

**EXAMPLES OF MISINFORMATION FROM GLOBAL WARMING DENIERS**

■ CLAIM: "there is no consensus, unanimous or otherwise, about long-term climate trends or what causes them...we are not in a position to confidently attribute past climate change to carbon dioxide or to forecast what the climate will be " (*Wall Street Journal*, June 11, 2001)

REALITY: 1078 climate scientists contributed directly to writing of the IPCC Scientific Assessment Report 2001 report (<http://www.ipcc.ch/>). Approximately half are American. Evidence for a warming trend is reviewed in great detail in the IPCC report. The IPCC consensus concluded:

- There was a global warming trend in the 20<sup>th</sup> century (certain)
- The 1990s were the hottest decade of the last millennium (90-99% certainty).
- The CO<sub>2</sub> level is higher now than in the past 420,000 years (certain) and higher than in the last 20 million years (66-90% certainty).
- Most of the warming over the past 50 years is attributable to human input of greenhouse gases (66-90% certainty) and this warming has contributed to sea-level rise (90-99% certainty).

A handful of “skeptical” scientists are given grossly disproportionate coverage in the US media, while the concerns of the overwhelming majority are marginalized (e.g., in the above quote):

“SKEPTIC”	FINANCIAL BACKING <sup>1</sup>	NOTES
Dr. S. Fred Singer (Formerly opposed CFC controls and wrongly argued that ozone depletion was not happening.)	ARCO, Exxon, Shell Oil, Sun Oil, Unocal	Widely quoted by <i>Wall Street Journal</i> and <i>Washington Post</i> . He has not had a single article accepted for any peer-reviewed scientific journal for over 15 yrs.
Prof. Patrick Michaels (U. Virginia and Cato Institute)	Western Fuels (\$63K) German Coal Mining Association (\$49K), Edison Electric Institute (\$15K), and Cyprus Minerals (\$440K)	His newsletter <i>World Climate Report</i> (funded by Western Fuels) is sent to journalists. His work is “a catalog of misrepresentation and misinterpretation” according to IPCC & NCAR scientist Prof. Tom Wigley
Dr. Robert Balling (ASU)	1991-95: British Coal Corporation (\$75K), German Coal Mining Association (\$80K), Kuwaiti Foundation for the Advancement of Science (\$48K).	Op Ed piece in <i>Wall Street Journal</i> said there was no problem with global warming. Kuwaiti Foundation funded Balling’s skeptic book on global warming.
Prof. Richard Lindzen (MIT)	Mostly has his own scientific reasons for “opposing” global warming. But 1991 trip to Senate hearings was paid for by Western Fuels. Also has received funding from OPEC.	Chosen as the scientist to brief Bush cabinet members on global warming. Has written opinion pieces for <i>Wall Street Journal</i> So far, his various negative feedback ideas on global warming have all been discredited in scientific journals. However, he pursues skepticism honorably through peer-reviewed journals.

<sup>1</sup>Source: Financial backing was investigated by former *Boston Globe* and *Washington Post* journalist Ross Gelbspan and is detailed in his book *The Heat is On*.

■ CLAIM: "[T]he atmosphere is not warming—nor has it warmed in the past 16 years, ever since precise global data have become available for the first time from weather satellites" (S. Fred Singer, letter to *New York Times*, Sept 9, 1995).

REALITY: Here the claim is that satellite data do not show the warming that surface weather stations do. Since 1979, Microwave Sounding Units (MSUs) on NOAA satellites have measured the intensity of upwelling microwave radiation from atmospheric oxygen. The intensity is proportional to the temperature of broad vertical layers of the atmosphere, as demonstrated by theory and direct comparisons with atmospheric temperatures from balloon measurements.

This claim of a mismatch originated in 1993 when a *Washington Post* reporter overstated his interpretation of a scientific paper he'd read (R. Rensberger, 1993, Blowing hot and cold on global warming, *Washington Post Weekly*, August 2-8). The idea of a satellite-surface mismatch continues to be repeated today by global warming deniers. At the time, University of Michigan geophysicist Prof. Henry Pollack responded with a letter (which the *Post* declined to publish) attempting to correct the error, "the two data sets are remarkably coherent, each showing departures from the average consistent with each other...the data are telling the same story about temperature fluctuations in the 1980s, and should build rather than undermine confidence in the ground-based temperature measured in the century preceding the satellite era". See Figure below:

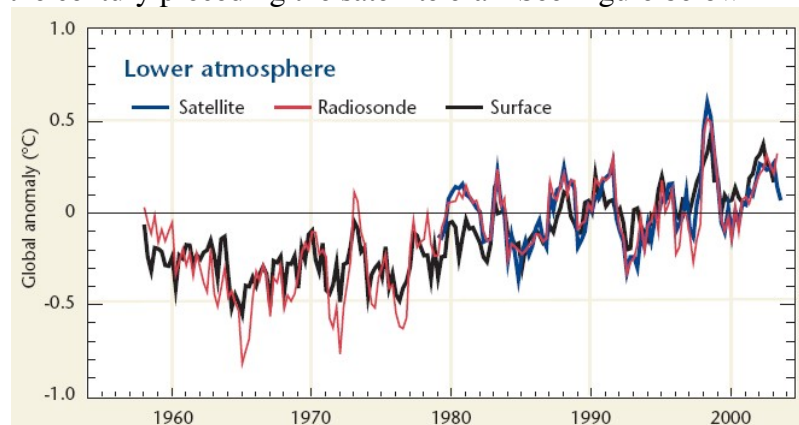


Figure (from Hadley Centre for Climate Prediction and Research report: *Climate change observations and predictions: Recent research on climate change science from the Hadley Centre*, December 2003).

The key scientific issues are:

- The satellite data from 1979-1995 would not likely indicate the 20<sup>th</sup> century trend because the period was too short subject to large sampling fluctuations, i.e., 1979 was a warm year, and the early 90s were cool due to Pinatubo. Consequently, such a record was unlikely to show an unambiguous upward trend until data for further years was added
- An important issue was data processing uncertainty –e.g., how you correct for orbital changes of the satellites and spatial coverage – which the National Academy of Sciences concluded exceeded the alleged discrepancy between surface and satellite

records (National Academy of Sciences (2000) *Reconciling Observations of Global Temperature Change*).

- Recent research shows an upward trend in the satellite data consistent with the surface station global warming trend:
  1. A correction for orbital decay of satellites found closer agreement with the surface station trend (Wentz and Schabel (1998) Effects of orbital decay on satellite-derived lower-tropospheric temperature trends *Nature* 394, 661 – 664
  2. According to Vinnikov & Grody (2003), the record through to 2003 shows an upward trend in tropospheric temperature of +0.22° to 0.26°C per 10 years, consistent with the global warming trend derived from surface meteorological stations, which is currently about +0.17/decade (Vinnikov, KY, & Grody, NC (2003) Global warming trend of mean tropospheric temperature observed by satellites, *Science*, 302, 269-272).

■ CLAIM: “The less than one-half degree of temperature rise, which is all that global warming enthusiasts can find, is probably part of the slow recovery from the Little Ice Age 1450-1850” (Dixy Lee Ray and Lou Guzzo, 1993)

REALITY: Any rebound from the European little ice age, which peaked in 1650-1750, would have been largely complete by the 20<sup>th</sup> century. Indeed, the natural long-term climate trend is to a colder climate towards the next glacial. The 20<sup>th</sup> century warming was  $0.6 \pm 0.2$  C (IPCC, 2001), which extensive study shows is most likely accounted for by anthropogenic greenhouse gases on the basis of physics as simulated by computer models, rather than natural variability.

■ CLAIM: Even if global warming occurs...

“necessary adjustments would be small relative to the adjustments that we make during the year to temperature differences where we reside” (economist, Julius Simon, *Scarcity or Abundance: A Debate on the Environment*, 1994, p.59).

“change into a lighter shirt” (economist Wilfred Beckman, Why worry about the weather? *Wall Street Journal Europe*, 25-26 August, 1995)

REALITY: The Pleistocene paleoclimate record shows that a relatively small global mean temperature change ( $\sim 5^\circ\text{C}$ ) characterizes the difference between having an ice age and an interglacial. Such relatively small global mean temperature changes cause very large changes in the distribution of the Earth’s biota and the regional climates over many parts of the planet. In the 21<sup>st</sup> century, the Earth has a 90% probability of warming up somewhere between 1.7 to 4.9°C (Wigley & Raper, *Science* 293, 451 (2001)).

The 21<sup>st</sup> century’s **rapidity** of warming is important and unprecedented. It leaves no time for biota to adapt. The trees of temperate regions and Alaska cannot put on a lighter shirt nor can the ecosystems that they live in. Simon’s and Beckman’s polemics ignore, for example:

- sea-level rise that directly endangers human population with storm surges, can ruin

agriculture in coastal regions, can ruin coastal wetlands, can salinize coastal aquifers, and can displace island nation peoples.

- direct dangers to human health with extreme weather events (e.g., 600 deaths on July 13, 1995 in Chicago due to hottest day in history; 34,000 deaths in western Europe, in the hottest summer of 2003) and vector-spread disease (e.g. malaria).

[a consequence of global heating of the lower troposphere is accelerated land-surface drying and more atmospheric water vapor (the dominant greenhouse gas). Accelerated drying increases the incidence and severity of droughts, whereas additional atmospheric water vapor increases the risk of heavy precipitation events]

- disappearance of species due to habitat loss, which diminishes the world forever for future generations
- in the worst case, a potential long-term catastrophe in altering the thermohaline circulation, which could threaten the climate of Europe, destabilize the world economy, and undermine international security (e.g., Pentagon-commissioned report, 2003; *Abrupt Climate Changes: Inevitable Surprises* by the National Academy of Sciences (2002).).

Overall, there should be (1) a moral obligation to children and grandchildren to leave a sustainable environment. (2) a moral obligation to prevent the destruction of the homes, environments, and livelihoods of various peoples around the world. Simon's and Beckman's "do-nothing" arguments callously disregard human welfare and future generations.

■ CLAIM: "I find it very hard to believe that the folks in the Pacific Islands won't adapt to a 30 cm sea level rise" (Dr. Patrick Michael (U. Virginia), quoted in the *Sydney Morning Herald*).

REALITY: The Tuvalu islanders, for example, have experienced high tide flooding in 2001 and 2004. Their land has been rendered useless for agriculture by salinization so that they are dependent on food imports. They cannot afford sea defenses or "adapt". It is only a matter of time before most of the low-lying islands disappear due to the time delay in the thermal expansion of the oceans. Such Pacific islanders will have to leave homelands they have occupied for thousands of years.

More generally: if there were a 1-meter increase in sea-level in the future, with the present world population, some consequences would be:

- People exposed to storm surges increases from 48 to 118 million
- 6% of the Netherlands would be under water
- 17.5% of Bangladesh would be under water (the most populous areas)
- 80% of the Marshall Islands (US) would be under water
- The Maldives would disappear under water
- 1% of Egypt that includes its best agricultural land would be submerged.

In the US, a 50-cm sea-level rise could inundate 8500-19000 sq. kms of dry land, expand the 100-year flood plain by more than 23,000 sq. kilometers, and eliminate as much as 50% of North America's coastal wetlands.

(Sources: (1) R. Watson, 1995. *Climate Change, Meeting Population, Environment and Resource Challenges: The Costs of Inaction*, Third Annual World Bank Conference on Effective Financing of Environmentally Sustainable Development, Washington DC; (2) *Testimony of Robert T. Watson (IPCC Chairman) before the US House of Representatives*, November 6, 1997)

■ **CLAIM: Global warming will be negligible because of the “iris effect” suggested by professor Richard Lindzen of the Massachusetts Institute of Technology.**

REALITY: Lindzen’s proposed negative climate feedback (in which it is supposed that tropical clouds adjust to allow more heat radiation to escape to space when the Earth gets warmer) has been discredited in specific tests against in situ and satellite data.

More generally, any feedbacks that exist in the real world are included in the empirical measures of climate sensitivity provided by the Pleistocene climate history of the Earth. This history shows that the Earth's climate is sensitive to forcings, with a sensitivity similar to that of climate models. Despite this, Lindzen’s “iris effect” continues to be trumpeted by the “skeptics” press.

(References: Lindzen et al. (2001): "Does the earth have an adaptive infrared iris?" *Bull. Amer. Meteor. Soc.*, 82, 417-432.

Hartmann, D.L., and M.L. Michelsen, No Evidence for Iris, *Bull. Amer. Meteor. Soc.* 83, February issue, 249-254, 2002

Plus three other journal articles refuting Lindzen’s evidence and logic.