

Asheville AMS
Minutes of Meeting
15 January 2008

1. The fourth meeting for the 2007-08 season of the American Meteorological Society (AMS), Asheville chapter, was held on Tuesday, 15 January 2008, at the Diane Wortham Theater, Asheville, NC. Approximately 270 people were in the audience.
2. Lt Col Roelle, chapter President, recognized a local company aiding in green environmental ideals as part of the ongoing local chapter's highlighting of ecologically friendly programs. This month recognition was given to Blue Ridge Biofuels, a local company developing the collection of the raw materials and the distribution of the resulting biofuels in western North Carolina. The biodiesel the company produces is a complete replacement for current oil based diesel. According to Bryan Winslet, company spokesperson, the use of this fuel from local food oil fryers, soybeans, and other bio products, results in a 78% reduction in greenhouse gases versus use of oil based diesel. They have permits from the local treatment plants to process the waste byproducts of this process. Future work will concentrate on finding additional sources, increasing the efficiencies of the processes, and adding more customers in western North Carolina.
3. Lt Col Roelle then introduced the evening's speaker, Dr Thomas C. Peterson, NOAA's National Climatic Data Center, Asheville, North Carolina. The title of the talk was "The Myth of the 1970s Global Cooling Scientific Consensus: The Evolution of Integrated Climate Change Science." Basically, the topic was a review of 1970's publications, scientific and popular, to investigate if the scientific articles of the time really favored the thought of imminent global cooling as portrayed by some commentators in recent times. Dr Peterson put it this way, "This talk will attempt to put the current science into historical perspective and correct a widely repeated, but erroneous "fact" along the way."
4. Dr Peterson stated that everybody believed in global cooling in the 1970's, or so we're told. He then quoted several current authors who furthered the supposed popular notion of global cooling. He also illustrated some instances where part of the speaker's or author's presentations of the time were taken out of context to bolster the global cooling hypotheses. He also quoted several Internet commentators who made light of the assumed rapid scientific change of opinion in the last 30 years.
5. Dr Peterson, as one of the co-authors of the IPCC Chapter 1, began his study to find out why "so many scientists were wrong" in their thinking of the 1970's. Co-authors William Connolley and newspaperman John Fleck of the Albuquerque Journal worked with Dr Peterson to produce this part of the report and for an article currently submitted to the "Bulletin of the American Meteorological Society." Dr Peterson likened the scientific study of the 1970's to the old east Indian tale of several blindfolded people touching different parts of an elephant, with resulting different interpretations of what they felt. In a similar fashion, different scientists of the day were concentrating on investigating particular aspects of the climate which did not produce an integrated approach to the research.

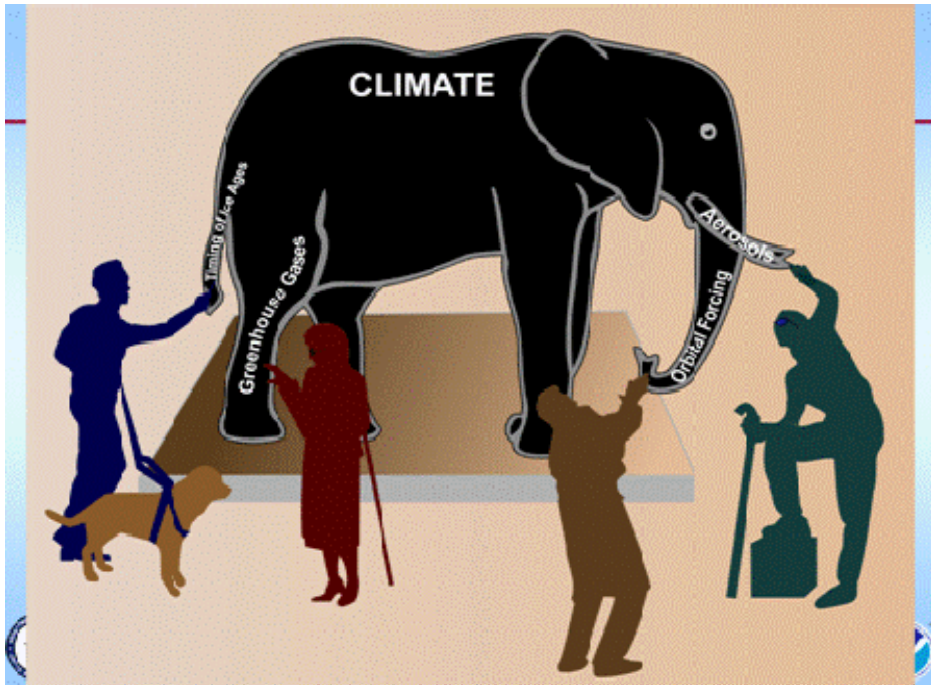


Figure 1.

6. The proponents of global cooling during the 1970's did have some observations to partially back their hypothesis. By the 1970's the global average temperatures had been cooling slightly for a couple of decades.

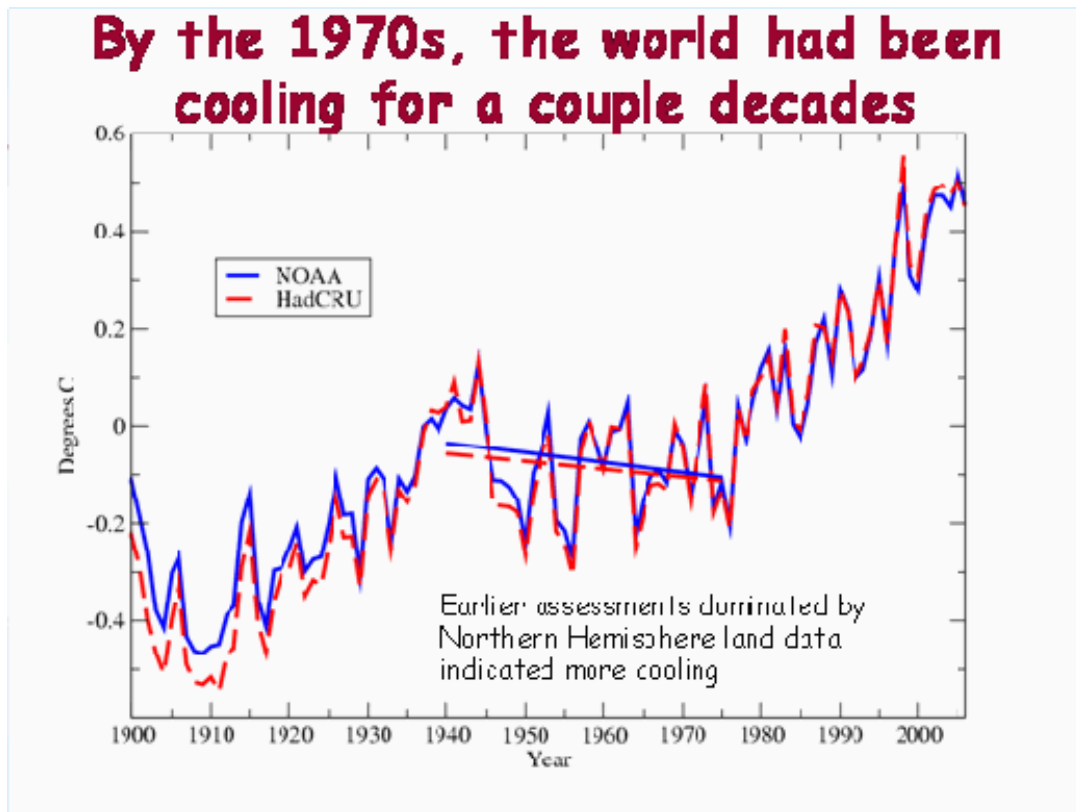


Figure 2.

7. Contrary to some popularized writings during the 1970's, there was also considerable research being done indicating global warming. Charles Keeling started accurate CO₂ measurements atop Mauna Loa, Hawaii and in Antarctica in 1957. By 1965 clear evidence of a quantifiable upwards trend in CO₂ was observed. Since then the forecast upward trend in CO₂ and resulting global increase in temperatures have been continually refined.

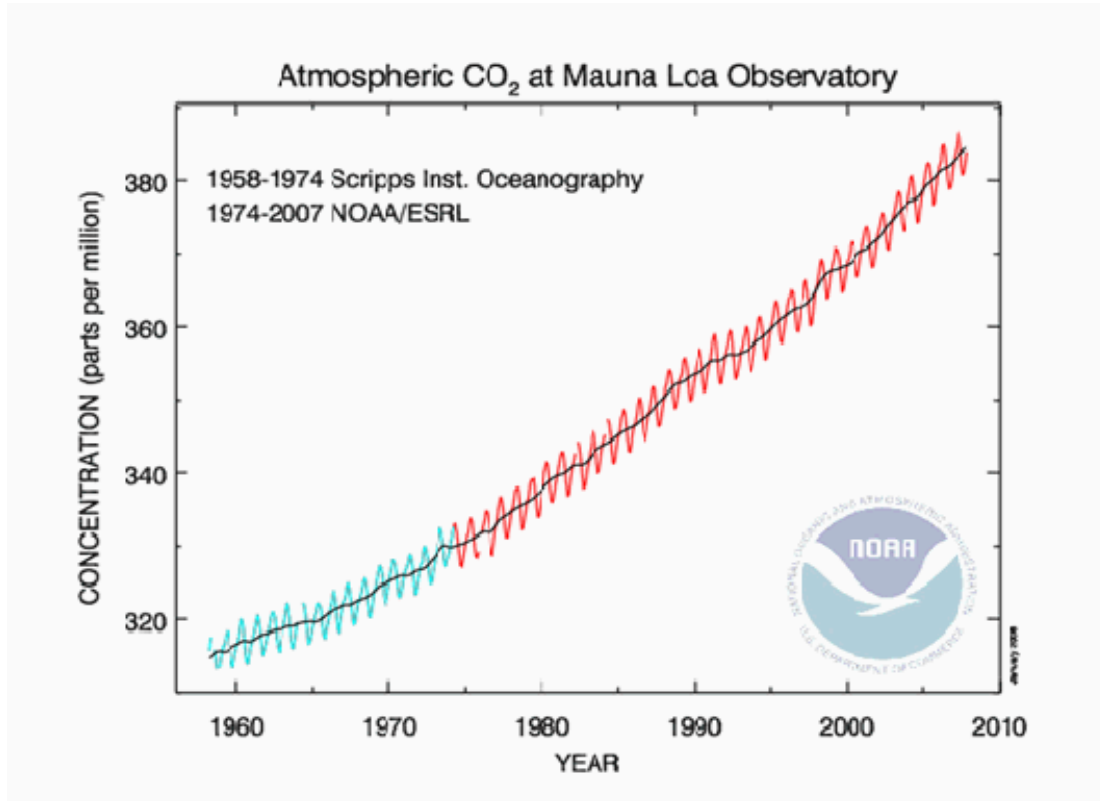


Figure 3

8. It is also somewhat ironic that much earlier scientific discussions were looking at the “global warming” scenario with respect to increases in greenhouse gases. John Tyndall in 1861 theorized that the greenhouse effect could cause “all the mutations of climate which the researches of geologists reveal.” Svante Arrhenius, Nobel Prize winner for chemistry in 1903, calculated that doubling atmospheric CO₂ would raise global temperatures 10°F, but figured it would take 3,000 years of fossil fuel burning to do it. Another scientist, Milutin Milankovic, calculated the Earth’s eccentricity, axial tilt, and precession on his slide rule. Based on this work he theorized orbital forcings regulated the timing of ice ages. By the mid-1970’s, based on this principle, scientists were actively predicting another ice age, but in several thousand years.

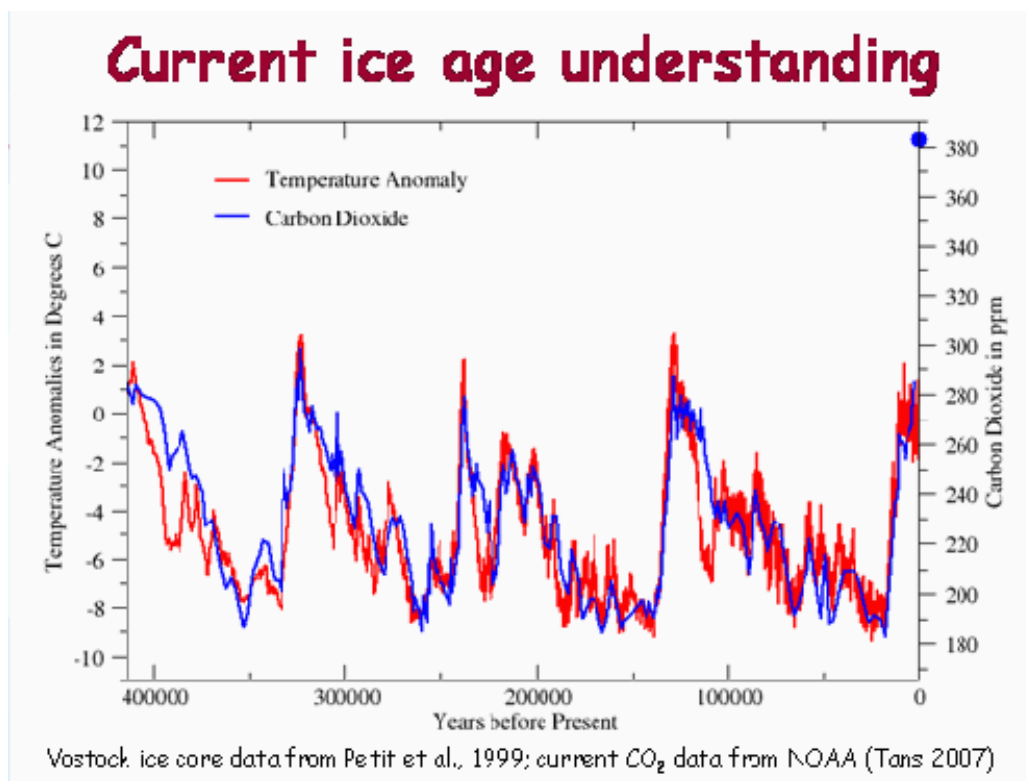


Figure 4.

9. The relative length of earth's ice ages was also studied. Before 1968 the prevalent scientific thinking was the earth had prehistoric long warm periods with short ice ages. Based on accumulating evidence from ice core samples, tree ring research, study of coral reefs, and other endeavors scientists' consensus shifted to long ice ages with short warm periods.

10. Another reason for temperature changes was investigated. Prominent scientists disagreed on the role of aerosols. After a decade of testing and refinement and Mount Agung's 1963 eruption, the role of aerosols became clearer. With respect to greenhouse gases and earth's orbit, aerosols were discovered not to be a dominant factor. The earth's orbit was a significant factor, but operating on a time scale of thousands of years. The role of greenhouse gases increase was relegated to the front of the line with respect to relative importance.

11. So, Dr Peterson set about to investigate if the majority of scientists 30 years ago had "missed the mark", with most believing that global cooling would be the dominant trend. In science proof requires quantitative assessments. Dr Peterson asked the questions; 1. How do you prove what scientists thought?, and 2. How do you prove the state of scientific understanding? To answer these questions Dr Peterson proposed the answer as "You assess what scientists wrote in peer-reviewed" journals of the day.

12. With support from the atmospheric science librarians in Asheville using major resources available on site, a search was conducted of peer-reviewed articles. Of the articles reviewed they were classified based on predicting, implying, or proving support evidence for future global cooling or warming. He also looked at articles which projected no change, discussing both warming and cooling influences without specifically indicating which were likely to be

dominant, or state not enough to make a sound prediction. Of the articles studied, only 10% of the total climate change articles indicated global cooling articles. The majority of the scientific peer-reviewed articles from the mid-60's to 1980 proposed global warming as the likely scenario. That trend became more dominant as time passed.

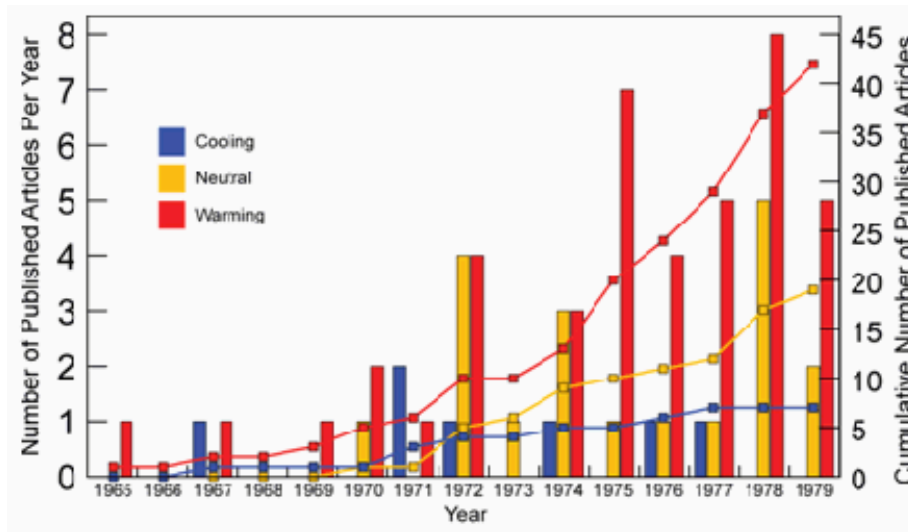


Figure 5.

13. Dr Peterson also stated that not all technical papers are created “equal”, that is other scientists regard all the articles as equally relevant or researched. To counter a possible bias in that area Dr Peterson researched other papers which cited an individual paper. That is, if a paper was regarded as particularly “on the money” one would expect more scientists to cite it in their own publications. Conversely, a technical article not considered to be as accurate would have no, few, or less citations. So the above graph was refined using the number of citations accredited to each particular paper. The results are shown in the following graph.

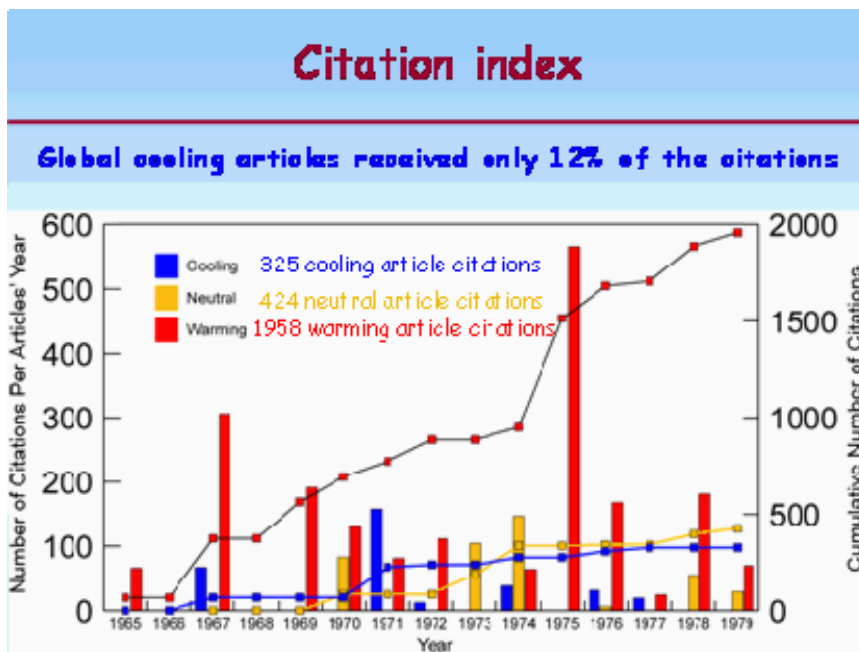


Figure 6

14. Dr Peterson reached the conclusion “There was no scientific consensus in the 1970s that the earth was headed into an imminent ice age. Indeed the possibility of anthropogenic warming dominated the peer-reviewed literature even then.” He closed his talk quoting a popular article which was lifted from a report of the National Science Board in 1972 as stating we were heading into another glacial age.” As Dr Peterson illustrated, what was omitted was the following statement in the NSB report stating the next glacial age would be expected some 20,000 years from now. The conclusion; popular literature of the 1970’s may have been slanted toward global cooling, but the scientific literature of that time was already heavily favoring global warming.

15. A question and answer period followed.

a. One person asked Dr Peterson if the atmospheric CO₂ levels had ever been as high as current? Dr Peterson stated, based on ice core measurements, that CO₂ levels are higher now than anytime during the last 400,000 years.

b. Another questioned whether CO₂ might actually rise in response to higher temperatures, in other words the cause and effect relationship actually be reversed? Dr Peterson stated there is some validity to that question. For instance, the temperature rises due to Earth orbital variances would first cause the temperatures to rise, then a feedback mechanism in the carbon cycle of the Earth would cause a rise in CO₂. This had been borne out during the investigations of ice core samples. However, he stated the drastic rises in CO₂ currently occurring are definitely the cause, not the effect, of temperature increases.

c. There was a question concerning the IPCC report, and how much information could be gleaned from it. Dr Peterson stated the IPCC report was the primary method for the world’s scientists to communicate their findings on climate change, but it was very difficult to read. They attempted to combine hard science with readability, but the science won out.

10. Lt Col Roelle announced the next meeting will be titled the “State of the Climate” in the Diane Wortham Theater in downtown Asheville on Feb 12th..

John D. Gray
Secretary, Asheville AMS