

Introduction to Technical Communications
21W.732 Section 2
Ethics in Science and Technology
Literature Review – Perspectives on Global Warming

Abstract

This literature review rigorously analyzes three specific topics in the evolution of the notion of global warming. While at first there was some scientific opposition to the idea of global warming, several scientific studies have been conducted in recent years, and all unanimously concur in that global warming is indeed a threat; the few studies which do not agree with the consensus do not oppose it either. The predicted consequences of global warming, such as sea levels rising, among others, would deal a high level of damage to both first-world and third-world countries; these consequences have been confirmed by current events already occurring as a result of global warming. Finally, although almost the entire scientific community now acknowledges global warming, the general population remains fervently skeptic and thus too little is being done to prevent it; this skepticism can be attributed to miscommunication by the media and misinterpretation of scientific data.

Perspectives on Global Warming—Literature Review

Since its initial discovery, global warming has been a controversial topic, subject to heated debate within the media and general public. At the very beginning, this phenomenon was somewhat contested within the scientific community itself, but after subsequent studies and research, scientists have rapidly come to the conclusion that global warming is indeed occurring and that it might hold incredibly destructive consequences for humanity in the future. This literature review aims to evaluate and emphasize the conclusions reached by the scientific community, and thus to dispel any false notions the general public may have about the veracity of global warming itself. To facilitate reading, this review will be divided into the following sections:

- I. Scientific data behind global warming research.
- II. Consequences of global warming.
- III. Media's influence over the general public and global warming.

I. Scientific History behind Global Warming Research.

This section of the literature review discusses the question, “Is global warming real and, if so, is there sufficient scientific data supporting it?”

Scientific awareness and research specifically on global warming began around the mid-1970s and early 1980s. In 1988, the World Meteorological Organization and the United Nations Environmental Programme created the Intergovernmental Panel on Climate Change (IPCC). Its purpose has been to evaluate the state of climate science as a basis for informed policy action, primarily on the basis of peer-reviewed and published scientific literature (Science Magazine, Vol. 306. no. 5702.) In its most recent assessment, the IPCC states clearly that the consensus of scientific opinion is that Earth's climate is being affected by human activities: "Human activities ... are modifying the concentration of atmospheric constituents ... that absorb or scatter radiant energy. ... Most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations" (J. J. McCarthy *et al.*, 2001.)

Another entity similar to the IPCC is the American Meteorological Society (AMS), which focuses on environmental research and studies. Their statement regarding global warming is, as of 2003, "... there is now clear evidence that the mean annual temperature at the Earth's surface, averaged over the entire globe, has been increasing in the past 200 years... of great urgency are the climate consequences of the increasing atmospheric abundance of greenhouse gases ... important decisions confront current and future national and world leaders." (AMS Council Report, February 2003.)

Other scientific groups have made public statements which fully support the conclusions reached by the IPCC. Some of these groups are:

a) The Joint Science Academies, which consists of scientists and scholars of the science academies of G8 and other nations.

b) The US National Research Council, which stated that "... greenhouse gases are accumulating in Earth's atmosphere as a result of human activities, causing surface air temperatures and subsurface ocean temperatures to rise. Temperatures are, in fact, rising." (Climate Change Science, 2001)

It is also of interest to know the exact evolution of scientific thoughts on global warming, and some scientific surveys on this matter reveal striking information. For instance, a Gallup Poll of 400 members of the American Geophysical Union and American Meteorological Society conducted in 1991 reveals that 66 % of the scientists said that human-induced global warming was occurring, with 10 % disagreeing and the rest undecided. It is noteworthy to mention that the exact numbers of this Gallup Poll are disputed (the above figures are given by FAIP—Fairness in Accuracy and Reporting) but in all reports, a majority of the scientists advocated for global warming. A recent study conducted by Naomi Oreskes of Science Magazine in which she looked at abstracts for 928 scholarly and scientific papers searching for arguments for and against global warming reveals that "... of all the papers, 75% ... explicitly or implicitly accept the consensus view; 25% ... [took] no position on current anthropogenic climate change. Remarkably, none of the papers disagreed with the consensus position." (Science Magazine, Vol. 306. no. 5702.) The above survey data reveals that, while the scientific community was somewhat divided on global warming shortly after its inception, this

division has long since faded away, and the scientific community involved with climate research currently acknowledges unanimously the existence of global warming.

II. Consequences of Global Warming.

Since the scientific community has unmistakably concluded that global warming does indeed exist, it is of interest to assess its consequences if no action is taken.

Scientific data shows that average temperatures across the globe have risen by almost 1 degree Celsius compared to 1800 – 1900 averages. Localized temperature changes can vary by up to 4 degrees Celsius from the 1800 – 1900 averages (Smith, 2005.) This change in temperature may appear to be slight, but quite a few drastic changes to some parts of the Earth's landscape have already resulted as a consequence of this temperature variance. For instance, Marcia Clemmitt reports in a 2006 study that:

- 1) The number of glaciers in Montana's Glacier National Park has dropped from 150 — when the park was created in 1910 — to fewer than 30 today, all greatly shrunken.
- 2) The legendary snows of Tanzania's Mount Kilimanjaro have melted about 80 percent since 1912 and could be gone by 2020. (Nat. Geographic Facts on Global Warming)
- 3) Rising sea levels are killing Bermuda's coastal mangrove forests.
- 4) Water temperatures near Antarctica have risen by a net 0.30 degrees Fahrenheit between 1950 and 1980. The population of Antarctic Adelie penguins has dropped by 33% as a result of ice habitats melting.
- 5) In May 2002, southeastern India suffered that country's highest-ever one-week death toll from heat; temperatures rose to 120 degrees Fahrenheit, and more than 1,200 people died.

These constitute only a small portion of the total effects that global warming has already had on the Earth's environment. As the situation currently stands, climate commitment studies indicate that, even if greenhouse gases were stabilized at present day levels, a further warming of perhaps 0.5 °C to 1.0 °C (0.9–1.8 °F) would still occur. (Nature, March 2005.)

Predictions of future effects global warming will have on the Earth's environment indicate that consequences may be catastrophic for several third-world countries and areas of extreme poverty. (Clemmitt, 2006.)

III. Media's Influence over the General Public and Global Warming.

Politicians and the media frequently assert with unmistakable confidence that climate science is highly uncertain. These statements are often backed up by pseudo-research from corporations whose revenues might be adversely affected by controls on carbon dioxide emissions (Climate Policy, 2003; Science Magazine, December 2004.) Such statements suggest that there is not a uniform scientific consensus about the reality of environmental climate change which, as can be seen from part I, is not the case.

The media, by nature, encourages people to participate and provide information for those who are willing to listen. This can and most often results in unqualified people giving false information to the general public. For instance, an article by journalist Alan Caruba on a popular news site, freedom.org, states that "global warming is real, i.e., a rapid increase in the overall temperature of the Earth, always seems to occur just as summer arrives when—surprise—it gets warmer... Everything ... was attributed to the dreaded, but fictitious global warming." In this manner, Caruba, who is a journalist with no previous scientific experience, appears before the general public as an "accredited scholar" and thus his false information is passed on to the unsuspecting reader. This, in turn, creates a growing perception among the public that global warming is false and also contributes to the false notion that the scientific community has not reached a consensus on global warming. Such types of journalism are detrimental and slow down the process of preventing disasters induced by global warming.

This phenomenon of pseudo-scientific journalism can be partially attributed to misinterpretation of scientific data by the general public. For instance, Tom Gremillion, a journalist featured in chronwatch.org, reports that "Global warming is a hoax... the environmentalists base their "proof" of the existence of global warming on the melting areas but are strangely silent, even militant to the point of violence, if anyone mentions the areas that are thickening, and those thickening areas are many." Unbeknownst to him,

global warming predicts an average increase in global temperature as explained in previous sections, but it also predicts growth of ice caps in certain areas of the world. (For instance, in Antarctica, warming of nearby oceans causes water to evaporate; this evaporated moisture then falls onto Antarctica as snow, causing it to increase in mass.) Also of interest in this statement is the phrase “militant to the point of violence,” a statement which is clearly untrue, but it demonstrates the success of sensationalistic journalism. The argument of ice cap growth is one held by the majority of environmental journalist skeptics.

Studies of the distribution of false information regarding global warming through the media are scarce and few, but those that have been made report shocking findings. For instance, World Climate Report states “...consider the “profession” of environmental journalism, which ran these headlines just one teensy month ago: “Antarctic glaciers shrink” (*The Baltimore Sun*, April 22, 2005); “Study shows Antarctic glaciers shrinking” (*Associated Press*, April 22, 2005); “Vanishing glaciers: Antarctica’s big melt” (*The Australian*, April 23, 2005) ... Suddenly the tune has changed: “Warming is blamed for Antarctic’s weight gain” (*New York Times*, May 20, 2005); “Antarctica ice cap thickens” (*Pittsburgh Post Gazette*, May 20, 2005); “Scientists link global warming to Antarctic’s ice cap’s growth” (*Chicago Tribune*, May 20, 2005.)” (World Climate Report, May 27, 2005.) This list clearly shows that the media is not particularly effective at transmitting veracious information.

Finally, it is also noteworthy to mention that scientific and scholarly journals would never publish articles such as the two discussed in this section. However, the general public does not have regular access or interest in scientific journals, choosing instead to receive information from other less-verifiable sources. This is one of the main causes of the successful distribution of false information.

Conclusion

Although global warming continues to generate controversy, careful research and study show that a scientific consensus on global warming does exist, and that action must be taken if we are to prevent its deadly effects on humanity. The general public must be educated on the actual truth about global warming and not on pseudo-scientific articles in order for the process of global warming prevention be as rapid and efficient as it needs to be, considering the dire consequences.