic aerosols) cannot reproduce the record; neither can GH gases by themselves. But the combination of natural and anthropogenic forcings does fit the global mean temperature record of the 20th century – so the IPCC claims.

Three points can be raised here to show that the claimed agreement is nothing but an exercise in curve fitting with several adjustable parameters::

- a) The IPCC gives climate sensitivity (for a doubling of GH forcing) as 1.5 – 4.5 deg C – i.e., a range of 300 percent -- without stating the most likely value. (It could even be less than 1.5 C.) The claimed fit uses a selected value that happens to produce a fit.
- b) The IPCC manages to obtain a fit for the global mean by selecting parameters for each of the natural forcings and for GH gases and aerosols.. But it cannot fit the NH and SH separately, using the same parameters. Nor do the observed variations of temperature with altitude fit the ones obtained from theoretical greenhouse climate models [2].
- c) The IPCC ignores forcings that are poorly known but are judged to be more important in affecting climate than those included. Examples are the cosmic-ray forcing from variations in the solar wind or the indirect effects of certain aerosols on producing clouds. Logic tells us that if a fit can be obtained by using only the well-known forcings, while ignoring others that may be more important, then there is only a minute probability that the advertised fit has any validity.

Conclusion: We conclude that climate models are not validated by observations and should not be relied on to make climate-change predictions.

4. Regional Changes in Temperature, Precipitation, and Soil Moisture: Are They Credible?

The absence of a current global warming trend should serve to discredit any predictions from current climate models, including the extreme warming from the two models (Canadian and British) selected for the 2000 National Assessment of the Impacts of Climate Change on the United States (NACC.)

Furthermore, the two NACC models give conflicting predictions, most often for precipitation and soil moisture [5]. For example, the Dakotas lose 85% of their current average rainfall by 2100 in one model, while the other shows a 75% gain. Half of the 18 regions studied show such opposite results; several others show huge differences. [See **Figure 3**]

The soil moisture predictions also differ drastically. The Canadian model shows a drier Eastern US in summer, the UK Hadley model a wetter one.

Conclusion: We must conclude that regional forecasts from climate models are beyond the state of the art and are even less reliable than those for the global average. Since the NACC scenarios are based on such forecasts, the NACC projections are not credible.

5. Sea Level Rise: Controlled by Nature not Humans

The most widely feared and also most misunderstood consequence of a hypothetical greenhouse warming is an accelerated rise in sea levels. But several facts contradict this conventional view:

- a) Global average sea level has risen about 400 feet (120 meters) in the past 15,000 years, as a result of the end of the Ice Age. The initial rapid rise of about 200 cm (80 inches) per century gradually changed to a slower rise of 15–20 cm (6-8 in)/cy about 7500 years ago, once the large ice masses covering North America and North Europe had melted away. But the slow melting of the West Antarctic Ice Sheet continued and will continue, barring another ice age, until it has melted away in about 6000 years.
- b) This means that the world is stuck with a sea level rise of about 18 cm (7 in)/cy, just what was observed during the past century. And there is nothing we can do about it, any more than we can stop the ocean tides.
- c) Careful analysis shows that the warming of the early 1900s actually slowed this ongoing SL rise [6], likely because of increased ice accumulation in the Antarctic.

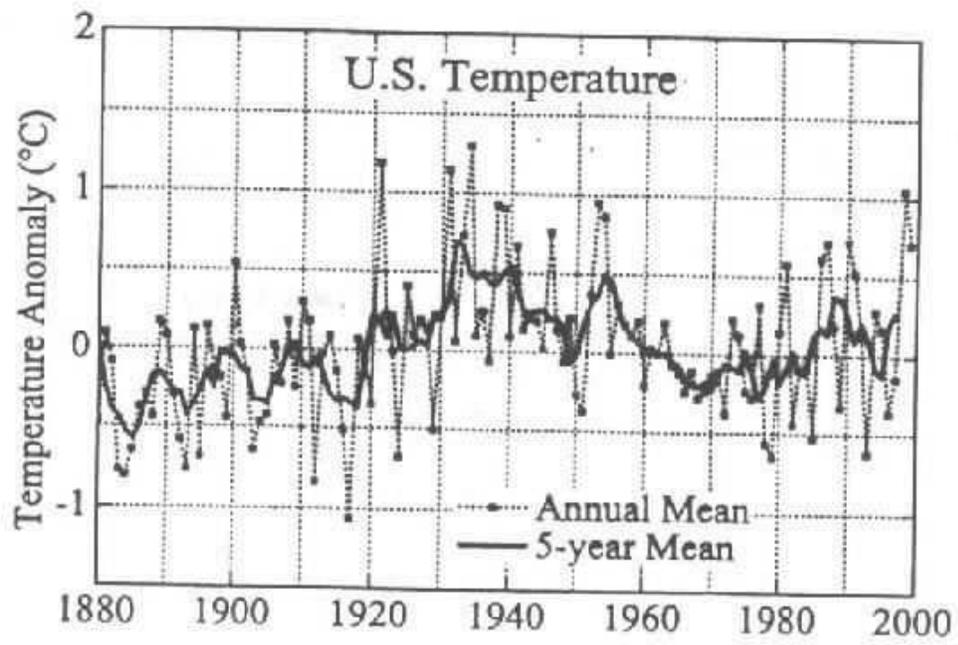
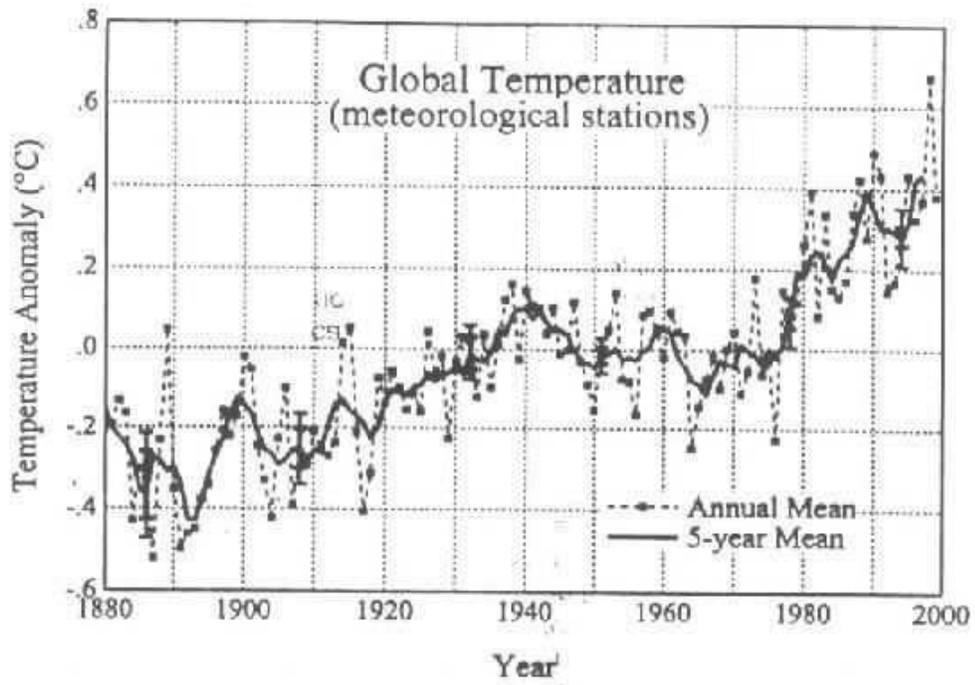
The bottom line: Currently available scientific evidence does not support any of the IPCC conclusions, including that the climate is currently warming. Studies of future impacts of climate change are merely exercises and deserve only a modest amount of effort and money; one should not shortchange the serious research required for atmospheric and ocean observations, and for developing better climate models.

The IPCC results should definitely NOT be used to justify irrational and unscientific energy and environmental policies, including the economically damaging Kyoto Protocol. These policy recommendations are especially appropriate during the coming presidential campaigns and debates. I respectfully request that an expanded exposition [7] be made part of my written record.

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References:

1. IPCC 2001. *Climate Change 2001: The Scientific Basis*. (Houghton J.T. et al, ed) Cambridge University Press, 892 pp.
2. National Research Council. "Reconciling Observations of Global Temperature Change." National Academy Press. Washington, DC. 2000; D.H. Douglass, B.D. Pearson, and S.F. Singer (2004; in press)
3. S.F. Singer. *Science* 301, 595 (2003)
4. S. McIntyre and R. McKittrick *Energy & Environment* 14 (No.6), 751-771 (2003)
5. R. Kerr. "Dueling Models: Future U.S. Climate Uncertain." *Science* 288, 2113 (2000); P.H. Stone. "Forecast Cloudy: The Limits of Global Climate Models." *Technology Review (MIT)*, Feb/March 1992. pp.32-40.
6. S.F. Singer. *Hot Talk, Cold Science: Global Warming's Unfinished Debate*. (The Independent Institute, Oakland, CA. 1999 (second edition, p. 18).
7. S.F. Singer. "Climate Policy—From Rio to Kyoto: A Political Issue for 2000—and Beyond" Hoover Institution Essay in Public Policy No. 102. Stanford, CA, 2000.



Note: The highest US temperatures occurred around 1935, followed by cooling. Source: NOAA/NCDC

Figures

Variations of the Earth's surface temperature for the past 1000 years

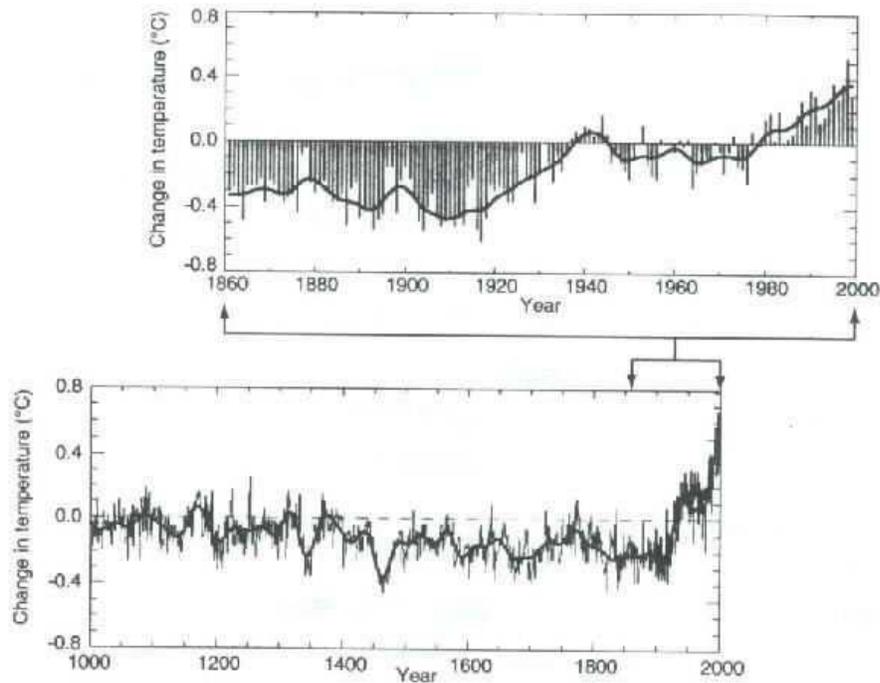


Figure 1: Global mean surface temperatures vary year by year and decade by decade. However, the warming during 20th Century has been atypical compared to the rest of the past 1,000 years. The rate and duration of the warming is likely to have been the largest of the period. The 1990s is likely to have been the warmest decade in the millennium in the Northern Hemisphere, and 1998 is likely to have been the warmest year.

“Hockey-stick” temperature graph (Mann, Bradley, and Hughes, *Geophysical Research Letters* 1999), used to back the claim that the 20th century was the warmest in 1000 years and that the 1990s were the warmest decade (as reproduced in the Summary for Policymakers of the IPCC-Third Assessment Report)

The graph is actually a composite of two records: temperatures from “proxy” data (tree rings, etc) superimposed on the global instrumental (thermometer) record of the past century.

Close examination reveals that the proxy record stops in 1980 and therefore does not independently support the post-1980 temperature increase suggested by the thermometer data. Thus there is no evidence for a substantial warming since 1980 (or even 1940)

Source: National Assessment of Climate Change Report. Note disagreements between the two model predictions.....

Percent Change in Predicted Rainfall — 1990 to 2090 — Two Climate Models

