Statement of Patrick Moore, Ph.D.

Before the Senate Environment and Public Works Committee, Subcommittee on Oversight

February 25, 2014

"Natural Resource Adaptation: Protecting ecosystems and economies"

Chairman Whitehouse, Ranking Member Inhofe, and members of the Committee. Thank you for the opportunity to testify at today's hearing.

In 1971, as a PhD student in ecology I joined an activist group in a church basement in Vancouver Canada and sailed on a small boat across the Pacific to protest US Hydrogen bomb testing in Alaska. We became Greenpeace.

After 15 years in the top committee I had to leave as Greenpeace took a sharp turn to the political left, and began to adopt policies that I could not accept from my scientific perspective. Climate change was not an issue when I abandoned Greenpeace, but it certainly is now.

There is no **scientific proof** that human emissions of carbon dioxide (CO2) are the dominant cause of the minor warming of the Earth's atmosphere over the past 100 years. If there were such a proof it would be written down for all to see. No actual proof, as it is understood in science, exists.

The Intergovernmental Panel on Climate Change (IPCC) states: "It is **extremely likely** that human influence has been the **dominant cause** of the observed warming **since the mid-20th century**." (My emphasis)

"Extremely likely" is not a scientific term but rather a judgment, as in a court of law. The IPCC defines "extremely likely" as a "95-100% probability". But upon further examination it is clear that these numbers are not the result of any mathematical calculation or statistical analysis. They have been "invented" as a construct within the IPCC report to express "expert judgment", as determined by the IPCC contributors.

These judgments are based, almost entirely, on the results of sophisticated computer models designed to predict the future of global climate. As noted by many observers, including Dr. Freeman Dyson of the Princeton Institute for Advanced Studies, a computer model is not a crystal ball. We may think it sophisticated, but we cannot predict the future with a computer model any more than we can make predictions with crystal balls, throwing bones, or by appealing to the Gods.

Perhaps the simplest way to expose the fallacy of "extreme certainty" is to look at the historical record. With the historical record, we do have some degree of certainty compared to predictions of the future. When modern life evolved over 500 million years ago, CO2 was more than 10 times higher than today, yet life flourished at this time. Then an Ice Age occurred 450 million years ago when CO2 was 10 times higher

than today. There is some correlation, but little evidence, to support a direct causal relationship between CO2 and global temperature through the millennia. The fact that we had both higher temperatures and an ice age at a time when CO2 emissions were 10 times higher than they are today fundamentally contradicts the certainty that human-caused CO2 emissions are the main cause of global warming.

Today we remain locked in what is essentially still the Pleistocene Ice Age, with an average global temperature of 14.5°C. This compares with a low of about 12°C during the periods of maximum glaciation in this Ice Age to an average of 22°C during the Greenhouse Ages, which occurred over longer time periods prior to the most recent Ice Age. During the Greenhouse Ages, there was no ice on either pole and all the land was tropical and sub-tropical, from pole to pole. As recently as 5 million years ago the Canadian Arctic islands were completely forested. Today, we live in an unusually cold period in the history of life on earth and there is no reason to believe that a warmer climate would be anything but beneficial for humans and the majority of other species. There is ample reason to believe that a sharp cooling of the climate would bring disastrous results for human civilization.

Moving closer to the present day, it is instructive to study the record of average global temperature during the past 130 years. The IPCC states that humans are the dominant cause of warming "since the mid-20th century", which is 1950. From 1910 to 1940 there was an increase in global average temperature of 0.5°C over that 30-year period. Then there was a 30-year "pause" until 1970. This was followed by an increase of 0.57°C during the 30-year period from 1970 to 2000. Since then there has been no increase, perhaps a slight decrease, in average global temperature. This in itself tends to negate the validity of the computer models, as CO2 emissions have continued to accelerate during this time.

The increase in temperature between 1910-1940 was virtually identical to the increase between 1970-2000. Yet the IPCC does not attribute the increase from 1910-1940 to "human influence." They are clear in their belief that human emissions impact only the increase "since the mid-20th century". Why does the IPCC believe that a virtually identical increase in temperature after 1950 is caused mainly by "human influence", when it has no explanation for the nearly identical increase from 1910-1940?

It is important to recognize, in the face of dire predictions about a 2°C rise in global average temperature, that humans are a tropical species. We evolved at the equator in a climate where freezing weather did not exist. The only reasons we can survive these cold climates are fire, clothing, and housing. It could be said that frost and ice are the enemies of life, except for those relatively few species that have evolved to adapt to freezing temperatures during this Pleistocene Ice Age. It is "extremely likely" that a warmer temperature than today's would be far better than a cooler one.

I realize that my comments are contrary to much of the speculation about our climate that is bandied about today. However, I am confident that history will bear me out, both in terms of the futility of relying on computer models to predict the future, and

the fact that warmer temperatures are better than colder temperatures for most species.

If we wish to preserve natural biodiversity, wildlife, and human well being, we should simultaneously plan for both warming and cooling, recognizing that cooling would be the most damaging of the two trends. We do not know whether the present pause in temperature will remain for some time, or whether it will go up or down at some time in the near future. What we do know with "extreme certainty" is that the climate is always changing, between pauses, and that we are not capable, with our limited knowledge, of predicting which way it will go next.

Thank you for the opportunity to present my views on this important subject.

Attached please find the chapter on climate change from my book, "Confessions of a Greenpeace Dropout: The Making of a Sensible Environmentalist". I would request it be made part of the record.

Excerpted from:

Confessions of a Greenpeace Dropout: The Making of a Sensible Environmentalist

Patrick Moore, Ph.D. Published 2013

chapter twenty-one

Climate of Fear

If a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts he shall end in certainties. —Sir Francis Bacon

The global media tells us plainly and bluntly that the vast majority of the world's scientists believe we are headed for a climate catastrophe that will devastate human civilization and the environment. We have no choice but to act immediately to save ourselves from this apocalypse. The greatest threat is the CO_2 released from burning fossil fuels and cutting forests. Fossil fuel use must be cut by 80 percent or more, and we must stop cutting trees. How should we react to this warning?

The subject of climate change, also referred to as global warming, is perhaps the most complex scientific issue we have ever attempted to re- solve. Hundreds, possibly thousands of factors influence the earth's cli- mate, many in ways we do not fully understand. So, first, let us recognize that the science of climate is not settled. In fact, we are only beginning to understand how the earth's climate works.

It is not correct to use the terms *global warming* and *climate change* as if they were interchangeable. Global warming is a very specific term meaning exactly what it says, that the average temperature of the earth is increasing over time. Climate change is a much more general term that includes many factors. For one thing the climate is always changing, whereas it is not always getting warmer. The old maxim "the only constant is change" fits perfectly here. And as the belief in human-caused global warming has come into doubt the term climate change has been adopted as a substitute, even though it means something completely different.

It is one thing to claim increases in CO_2 cause global warming and quite another to claim increases in CO_2 cause:

- Higher temperatures
- Lower temperatures
- More snow and blizzards
- Drought, fire, and floods
- Rising sea levels
- Disappearing glaciers
- Loss of sea ice at the poles
- Species extinction
- More and stronger storms
- More storm damage
- More volcanic eruptions
- Dying forests
- Death of coral reefs and shellfish
- Shutting down the Gulf Stream
- Fatal heat waves
- More heat-related illness and disease
- Crop failure and food shortages
- Millions of climate change refugees
- Increased cancer, cardiovascular disease, mental illness, and respiratory disease[290]
- And, a devastating effect on the quality of French wines[291]

The science of climatology is only a few decades old. It is not a single science but rather an interdisciplinary cluster of sciences. These include meteorology (the study of weather), atmospheric chemistry, astrophysics and cosmic rays, geology and other earth sciences, oceanography, carbon cycling through all living species, soil science, geology, climate history through the millennia, ice ages and greenhouse ages, study of the sun, knowledge of earth wobbles, magnetic fields and orbital variations, etc. All of these disciplines are interrelated in complex, dynamic patterns that cannot be reduced to a simple equation. That is why climatologists have built very complicated computer models in the hope of predicting future climatic conditions. A "climate change con- sisting of widely divergent groups with sharply differing opinions. The most prominent and formally structured group is the United Nations Intergovernmental Panel on Climate Change (IPCC) and the scientists,

290. "A Human Health Perspective on Climate Change," National Institute of Environmental Health Sciences, April 2010, http://www.niehs.nih.gov/health/docs/climatereport2010.pdf

291. "Impact of Climate Change on Wine in France," Greenpeace International, September 2009, http://www.greenpeace.org/raw/content/international/press/reports/impacts-of-climate-change-on-w.pdf

scholars, activists, and politicians who associate themselves with this organization. The IPCC was created in 1988 as a partnership between the World Meteorological Organization and the United Nations Environment Program, put simply, meteorologists and environmentalists. Members of this group generally believe humans are causing global warming, that we are changing the climate, and this will generally be negative for civilization and the environment. They claim to represent an "overwhelming consensus among climate scientists."[292]

The IPCC is rather insular, believing its members are the only true climate scientists and that those who disagree with them are either some other kind of scientists, or not really scientists at all. Thus there is a self- defined overwhelming, even unanimous, consensus because they don't recognize the legitimacy of those who disagree with them. In 2007 the IPCC published its *Fourth Assessment Report*, which stated, "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (human- caused) greenhouse gas concentrations."[293]

At the other end of this spectrum there is a considerable contingent of scientists and scholars, largely schooled in the earth and astronomical sciences, who believe climate is largely influenced by natural forces and cycles. They were not organized into an official body until 2007 when the Nongovernmental International Panel on Climate Change (NIPCC) was formed in Vienna. Led by atmospheric scientist Dr. Fred Singer, the NIPCC published "Climate Change Reconsidered," a comprehensive scientific critique of the IPCC's findings, in 2009.[294] This report was signed by more than 31,000 American scientists and concluded, "there is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate."[295] Clearly there is no overwhelming consensus among scientists on the subject of climate.[296] In my opinion the believers and the skeptics of human-caused, catastrophic climate change can be roughly divided between those who see history in very recent terms (years to thousands of years) and those who see history in the long term (thousands to hundreds of millions of years). Both meteorologists and environmentalists tend to think about weather and climate in

292. "Statistical Analysis of Consensus," realclimate.org, December 16, 2004, http://www.realclimate.org/index.php/archives/2004/12/a-statistical-analysis-of-the-consensus/

293. "Summary for Policymakers," *Fourth Assessment Report*, Intergovernmental Panel on Climate Change, 2007, p. 3, http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

294. Craig Idso and S. Fred Singer, "Climate Change Reconsidered," Nongovernmental International Panel on Climate Change, 2009. http://www.heartland.org/publications/NIPCC%20report/PDFs/NIPCC%20Final.pdf

295. "Climate Change Reconsidered," Center for the Study of Carbon Dioxide and Global Change," 2009, www.nipccreport.org/

296. "More Than 700 International Scientists Dissent Over Man-Made Global Warming Claims: Scientists Continue to Debunk 'Consensus' in 2008 & 2009," U.S. Senate Minority Report, March 16, 2009, http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=83947f5d-d84a-4a84-ad5d-6e2d71db52d9

terms of recent human history. Geologists, evolutionary biologists, and astrophysicists tend to think of climate in the context of the 3.5 billion-year history of life and the 4.6 billion-year history of the Earth.

The various camps have invented some names for each other and for themselves. Pretty much everyone involved thinks they are “climate scientists.” But people who are convinced we are the main cause of climate change have been dubbed “true believers” and “warmists,” highlighting what are seen to be religious and ideological orientations, respectively. People who are undecided, critical, or questioning are called “skeptics.” The skeptics are happy with this description as it indicates they have an open mind and as scientists they believe they have a duty to challenge un-proven hypotheses. The true believers use the word skeptic as a slur, as in “unbelievers,” as if it is unacceptable to question their beliefs. Then there are the “climate deniers,” or “denialists,” terms invented by the true believers, and characterized by skeptics as associating them with Holocaust deniers. Much of this is just name-calling, but it is useful in the sense that it defines the battleground.

Over the years the media have largely ignored the scientists and organizations that remain skeptical of human-caused global warming and climate change. The public has been inundated with alarmist headlines about catastrophic climate change and many governments have bought into the belief there is a global emergency that must be addressed quickly and decisively. As with fear of chemicals, fear of climate change results in a convergence of interests among activists seeking funding, scientists applying for grants, the media selling advertising, businesses promoting themselves as green, and politicians looking for votes. It may not be a conspiracy, but it is a very powerful alignment that is mutually reinforcing.

In 2007 the IPCC and one of its main champions, Al Gore, were awarded the Nobel Peace Prize for alerting the world to the dire threat of human-caused climate change. One would imagine the public would strongly support this alarmist position, having been exposed to such one- sided media coverage and the news of prestigious awards. Amazingly this is not the case, even in countries such as the United States and England, where the official government positions are sharply accepting of catas-trophic human-caused warming.

A Pew Foundation poll conducted in October 2009 found only 36 per- cent of the general public in the United States believes humans are the cause of global warming, whereas 33 percent does not believe the earth is warming and 16 percent believe the earth is warming but that it is due to natural causes. Public opinion was sharply divided along partisan lines: 50 percent of Democrats believe global warming is caused by humans, while 33 percent of independents, and only 18 percent of Republicans agree with this. The trend since 2007 is decidedly

downwards with about 10 percent fewer people believing in human-caused global warming in all categories.

Another Pew Foundation poll taken in May 2010 asked Americans to rank priorities for Congress. It found only 32 percent think it is very important for Congress to address climate change in the coming months, including 47 percent of Democrats, 29 percent of independents, and 17 percent of Republicans.[297]

The partisan spread mirrors the poll on belief in human-caused cli- mate change almost perfectly. This is a strong indication that the reason a majority is not concerned about climate change legislation is because it doesn't believe in human-caused climate change in the first place.

A poll taken by Ipsos Mori in June 2008 found 60 percent of Britons believed, "many scientific experts still question if humans are contributing to climate change."[298] Clearly a majority of the British public does not believe there is a scientific certainty on the subject.

A more recent British poll in February 2010, again taken by Ipsos Mori, showed that only 17 percent of Britons put climate change in their top three most important issues facing them and their families.[299]

In one of the most surprising surveys taken, 121 U.S. television weather presenters, all members of the American Meteorological Society, were asked their opinions on climate change in April 2010. Ninety-four percent of those surveyed were accredited meteorologists. When asked about the UN's Intergovernmental Panel on Climate Change's statement, "Most of the warming since 1950 is very likely human-induced," a full 50 percent either disagreed or strongly disagreed. Twenty-five percent were neutral and only 24 percent said they agreed or strongly agreed.[300]

In April 2013 a US Department of Agriculture-funded survey of US Midwest corn farmer's beliefs in climate change was published. 18,800 farmers with an income of US$100,000 or more were polled, of whom 26 percent responded (4,778). Only 8 percent of these farmers, who spend their lives in the weather and the climate, agreed with the statement, "Climate change is occurring and it is caused mostly by human activities." In other words, 92 percent of corn farmers do not believe humans are the main cause of climate change. I say give them all honorary doctorates of science.

297. "Public's Priorities, Financial Regs: Congress's Job Rating—13%," Pew Research Center for People and the Press, May 18, 2010, http://people-press.org/report/615/

298. "Scientists Exaggerate Climate-Change Fears, Majority of Britons Believe," Mail Online, June 22, 2008, http://www.dailymail.co.uk/news/article-1028425/Scientists-exaggerate-climate-change-fears-majority-Britons-believe.html

299. "Climate Change Omnibus: Great Britain," Ipsos Mori, February 24, 2010, http://www.ipsos-mori.com/researchpublications/researcharchive/poll.aspx?oItemId=2552

300. Edward Maibach et al., "A National Survey of Television Meteorologists About Climate Change: Preliminary Findings," George Mason University Center for Climate Change Communication, March 29, 2010, http://www.climatechangecommunication.org/images/files/TV_Meteorologists_Survey_Findings_(March_2010).pdf

Why is there such a high degree of skepticism among professionals and the public when the mainstream media is so biased toward the IPCC view? It would appear they are reading about skeptical opinions on the Internet, blogs in particular, and talking to one another about the subject in an open-minded manner. Obviously most weather presenters are acutely interested in and aware of the fine points of the debate. The fact they disagree with the IPCC "consensus" by two-to-one speaks volumes about where these weather professionals find credibility on the subject of global warming.

Climate science is a classic case of the necessity to distinguish between historical and present facts on the one hand, and predictions of the future on the other. There are a number of things we can say with relative certainty:

• During the past 500 million years, since modern life forms emerged, the earth's climate has been warmer than it is today most of the time. During these "Greenhouse Ages" the earth's temperature averaged around 22 to 25 degrees Celsius (72 to 77 Fahrenheit).[301] All the land was either tropical or subtropical and the world was generally wetter. The sea level was much higher than today and life flourished on land and in the oceans. These warm periods were punctuated by three Ice Ages during which large ice sheets formed at the poles and in mountainous areas, effectively eliminating most plants and animals in those regions.

• The two Ice Ages that preceded the current one occurred between 460 and 430 million years ago and between 360 and 260 million year ago. From 260 million years ago until quite recently, a Greenhouse Age existed for about 250 million years. Ice started to accumulate in Antarctica beginning 20 million years ago and eventually the cur- rent Ice Age, known as the Pleistocene, began in earnest about 2.5 million years ago.[302] *The Pleistocene, which we are still in today and during which our species evolved to its current state, accounts for only 0.07 percent of the history of life on earth.*

• During the coldest periods of the Pleistocene Ice Age the average temperature of the earth was around 12 degrees Celsius (54 degrees Fahrenheit) and there were large ice sheets on both poles. Before the recent retreat of the glaciers, beginning 18,000 years ago, the ice extended below the U.S./Canada border, over all of Scandinavia, much of northern Europe, and well into northern Russia. The sea was about 122 meters (400 feet) lower than it is today, having risen steadily since then and continuing to do so today.[303] In recent times the sea has risen about 20 centimeters (8 inches) per century. The

301. Christopher R. Scotese, "Climate History," Paleomar Project, April 20, 2002, http://www.scotese.com/climate.htm 302. "Ice Age" Wikipedia, http://en.wikipedia.org/wiki/Ice_age 303. "Sea Level," Wikipedia, http://en.wikip

cause of sea level rise is a combination of melting glaciers (ice on land) and rising ocean temperature, as water expands when it gets warmer.

- The earth's climate underwent a general warming trend beginning with the end of the last major glaciation, about 18,000 years ago. This has not been an even warming, as there have been many fluctuations along the way. For example, during the Holocene Thermal Maximum between 9000 and 4000 years ago it was warmer than it is today by as much as 3 degrees Celsius (5.4 degrees Fahrenheit).[304] During this time the present-day Sahara Desert was covered with lakes and vegetation, clearly indicating there was much more rain- fall there than today.[305] We know for a fact this was not caused by humans. Many scientists believe it was caused by variations in the earth's orbit around the sun.

- This historical record highlights the importance of analyzing the starting point and end point of temperature measurements when explaining trends, both up and down. It is warmer today than it was 18,000 years ago. But it is cooler today than it was 5,000 years ago during the Holocene Thermal Optimum. So it could be said we have been in a cooling trend for the past 5000 years even though it is warmer now than it was when the glaciation ended. I will try not to "trick" the reader by cherry-picking timelines that support a particular bias.

- Today the average temperature of the earth is about 14.5 degrees Celsius (58 degrees Fahrenheit), decidedly closer to the Ice Age level than the Greenhouse Age level and only 2.5 degrees above the temperature at the height of the last major glaciation. The fact is we are still in the Pleistocene Ice Age and it is possible another major glaciation may occur sometime in the next 10,000 years, but that is a prediction, not a fact.

- Carbon Dioxide (CO_2) is a greenhouse gas in that it tends to heat the atmosphere and thus raise the temperature of the earth. But water vapor is by far the most important greenhouse gas, contributing at least two thirds of the "greenhouse effect." CO_2 and other minor gases, such as methane and nitrous oxide, make up the other third of the greenhouse effect.[306] It is not possible to prove the exact ratios among the various greenhouse gases as they interact in complex ways.

304. Chris Caseldine et al., "Holocene Thermal Maximum up to 3oC Warmer Than Today, *Quaternary Science Reviews* 25, no. 17–18 (September 2006): 2025–2446.

305. "Earth's Climatic History: The Last 10,000 Years," *CO_2 Science*, http://www.co2science.org/subject/other/clim_hist_tenthousand.php

306. J. T. Kiehl and Kevin E. Trenberth, "Earth's Annual Global Mean Energy Budget," *Bulletin of the American Meteorological Society* 78, no. 2 (February 1997): 197-208, www.atmo.arizona.edu/students/courselinks/spring04/atmo451b/pdf/RadiationBudget.pdf

In particular, the balance between water vapor and clouds (made up of condensed water vapor) is impossible to predict accurately.[307]

- We know global levels of CO_2 in the atmosphere have risen steadily from 315 parts per million (ppm) to nearly 390 ppm since scientists began taking regular measurements at Mauna Loa on the big island of Hawaii in 1958.[308] This is a very short time compared to the 3.5 billion years of life on earth. Many scientists assume that human emissions of CO_2 from burning fossil fuels are the main cause of this increase. Some scientists question this assumption. It is a fact that CO_2 levels were much higher than they are today during previ ous eras. This will be discussed in detail later.

- The average temperature of the earth has fluctuated during the past 100 years, sometimes cooling, sometimes warming, and in balance has increased somewhat, especially during the periods from 1910 to 1940 and from 1980 to 1998. Since 1998 there has been no further warming and apparently a slight cooling. There is a lot of controversy around the accuracy of these trends. In particular there is a concern that many of the weather stations used to determine the global aver- age were originally in the countryside but over the years have been swallowed up by expanding urban development. The "urban heat island effect" refers to the fact that concrete and heat from buildings results in an increase in temperature in urban areas compared to the surrounding countryside,[309] thus the possibility exists that the results have been skewed. In N ovem ber 2
or hacked, from the Climatic Research Unit of the University of East Anglia in the U.K. shocked the climate change community. It was quite clear from a number of email exchanges that the scientists with this most important source of information had been manipulating data, withholding data, and conspiring to discredit other scientists who did not share their certainty that humans were the main cause of climate change. These revelations were quickly dubbed "Climategate" and have since been hotly debated in climate change circles.[310] [311] [312] It is very difficult to find

307. "Forecast: Water and Global Warming," ESPERE, http://www.espere.net/Unitedkingdom/water/uk_forecast.html
308. R. F. Keeling et al., "Atmospheric CO_2 Values (ppmv) Derived from In Situ Air Samples Collected at Mauna Loa, Hawaii, USA," Scripps Institute of Oceanography, September 2009, http://cdiac.ornl.gov/ftp/trends/co2/maunaloa.co2
309. "Surfacestations Project Reaches 82% of the Network Surveyed," surfacestations.org, July 16, 2009, http://www.surfacestations.org/
310. "The Tip of the Climate Change Iceberg," *Wall Street Journal*, December 8, 2009, http://online.wsj.com/article/SB10001424052748704342404574576683216723794.html
311. James Delingpole, "Climategate: The Final Nail in the Coffin of 'Anthropogenic Global Warming'?" *Telegraph*, November 20, 2009, http://blogs.telegraph.co.uk/news/jamesdelingpole/100017393/climategate-the-final-nail-in-the-coffin-of-anthropogenic- global-warming/
312. Andrew C. Revkin, "Hacked E-Mail Is New Fodder for Climate Dispute," *New York Times*, November 20, 2009, http://www.nytimes.com/2009/11/21/science/earth/21climate.html

a balanced account of this scandal. Commentary is divided sharply, with believers claiming that while the scientists involved behaved badly, this does not change the fact that the science is clear that humans are causing warming, while skeptics claim the revelations demonstrate the books have been cooked, placing the entire hypothesis of global warming in doubt.

In December 2009, after months of promotion and hype, the Copenhagen conference on climate change ended in disaster for the true believers. The delegates at the largest international meeting in history failed to reach a single binding decision to control CO_2 emissions. There does not seem to be any conceivable strategy to achieve international agreement on this subject. The United States will not sign a deal that does not include China, India, Brazil, and the other developing countries. The developing countries will not agree to reduce or restrict their CO_2 emissions so long as the U.S. and other industrialized countries have far higher emissions on a per capita basis. Whereas the U.S. emits nearly 20 tonnes (22 tons) of CO_2 per person, China emits 4.6 tonnes (5.1 tons) and India emits 1.2 tonnes (1.3 tons). There is no possibility this impasse will be resolved in the near future. The U.S. will not agree to reduce its emissions to a lower level while the developing countries increase theirs. The developing countries will not agree to a system in which the U.S. and other industrialized countries are allowed even higher per capita emissions. Despite this obvious impasse, the delegates continue to meet regularly, thousands of people jetting to desirable locations like Bali, Montreal, and Rio de Janeiro at public expense, with no possibility of ever reaching agreement.

We can be fairly certain of the facts listed above, with the qualifications given. While this is very interesting, it is not the known facts but rather the unanswered questions that are most intriguing. Climate change cannot be defined by a single question. It is much like peeling back the layers of an onion, beginning with the science, leading to possible environmental impacts, followed by potential economic and social impacts, and concluding with policy options. Among these questions are:

- Is CO_2, the main cause of global warming, either natural or human-caused?
- Are human-caused CO_2 emissions the principal cause of recent global warming?
- Is the recent warming trend fundamentally different from previous warming and cooling trends?
- If warming continues at the rate experienced in the 20th century into the 21st century will this be positive or negative for human civilization and the environment?
- Is the melting of glaciers and polar ice really a threat to the future of human civilization?

- Will increased CO_2 result in "acidification" of the oceans and kill all the coral reefs and shellfish?
- Is it possible for humans to halt global warming and to control the earth's climate?
- Which would cost more to the economy, an 80 percent reduction in fossil fuel use or adaptation to a warmer world?
- Could the United States and China ever agree to a common policy on reducing CO_2 emissions?
- Is the effort to conclude a binding agreement to control CO_2 emissions among all nations futile?

These are just some of the many questions we must answer if we are to make intelligent choices about the direction public policy should take on the subject of climate change.

Before going int

the fact that both CO_2 and temperature are increasing at the same time does not prove one is causing the other. It may be that increased CO_2 is causing some or most of the increased temperature. It may also be that increased temperature causes an increase in atmospheric CO_2. Or it may be they are both caused by some other common factor, or it may be just coincidental they are both rising together and they have nothing to do with one an- other. Correlation does not prove causation. In order to demonstrate one thing causes another, we need among other things, to be able to replicate the same cause-effect sequence over and over again. This is not possible with the earth's climate as we are not in control of all (or any of) the factors that might influence climate. Now, if we had a record of CO_2 and temperature going back many millions of years and it showed that increased temperature always followed increased CO_2, we would be a long way toward proving the point. As we shall see later, the historical record is not so clear on the relationship between CO_2 and temperature.

Second, it is often as

interests of the environment are one and the same. This may be the case for some factors, such as rainfall, but for others it simply does not apply. Take sea level rise, for example. If the sea level rises relatively rapidly, it will damage a great deal of human infrastructure and a great deal of work and expense will be required either to protect or to replace farms, buildings, wharfs, roadways, etc. But fish and other marine creatures will be perfectly happy with the rising sea level and most land animals will not find it difficult to move a few feet higher. A 1.5 meter (5-foot rise) in sea level may inundate Bangladesh, turning much of it into a salt marsh and displacing millions of people. This would be devastating for humans, but from an environmental perspective there is nothing wrong with a salt marsh. From an ecological point of view, a natural salt marsh represents an improvement over intensive agriculture with monocultures of nonnative food crops.

Fortunately, no credible scientist believes the sea level will rise anywhere near 1.5 meters in the next century.

A Longer View

Our lifetimes are so short compared to the billions of years of life's history on earth that we tend to dwell on the very recent past when considering historical information. Nearly all the discussion of climate change is in the context of the past 100 years, or occasionally the past 1000 years, even though the earth's climate has changed constantly for billions of years. Let's take a look at the history of climate change in this larger context, in particular the past 500 million years since modern life forms evolved.

Temperature

The earth's average temperature has fluctuated widely over the past one bil- lion years (see Figure 1). It is interesting to note that during the Cambrian Period, when most of the modern life forms emerged, the climate was much warmer than it is today, averaging 25 degrees Celsius (77 degrees Fahrenheit). Only at three other times during the past billion years has the temperature been as cold as or colder than it is today. The age of the dinosaurs, the Jurassic and Cretaceous Periods, experienced a warm climate with a moderate cooling spell in the late Jurassic. Following the dinosaur extinction the climate remained warm for 10 million years, spiking to 27 degrees Celsius (80 degrees Fahrenheit), followed by a gradual decline that eventually led to the Pleistocene Ice Age. As the graph below indicates, it is colder today than it has been throughout most of the past billion years.

Humans generally prefer warmer climates to colder ones. When I mention that the global climate was much warmer before this present Ice Age, people often say something like, "But humans were not even around five million years ago, certainly not 50 or 500 million years ago. We have not evolved in a warmer world and will not be able to cope with global warming." The fact is we did evolve in a "warmer world." The human species originated in the tropical regions of Africa, where it was warm even during past glaciations nearer the poles. Humans are a tropical species that has adapted to colder climates as a result of harnessing fire, making clothing, and building shelters. Before these advances occurred, humans could not live outside the tropics. It may come as a surprise to most that a naked human in the outdoors with no fire will die of hypothermia if the temperature goes below 21 degrees Celsius (70 degrees Fahrenheit). Yet as long as we have food, water, and shade we can survive in the hottest climates on earth without fire, clothing, or shelter.[313] The Australian Aborigines survived in

313. Claude A. Piantadosi, *The Biology of Human Survival: Life and Death in Extreme Environments* (Oxford: Oxford University Press, 2003)

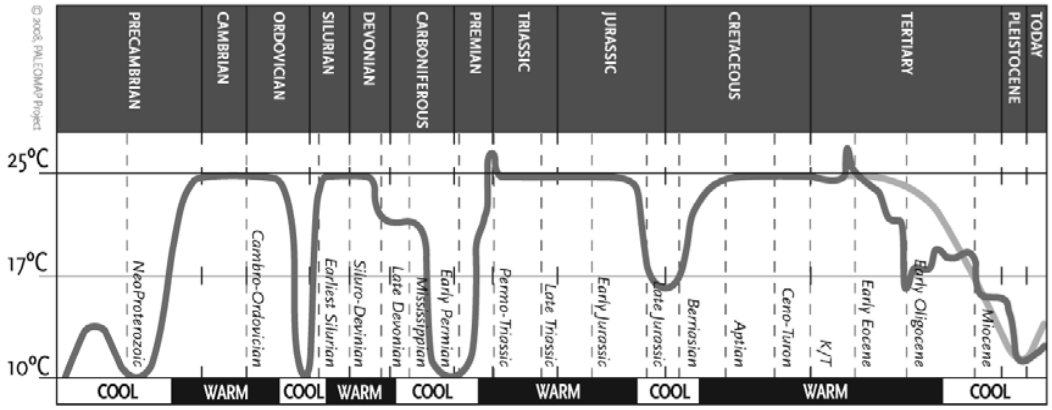


Figure 1. Graph showing global average temperature during the past billion years.[314]

temperatures of over 45 degrees Celsius (113 degrees Fahrenheit) without air conditioning for 50,000 years.

The fact that humans are essentially a tropical species explains why even today there are no permanent residents of Antarctica and only four million people living in the Arctic (0.06 percent of the global population). Most of the Arctic population is engaged in resource extraction and would not choose to live there otherwise. Historically, the very small populations of indigenous people in the Arctic managed to eke out a living by inhabiting ice-shelters, getting food from marine mammals and oil from marine mammals for heating and light. They used sled dogs for transport and protection from polar bears. There is a good reason why there are more than 18 million people in Sao Paulo, Brazil, only 4,429 residents in Barrow, Alaska,[315] and 3,451 inhabitants of Inuvik, Northwest Territory.[316]

Why are there 300 million people in the United States and only 30 million in Canada, which is larger geographically? One word answers this question: cold. About 80 percent of Canadians live within 100 miles of the U.S. border, as it is warmer there (although not by much in many regions) than it is in 90 percent of Canada, which is frozen solid for six or more months of the year.

So clearly, on the basis of temperature alone, it would be fine for humans if the entire earth were tropical and subtropical as it was for millions of years during the Greenhouse Ages. It would also be fine for the vast majority of species in the world today, most of which live in tropical and subtropical regions. But this would not be the case for some other species that have evolved specifically to be able to survive in cold climates.

The polar bear did not exist until the Pleistocene Ice Age froze the Arctic and created the conditions for adaptation to a world of ice. Polar bears are not really

314. Global Temperature Curve by C.R. Scotese, PALEOMAP Project, http://www.scotese.com/climate.htm

315. "City of Barrow – Farthest North American City," http://www.cityofbarrow.org/ 316. "Inuvik," http://www.inuvik.ca/tourism/faq.html

a distinct species; they are a variety of the European brown bear, known as the grizzly bear in North America. They are so closely related genetically that brown bears and polar bears can mate success- fully and produce fertile offspring.[317] The white variety of the brown bear evolved as the ice advanced, the white color providing a good camouflage in the snow. Once bears could walk out to sea on the ice floes, it became feasible to hunt seals. It is possible that if the world warmed substantially over the next hundreds of years that the white variety of the brown bear would become reduced in numbers or even die out. This would simply be the reverse of what happened when the world became colder. Some varieties of life that exist today are only here because the world turned colder a few million years ago, following a warmer period that lasted for over 200 million years. If the climate were to return to a Greenhouse Age those varieties might not survive. Many more species would benefit from a warmer world, the human species among them.

The polar bear did not evolve as a separate variety of brown bear until about 150,000 years ago, during the glaciation previous to the most recent one.[318] [319] This is a very recent adaptation to an extreme climatic condition that caused much of the Arctic Ocean to freeze over for most of the past 2.5 million years. The polar bear did manage to survive through the inter- glacial period that preceded the one we are in now even though the earth's average temperature was higher during that interglacial than it is today.[320] So as long as the temperature does not rise more than about 5 degrees Celsius (9 degrees Fahrenheit) above the present level, polar bears will likely survive. But that is a prediction, not a fact.

To listen to climate activists and the media, you would think the polar bear population is already in a steep decline. A little investigation reveals there are actually more polar bears today than there were just 30 years ago. Most subpopulations are either stable or growing. And the main cause of polar bear deaths today is legally sanctioned trophy hunting, not climate change. Of an estimated population of 20,000 to 25,000 bears, more than 700 are shot every year by trophy hunters and native Inuit. One hundred and nine are killed in the Baffin Bay region of Canada alone. And yet activist groups like the World Wildlife Fund use the polar bear as a poster child for global warming, incorrectly alleging that they are being wiped out by climate change.

The population of polar bears was estimated at 6000 in 1960. In 1973 an International Agreement between Canada, the United States, Norway,

317. Katherine Hamon, "Climate Change Likely Caused Polar Bear to Evolve Quickly," *Scientific American*, March 1, 2010, http://www.scientificamerican.com/article.cfm?id=polar-bear-genome-climate

318. "Polar Bear" Wikipedia, http://en.wikipedia.org/wiki/Polar_bear

319. Katherine Hamon, "Climate Change Likely Caused Polar Bear to Evolve Quickly," *Scientific American*, March 1, 2010, http://www.scientificamerican.com/article.cfm?id=polar-bear-genome-climate

320. "Interglacial,"Wikipedia,http://en.wikipedia.org/wiki/Interglacial

Russia, and Greenland ended unrestricted hunting and introduced quotas. Since then only native people have been allowed to hunt polar bears, although in Canada the native Inuit often act as guides for non- native hunters. As a result of this restriction on hunting, the population has rebounded to its present level of 20,000 to 25,000. The International Union for the Conservation of Natural Resources Polar Bear Specialist Group reports that of 18 subpopulations of bears, two are increasing, five are stable, five are declining, while for six subpopulations, mainly those in Russia, there is insufficient data.[321] There is no reliable evidence that any bear populations are declining due to climate change and all such claims rely on speculation; they are predictions based on conjecture rather than actual scientific studies.

At the other end of the world in Antarctica, numerous species of pen- guins have evolved over the past 20 million years so that they can live in ice-bound environments. There are also many species of penguins that live in places where there is no ice, such as in Australia, South Africa, Tierra del Fuego, and the Galapagos Islands. It took 20 million years for the Antarctic ice sheet to grow to the extent it has been for the past 2.5 million years, during the Pleistocene Age. Antarctica differs significantly from the Arctic in that most of the ice is on land and at higher elevation. It is very unlikely Antarctica will become ice-free in the near future. It took millions of years for the present ice sheet to develop. In all likelihood the penguins will be able to breathe easily for thousands, possibly millions of years.

Coming closer to the present day, there is good historical evidence that it was warmer than it is today during the days of the Roman Empire 2000 years ago and during the Medieval Warming Period 1,000 years ago.[322] [323] We know that during the Medieval Warming Period, the Norse (Vikings) colonized Iceland, Greenland, and Newfoundland. The settlements in Newfoundland and Greenland were then abandoned during the Little Ice Age that lasted from about 1500 to the early 1800s.[324] The Thames River in England froze over regularly during the cold winters of the Little Ice Age. The Thames last froze over in 1814.[325] Since then the climate has been in a gradual warming trend. Given that there were very low levels of CO_2 emissions from human activity in those times, it is not possible that humans caused the Medieval Warming Period or the Little Ice Age. Natural factors had to be instrumental in those changes in climate.

321. “Summary of Polar Pear Population status per 2010,” IUCN Polar Bear Specialist Group, http://pbsg.npolar.no/en/status/status-table.html

322. “Roman Warm Period (Europe – Mediterranean) – Summary,” *CO_2 Science*, http://www.co2science.org/subject/r/summaries/rwpeuropemed.php

323. “Medieval Warm Period Project,” *CO_2 Science*, http://www.co2science.org/data/mwp/mwpp.php

324. “20th Century Climate Not So Hot,” Harvard Smithsonian Center for Astrophysics, March 31, 2003, http://www.cfa.harvard.edu/news/archive/pr0310.html

325. “The Frozen Thames in London: An Introduction,” History and Traditions of England, January 10, 2010, http://www.webhistoryofengland.com/?p=613

Speaking of natural factors, it is clear the climate changes over the past billions of years were not caused by our activities. So how credible is it to claim we have just recently become the main cause of climate change? It's not as if the natural factors that have been causing the climate to change over the millennia have suddenly disappeared and now we are the only significant agent of change. Clearly the natural factors are still at work, even if our population explosion and increasing CO_2 emissions now play a role in climate change. So the real question is, are human impacts over- whelming the natural factors or are they only a minor player in the big picture? We do not know the definitive answer to that question.

Let's go back to the IPCC's *Fourth Assessment Report* in 2007, which stated: "*Most* of the observed increase in global average temperatures *since the mid-20th century* is *very likely* due to the observed increase in anthropogenic (human-caused) greenhouse gas concentrations"[my emphasis]. The first word, *most*, in common usage means more than 50 percent and less than 100 percent, i.e., more than half but not all. That's a pretty big spread, so clearly IPCC members don't have a very precise estimate of how much of the warming they think we are causing. If they are that uncertain, how do they know it's not 25 percent, or 5 percent? They restrict the hu- man influence to "since the mid-20th century," implying humans were not responsible for climate change until about 60 years ago. So the logical question is, What was responsible for the significant climate changes be- fore 60 years ago, the warming between 1910 and 1940, for example? The most problematic term in their statement is "very likely," which certainly provides no indication of scientific proof. The IPCC claims that "very likely" means "greater than 90 percent probability."[326] But the figure 90 is not the result of any calculation or statistical analysis. The footnote entry for the term "very likely" explains, "in this Summary for Policymakers, the following terms have been used to indicate the assessed likelihood, *using expert judgement*, [my emphasis] of an outcome or a result: *Virtually certain* > 99% probability of occurrence, *Extremely likely* > 95%, *Very likely* > 90%, *Likely* > 66%, *More likely than not* > 50%, *Unlikely* < 33%, *Very unlikely* < 10%, *Extremely unlikely* < 5%."[327] One expects "judgments" from judges and opinionated journalists. Scientists are expected to provide calculations and observable evidence. I'm not convinced by this loose use of words and numbers.

According to the official records of surface temperatures, 1998 was the warmest year in the past 150 years. Since then the average global temperature remained relatively flat down, completely contrary to the predictions of the IPCC,

326. "Summary for Policymakers," Intergovernmental Panel on Climate Change, 2007, p. 3 http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

327. Ibid.

and in spite of steadily growing CO_2 emissions from countries around the world. This drop in temperature is now attributed to natural factors, something that was downplayed in previous predictions. Mojib Latif, a prominent German meteorologist and oceanographer, explains it this way, "So I really believe in Global Warming. Okay. However, you know, we have to accept that there are these natural fluctuations, and therefore, the temperature may not show additional warming temporarily."[328] The question is, How long is temporarily? At this writing the global temperature has not increased during the past 16 years. The assertion that it will resume warming at some time in the future is a prediction, not a fact. And even if warming does resume, it is possible that this may be due to natural factors. *It is not logical to believe that natural factors are only responsible for cooling and not for warming.*

The situation is complicated further by the revelations of "Climategate" in November 2009, which clearly showed that many of the most influential climate scientists associated with the IPCC have been manipulating data, withholding data, and conspiring to discredit other scientists who do not share their certainty that we are the main cause of global warming.[329] It has also been well documented that the NASA Goddard Institute for Space Science, which is responsible for one of the primary temperature records, has dropped a large number of weather stations, mainly in colder regions, thus likely making it seem warming is occurring even though this may not be the case.[330] The situation is in such a state of flux that it may be several years before an objective process is in place to sort out what is believable and what is not.

Leading up to the 15th Conference of the Parties in the Framework Convention on Climate Change in Copenhagen in December 2009, the IPCC, the European Union, and many other participants warned we must keep global temperatures from rising more than 2 degrees Celsius (3.6 degrees Fahrenheit) or we will face climate catastrophe.[331] Yet the global temperature has been 6 to 8 degrees Celsius (11 to 14 degrees Fahrenheit) warmer than it is today through most of the past 500 million years. It seems clear that the real "climate catastrophes" are the major glaciations that occurred during the Ice Ages, not the warm Greenhouse Ages when life flourished from pole to pole.

328. "Scientist Explains Earth's Warming Plateau," National Public Radio, November 22, 2009 http://www.npr.org/templates/story/story.php?storyId=120668812&ft=1&f=1007

329. James Delingpole, "Climategate: The Final Nail in the Coffin of 'Anthropogenic Global Warming'?" *Telegraph*, November 20, 2009, http://blogs.telegraph.co.uk/news/jamesdelingpole/100017393/climategate-the-final-nail-in-the-coffin-of- ... - ... anthropogenic global-warming/

330. Joseph D'Aleo and Anthony Watts, "Surface Temperature Records: Policy-Driven Deception?" Science & Public Policy Institute, June 2, 2010, http://scienceandpublicpolicy.org/images/stories/papers/originals/surface_temp.pdf

331. James Murray, "IPCC Chief Warns Even Two Degree Rise Spells 'Bad News'," businessgreen.com, March 10, 2009, http://www.businessgreen.com/business-green/news/2238184/ipcc-chief-warns-two-degree

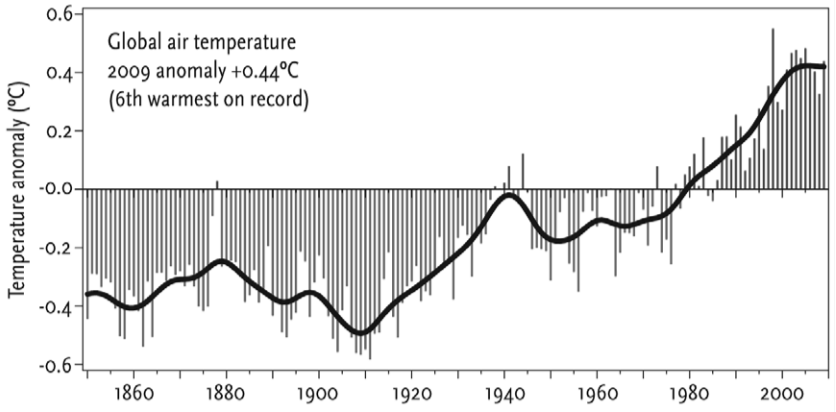


Figure 2. Global temperature trends 1860–2008 according to Phil Jones of the Climatic Research Unit in the U.K.

The graph on this page, Figure 2, is a record of global temperatures from 1850 to 2008, as prepared by the Climatic Research Unit at the University of East Anglia in the U.K.[332] It was authored by Phil Jones, who was at the centre of the "Climategate" scandal. As previously mentioned, the emails he and his colleagues exchanged indicated they withheld data, manipulated data, and attempted to discredit other scientists who held contrary views. Jones was suspended from his post in November 2009, pending an inquiry into the scandal. Therefore the data this graph is based on are not necessarily credible; they need to be rigorously re-examined.[333] But the graph does provide a useful tool for examining a couple of points about recent temperature trends.

The graph indicates global temperature has risen by about 0.8 degrees Celsius (1.4 degrees Fahrenheit) over the past 150 years. But about half of this warming occurred from 1910 to 1940, before the huge increase in CO_2 emissions from fossil fuel that began after the Second World War. What caused this increase? We simply don't know. Then there was a period of cooling from 1940 to 1980, just as CO_2 emissions started to increase dramatically. In the mid-1970s, mainstream magazines and newspapers, including *Time*, *Newsweek*, and the *New York Times*, published articles on the possibility of a coming cold period, perhaps another Ice Age.[334] [335] These articles were based on interviews with scientists at the National Academy of Sciences and NASA, among others. Prominent supporters of the global cooling

332. Phil Jones, "Global Temperature Record," Climatic Research Unit, March 2010, http://www.cru.uea.ac.uk/cru/info/warming/

333. Joseph D'Aleo and Anthony Watts, "Surface Temperature Records: Policy-Driven Deception?" Science & Public Policy Institute, June 2, 2010, http://scienceandpublicpolicy.org/images/stories/papers/originals/surface_temp.pdf

334. Mauritzio Marabito, "Same Fears: Different Name?" *Spiked*, December 10, 2009, http://www.spiked-online.com/index.php/site/article/7817/

335. Robert Bradley Jr, "The Global Cooling Scare Revisited ('Ice Age' Holdren Had Plenty of Company)," Master Resource, September 26, 2009, http://www.masterresource.org/2009/09/the-global-cooling-scare-revisited/

theory included present-day global warming supporters such as John Holdren, the Obama administration's science czar[337] and the late Stephen Schneider, a former leading member of the IPCC.[338]

In 1980, global temperatures began a 20-year rise, according to the now questionable records used by the IPCC for its predictions of climate disaster. This is the only period in the 3.5 billion years of life on earth in which the IPCC attributes climate change to human activity. Since 1998 there has been no further increase in global temperature, even according to the IPCC sources. How does one 20-year period of rising temperatures out of the past 150 years prove we are the main cause of global warming?

The alarmists declare that the present warming trend is "unprecedented" because it is happening on a scale of centuries whereas past warming trends have been much slower, giving species time to adapt. This is shown to be false even during the past century. The IPCC does not contend that humans caused the warming from 1910 to 1940; therefore it must have been a natural warming trend. But the warming from 1910 to 1940 was just as large (0.4 degrees Celsius or 0.7 degrees Fahrenheit) and just as rapid over time as the supposed human-caused warming from 1975 to 2000. How can scientists who claim to be on the cutting edge of human knowledge miss this point?

It is a testament to the fickleness of trends in science, public policy, and media communications that such certainty about human-caused climate change came about. That era finally seems to have ended now that more attention is being paid to the proposition that we really don't have all the answers. One hopes this will usher in a more sensible conversation about climate change and a more balanced approach to climate change policy.

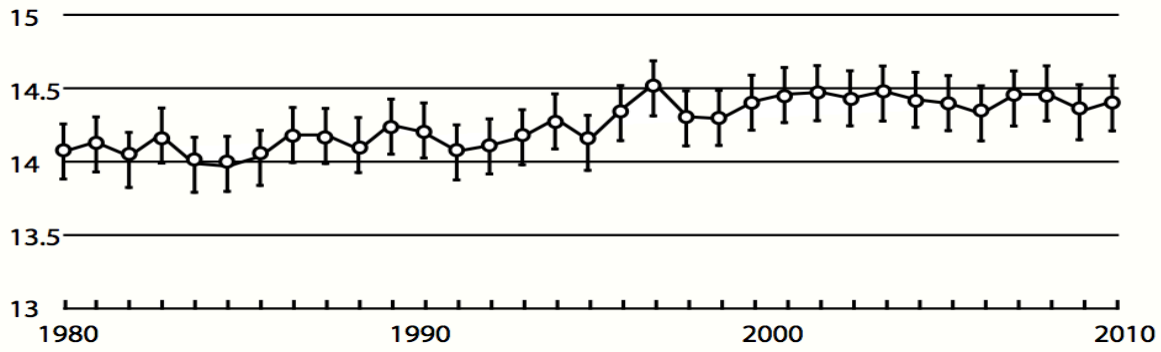


Figure 3. The HadCRUT 3 record of global temperature since 1980. There is no statistically significant increase in temperature since 1997.[336]

336. http://www.thegwpf.org/temperature-standstill-continues-2012-scrapes-top-ten/hadcrut3-2/
337. "John Holdren in 1771: 'New Ice Age Likely'," Zomblog, September 16, 2009, http://www.zombietime.com/zomblog/?p=873
338. John L. Daly, "Stephen Schneider: Greenhouse Superstar," August 2008, http://www.john-daly.com/schneidr.htm

In early 2013 there were three independent announcements by leading believers in human-caused catastrophic climate change that confirmed the standstill in global temperature. James Hansen, Director of the NASA Goddard Institute for Space Studies and senior science advisor to Al Gore, stated "The 5-year running mean of global temperature has been flat for the past decade." In January 2013 The UK Met Office and the Climatic Research Unit of the University of East Anglia released the data for December in their Hadcrut3 and Hadcrut4 global temperature datasets. The data clearly shows that there has been no increase in global temperature for 16 years, since 1997. In an interview with The Australian in February 2013, Rajenda Pachauri, the chair of the Intergovernmental Panel on Climate Change, acknowledged the reality of the post-1997 standstill in global average temperatures.

Carbon Dioxide

The trains carrying coal to power plants are death trains. Coal-fired power plants are factories of death. —James Hansen, director, NASA Goddard Institute for Space Studies, science advisor to former vice president Al Gore

The entire global warming hypothesis rests on one belief—human emissions of CO_2 are causing rapid global warming that will result in a "catastrophe" if we don't cut emissions drastically, beginning now. Let's look at the history, chemistry, and biology of this much-maligned molecule.

Carbon dioxide (CO_2) and carbon are probably the most talked about substances in the world today. We hear the term "carbon footprint" every day and fossil fuels are now routinely described as "carbon-based energy." True believers speak of CO_2 as if it is the greatest threat we have ever faced. Perhaps our CO_2 emissions will have some negative effects. But in my view CO_2 is one of the most positive chemicals in our world. How can I justify this statement given that the US Environmental Protection Agency has declared CO_2 and other greenhouse gases are "pollutants" that are dangerous to human health and the environment?[339]

What about the undisputed fact that CO_2 is the most important food for all life on earth? Every green plant needs CO_2 in order to produce sugars that are the primary energy source for every plant and animal. To be fair, water is also essential to living things, as are nitrogen, potassium, phosphorus, and many other minor elements. But CO_2 is the most important food, as all life on earth is carbon-based, and the carbon comes from CO_2 in the atmosphere. Without CO_2 life on this planet would not exist. How important is that?

339. "Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act," U.S. Environmental Protection Agency, December 7, 2009, http://www.epa.gov/climatechange/endangerment.html

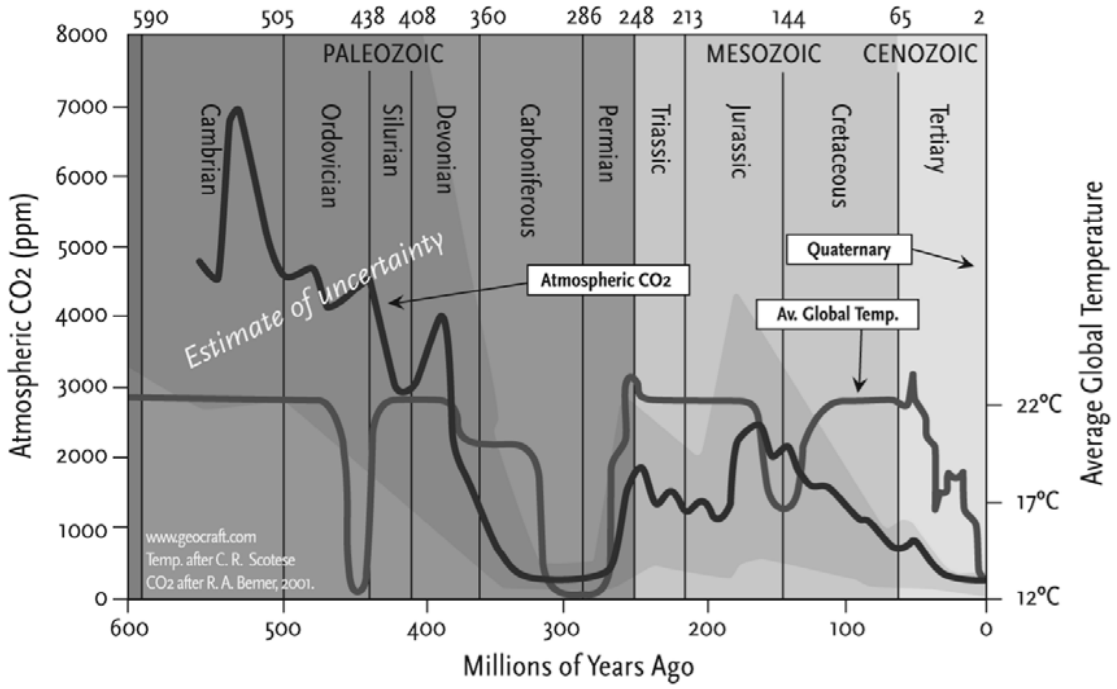


Figure 4. This graph shows global levels of CO2 and the global temperature for the past 600 million years. The correlation between the two parameters is mixed at best, with an Ice Age during a period of high CO2 levels and Greenhouse Ages during a period of relatively low CO2 levels.340

When President Obama appointed Lisa Jackson as head of the EPA, she promised to "ensure EPA's efforts to address the environmental crises of today are rooted in three fundamental values: science-based policies and programs, adherence to the rule of law, and overwhelming transparency." During the EPA's deliberations on the "endangerment" ruling for CO_2, one of its top economic policy experts, Alan Carlin, a 35-year veteran of the agency, presented a 98-page analysis concluding that the science behind man-made global warming is inconclusive at best and that the agency should re-examine its findings. His analysis noted that global temperatures were on a downward trend. It pointed out problems with climate models. It highlighted new research about climate change that contradicts apocalyptic scenarios. "We believe our concerns and reservations are sufficiently important to warrant a serious review of the science by EPA," the report read.

In response to the report Carlin's boss, Al McGartland, emailed him, forbidding him from engaging in "any direct communication" with any- one outside his office about his analysis. In a follow-up email, McGartland wrote, "With the endangerment finding nearly final, you need to move on to other issues and subjects. I don't want you to spend any additional EPA time on climate change.

340. Monte Hieb, "Climate and the Carboniferous Period," Plant Fossils of West Virginia, March 21, 2009, http://www.geocraft.com/WVFossils/Carboniferous_climate.html

No papers, no research, etc., at least until we see what EPA is going to do with Climate."[341] These emails were leaked. So much for transparency, and so much for science.

There is an interesting parallel here with the issue of chlorine, a chemical described by Greenpeace as the "devil's element." There are some chlorine-based chemicals that are very toxic and should be tightly con- trolled and even banned in certain contexts. But as discussed earlier, chlorine is the most important element for public health and medicine, just as carbon is the most important element for life. And yet Greenpeace and its allies give the impression these two building blocks of nature are essentially evil. It is time to bring some balance into this discussion.

Al Gore is fond of reminding us that there is more CO_2 in the atmosphere today than there has been for the past 400,000 years.[342] He may be correct, although some scientists dispute this.[343] But 400,000 years is a blink of an eye in geological history. It is also true to state that CO_2 levels in the atmosphere have rarely been as low as they are today over the entire 3.5 billion years of life on earth, and particularly during the past 500 million years since modern life forms evolved. Figure 4 (previous page) shows the historic levels of CO_2 as well as the global temperature, going back 600 million years

Note the graph shows CO_2 was at least 3000 ppm, and likely around 7000 ppm, at the time of the Cambrian Period, a Greenhouse Age when modern life forms first evolved. This is nearly 20 times the CO_2 concentration today. The Ice Age that peaked 450 million years ago occurred when CO_2 was about 4000 ppm, more than 10 times its present level. If both warm and cold climates can develop when there is far more CO_2 in the atmosphere than today, how can we be certain that CO_2 is determining the climate now?

The graph does show a limited correlation between temperature and CO_2 during the late Carboniferous, and a very weak correlation from then until today. It is true that the most recent Ice Age corresponds with a relatively low CO_2 level in the atmosphere. None of this is intended to make the argument that CO_2 does not influence climate. I am no denier. We know that CO_2 is a greenhouse gas and that it plays a role in warming the earth. The real questions are: How much of a role? and If warming is caused by our CO_2 emissions, does this really harm people and the planet?

Coming closer to the present, one of the best sets of data comes from ice cores at the Russian Vostok station in Antarctica. These cores give

341. Kimberley A. Strassel, "The EPA Silences a Climate Skeptic," *Wall Street Journal*, July 3, 2009, http://online.wsj.com/article/SB124657655235589119.html

342. Dave McArthur, "The Inconvenient Truth About *An Inconvenient Truth*," *Scoop*, July 26, 2006, http://www.scoop.co.nz/stories/HL0607/S00400.htm

343. Ernst-Georg Beck, "180 Years of Atmospheric CO_2 Gas Analysis by Chemical Methods," *Energy and Environment*,18, no. 2 (2007), http://icecap.us/images/uploads/EE_18-2_Beck.pdf

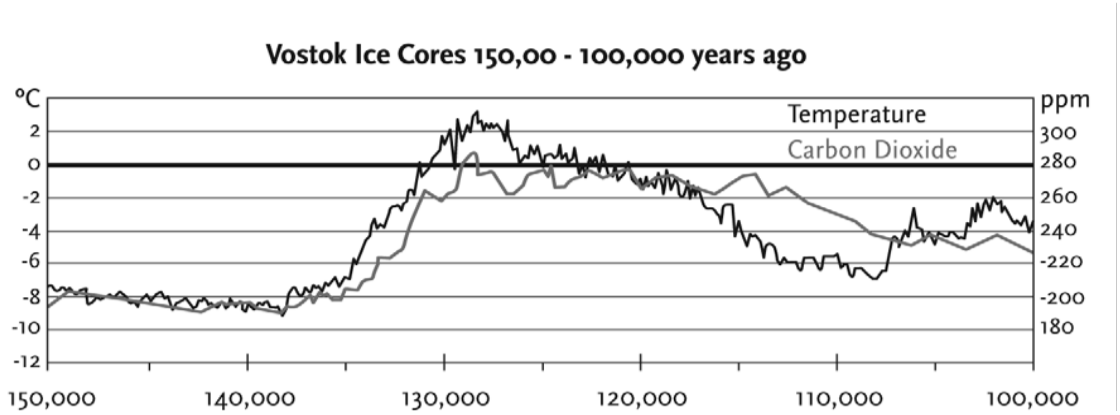


Figure 5. Graph showing temperature and CO_2 levels from 150,000 to 100,000 years ago. Note that temperature rises ahead of a rise in CO_2.

us a picture of both temperature and atmospheric CO_2 levels going back 420,000 years. Al Gore uses this information in his film *An Inconvenient Truth* to assert that it provides evidence that increased CO_2 causes an in- crease in temperature. Closer examination of the data shows that it is the other way around.[344] Through most of this period it is temperature that leads CO_2 as shown for the period 150,000 to 100,000 years ago in Figure 5. When temperature goes up, CO_2 follows and when temperature goes down, CO_2 follows it down.

This does not prove that increases in temperature cause increases in CO_2, it may be that some other common factor is behind both trends. But it most certainly does not indicate rising CO_2 levels cause increases in temperature. It may be that CO_2 causes a tendency for higher temperatures but that this is masked by other, more influential factors such as water vapor, the earth's orbit and wobbles, etc.

The April 2008 edition of *Discover* magazine contains a full-page article about plants, written by Jocelyn Rice, titled, "Leaves at Work." The article begins with this passage, "In the era of global warming, leaves may display an unexpected dark side. As CO_2 concentrations rise, plants can become full. As a result, their stomata—the tiny holes that collect the CO_2...will squeeze shut. When the stomata close, plants not only take less CO_2 from the air but also draw less water from the ground, resulting in a run of water into rivers. The *stomata effect* [my emphasis] has been responsible for the 3 percent increase in river runoff seen over the past century."[345] At this point my BS meter came on. There is no possibility anyone has a data set that could determine a 3 percent increase in global

344. Joanne Nova, "Carbon Follows Temperature in the Vostok Ice Cores," JoNova, 2008–2010, http://joannenova.com.au/global-warming/ice-core-graph/

345. Jocelyn Rice, "Leaves at Work," *Discover* magazine, April 2008, p. 17 http://www.beattystreetpublishing.com/confessions/references/stomata-effect

river runoff in the past 100 years. The U.K.'s Hadley Centre for Climate Prediction and Research was given as the source of this information. A thorough review of the Hadley Centre website turned up nothing on the subject.[346]

The story goes on to predict that, given present trends in CO_2 emissions, "runoff within the next 100 years could increase by as much as 24 percent above pre-industrial levels... in regions already hit hard by flooding, the stomata effect could make matters much worse." The Great Flood will return and inundate the earth due to trillions of tiny stomata shutting their doors in the face of too much CO_2!

I also knew immediately that the entire article was bogus because I am familiar with the fact that greenhouse growers purposely divert the CO_2 -rich exhaust gases from their wood or gas heaters into their greenhouses in order to greatly increase the CO_2 level for the plants they are growing. I searched the Internet using the phrase "optimum CO_2 level for plant growth." All I needed were the first few results to see plants grow best at a CO_2 concentration of around 1500 ppm, which boosts plant yield by 25 to 65 percent.[347] The present CO level in the global atmosphere is about 390 ppm. In other words, the trees and other plants that grow around the world would benefit from a level of CO_2 about four times higher than it is today. There is solid evidence that trees are already showing increased growth rates due to rising CO levels.[348]

Greenhouse growers are able to obtain growth rates that are 40 to 50 percent higher than the rates plants grow under in today's atmospheric conditions. This makes sense when you consider that CO_2 levels were generally much higher during the time when plant life was evolving than they are today. The fact is, at today's historically low CO_2 concentrations, all the plants on earth are CO_2-deprived. Those plants are starving out there!

Yet believers in catastrophic climate change will not abide by this clear evidence. In May 2010 Science magazine published an article titled, "Carbon Dioxide Enrichment Inhibits Nitrate Assimilation in Wheat and Arabidopsis."[349] The article implied that increased CO levels in the atmos phere might inhibit the uptake of nitrogen. The popular press interpreted this as evidence that increased CO_2 might not result in increased growth rates, as has been conclusively demonstrated in hundreds of lab and field experiments.[350] This is why greenhouse growers purposely inject CO into their greenhouses. Typically, the *Vancouver Sun* ran with the headline,

346. "Met Office Hadley Centre," Met Office, http://www.metoffice.gov.uk/climatechange/science/hadleycentre/

347. "Indoor Growing: Using CO_2," Planet Natural, http://www.planetnatural.com/site/xdpy/kb/implementing-co2.html

348. "Forest are Growing Faster, Climate Change Appears to be Driving Accelerated Growth," Smithsonian Environmental Research Center, February 1, 2010, http://sercblog.si.edu/?p=466

349. Arnold J. Bloom, "Carbon Dioxide Enrichment Inhibits Nitrate Assimilation in Wheat and Arabidopsis," *Science* 328, no. 5980 (May 14, 2010): 899–903, http://www.sciencemag.org/cgi/content/abstract/328/5980/899

350. "Plant Growth Database," *CO_2 Science*, http://www.co2science.org/data/plant_growth/plantgrowth.php

"Rising Carbon Dioxide Levels May Hinder Crop Growth: Greenhouse Gas Is Not Beneficial to Plants, As Once Thought."[351] The Science article was clever enough not to suggest that CO_2 would "hinder" plant growth, or even to question the proven fact that CO_2 increases plant growth. But by raising a side issue of nitrogen uptake it encouraged the media to make sensationalist claims, apparently debunking the fact that doubling, tripling, or even quadrupling CO_2 results in increased growth, regardless of some point about nitrogen.

It may turn out to be a very good thing that humans discovered fossil fuels and started burning them for energy. By the beginning of the Industrial Revolution CO_2 levels had gradually diminished to about 280 ppm. If this trend, which had been in effect for many millions of years, had continued at the same rate it would have eventually threatened plant life at a global level. At a level of 150 ppm, plants stop growing altogether. If humans had not appeared on the scene, it is possible that the declining trend in CO_2 levels that began 150 million years ago would have continued. If it had continued at the same rate, about 115 ppm per million years, it would have been a little over one million years until plants stopped growing and died. And that would be the end of that!

This is perhaps my most heretical thought: that our CO_2 emissions may be largely beneficial, possibly making the coldest places on earth more habitable and definitely increasing yields of food crops, energy crops, and forests around the entire world. Earlier I referred to my meeting with James Lovelock, the father of the Gaia Hypothesis and one of the world's leading atmospheric scientists. I found it strange he was so pessimistic about the future, and cast our species as a kind of rogue element in the scheme of life.

Whereas the Gaia Hypothesis proposes that all life on earth acts in concert to control the chemistry of the atmosphere in order to make it more suitable for life, Lovelock believes human-caused CO_2 emissions are the enemy of Gaia. But surely humans are as much a part of Gaia as any other species, past or present? How could we know we are the enemy of Gaia rather than an agent of Gaia, as one would expect if "all life is acting in concert"? In other words, is it not plausible that Gaia is using us to pump some of the trillions of tons of carbon, which have been locked in the earth's crust over the past billions of years, back into the atmosphere? Perhaps Gaia would like to avoid another major glaciation, and more importantly avoid the end of nearly all life on earth due to a lack of CO_2. One thing I know for sure is we should be a lot more worried the climate will cool by 2 or 3 degrees Celsius than we should be about it warming by 2

351. Amina Khan, "Rising Greenhouse Gas Levels May Hinder Crop Growth," *Vancouver Sun*, May 15, 2010, http://www.vancouversun.com/health/Rising+carbon+dioxide+levels+hinder+crop+growth/3031640/story.html#ixzz0oFzR7jth

or 3 degrees Celsius. Cooling would definitely threaten our food supply; warming would almost certainly enhance it.

I'm not saying I buy into the entire Gaia Hypothesis hook, line, and sinker. I find some aspects of it very compelling, but it might be a bit of a stretch to believe all life is acting in harmony, like on the planet Pandora in the movie *Avatar*. But that's not my point. What bothers me is the tendency to see all human behavior as negative. Lovelock and his followers seem to need a narrative that supports the idea of original sin, that we have been thrown out of the Garden of Eden, or is it the Garden of Gaia?

The Hockey Stick

No discussion of climate change would be complete without mention of the infamous hockey stick graph of global temperature. The graph, said to depict Northern Hemisphere temperatures over the past 1,000 years, was created by Michael Mann of Pennsylvania State University and his colleagues. It shows a very even temperature until the modern age when there is a steep rise.[352] The surprise for many scientists was that the graph implied the Medieval Warm Period and the Little Ice Age did not exist and that the only significant change in temperature during the past 1000 years was a precipitous rise during the past century. The graph was very controversial in climate science circles. Despite the sharp debate, it was showcased in the 2001 and 2004 reports of the IPCC. [353]

Two Canadians, Steve McIntyre, a retired mining engineer, and Ross McKitrick, an economist, became concerned that the data used to create the hockey stick graph were not objective and the statistical analysis used was not legitimate. They asked Mann and others to provide them with the original data and the statistical methods used to arrive at the hockey stick graph. Mann and his colleagues at the Climatic Research Unit (CRU) at the University of East Anglia refused repeated requests to supply the data. The effort to obtain the data went on for 10 years as the researchers even refused requests under Freedom of Information Act rules. It was not until the release of thousands of emails from the CRU that it became clear information was being withheld illegally and there was a conspiracy of sorts to manipulate the data and discredit opposing opinions.

In 2003 McIntyre and McKitrick published a critique of the hockey stick graph in *Energy & Environment* in which they contended that Mann's paper contained, "collation errors, unjustifiable truncation or

352. Michael E. Mann et al., "Global-Scale Temperature Patterns and Climate Forcing Over the Past Six Centuries," *Nature* 392 (April 23, 1998). http://www.junkscience.com/MSU_Temps/PDF/mann1998.pdf

353. Suzanne Goldenberg, "'Hockey Stick' Graph Creator Michael Mann Cleared of Academic Misconduct," *Guardian*, February 3, 2010, http://www.guardian.co.uk/environment/2010/feb/03/climate-scientist-michael-mann

extrapolation of source data, obsolete data, geographical location errors, incorrect calculation of principal components and other quality control defects."[354] As a result of this and other critiques the IPCC did not use the hockey stick graph again in its 2007 report. The continuing debate over this graph highlights the absence of a consensus on the temperature record, never mind whether or not humans are responsible for climate change.

What's So Good About Glaciers, Anyway?

Much has been made of the fact that many glaciers around the world have been retreating in recent years. By many accounts we should be viewing this with alarm. The potential loss of glaciers is portrayed as an ecological catastrophe, as if it were equivalent to a species becoming extinct. In its June 2007 issue the *National Geographic* magazine reported that a certain Peruvian glacier was in a "death spiral," as if it were a living thing.[355] What should we make of this hysterical reaction to melting ice?

It is important to recognize that glaciers have been retreating for about 18,000 years, since the height of the last glaciation. It has not been a steady retreat as there have been times, such as during the Little Ice Age, when the glaciers advanced. But there is no doubt that in balance there has been a major retreat and it appears to be continuing today.

The retreat of the glaciers is largely a result of the climate becoming warmer. It brings us back to the question of whether humans are responsible for the warming or if it is just a continuation of the trend that began 18,000 years ago. Either way, we then must ask whether, in balance, this is a good thing or a bad thing. We know the climate was warmer than it is today during most of the past 500 million years, and that life flourished during these times. We also know there is very little life on, in, or under a glacier. Glaciers are essentially dead zones, proof that ice is the enemy of life.

When a glacier retreats up the valley it carved, the bedrock and gravels are exposed to light and air. Seeds find their way there, on the wind and in bird droppings, and can germinate and grow. Before long the lifeless barrens become a newly developing ecosystem full of lichens, mosses, ferns, flowering plants, and eventually, trees. Isn't it fairly obvious that this is a better environmental condition than a huge blob of frozen water that kills everything beneath it? Glaciers certainly are photogenic, but as we dis-

354. Stephen McIntyre and Ross McKitrick, "Corrections to the Mann et al. (1998) Proxy Data Base and Northern Hemispheric Average Temperature Series," *Energy & Environment* 14, no. 6 (2003): 751–771, http://www.uoguelph.ca/~rmckitri/research/MM03.pdf 355. Tim Appenzeller, "The Big Thaw," *National Geographic*, June 2007, http://ngm.nationalgeographic.com/2007/06/big-thaw/big-thaw-text

cussed in the chapter on forests, you can't judge the health of an ecosystem by the fact that it looks pretty. Sand dunes make for nice scenery too, but they aren't very welcome when they bury a town and kill all the crops.

Much attention has been focused on the Greenland ice cap, virtually one big glacier with many arms to the sea. During the warming that occurred in the 1980s and 1990s it was reported that the Greenland ice cap was melting rapidly. Al Gore predicted the sea might rise by 20 feet in the next century, apparently assuming the entire ice cap might melt in 100 years.[356] This is a physical impossibility. The high elevation and extreme low temperatures dictate that it would take at least thousands of years for the glaciers of Greenland to disappear.

More recently the focus has been on the Himalayan glaciers, the largest ice cap outside the Polar Regions. The story of what has become "Glaciergate" helps to illustrate the present very confused state of climate science and of how important glaciers are, or are not. The 2007 report of the IPCC, its fourth report, stated Himalayan glaciers may be completely gone by 2035, less than 25 years from now.[357] [358] The report warned, "if the present rate continues, the likelihood of them disappearing by the year 2035 and perhaps sooner is very high if the Earth keeps warming at the current rate." It was not until the lead-up to the 2009 Kyoto Protocol meeting in Copenhagen that scientists began to question this assertion. The Ministry of the Environment in India published a paper rejecting the 2035 prediction, stating that it would be hundreds of years before the glaciers melted, even if the present warming trend continued.[359] This caused the chairman of the IPCC, Dr. Rajendra Pachauri, who happens to be Indian, to denounce the Environment Ministry's report as "voodoo science."[360]

It was not until after the Copenhagen conference that the IPCC published an admission of error. They stated, "In drafting the paragraph in question, the clear and well-established standards of evidence, required by the IPCC procedures, were not applied properly."[361] Yet Dr. Pachauri refused to apologize for calling the Environment Ministry's report "voodoo science."[362] It was revealed that the 2035 date was based

356. Jeffrey Masters, "Al Gore's *An Inconvenient Truth*," Weather Underground, http://www.wunderground.com/education/gore.asp
357. "The Himalayan Glaciers," Intergovernmental Panel on Climate Change, 2007, http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch10s10-6-2.html
358. "IPCC Slips on the Ice with Statement About Himalayan Glaciers," climatesciencewatch.org, January 19, 2010, http://www.climatesciencewatch.org/index.php/csw/details/ipcc_slips_on_the_ice/
359. V. K. Raina, "Himalayan Glaciers," Science & Public Policy Institute, November 12, 2009, http://scienceandpublicpolicy.org/reprint/himalayan_review_of_glacial_studies.html
360. "Pachauri Calls Indian Govt. Report on Melting Himalayan Glaciers as 'Voodoo Science,'" *Thaindian News*, January 9, 2010, http://www.thaindian.com/newsportal/health/pachauri-calls-indian-govt-report-on-melting-himalayan-glaciers-as-voodoo-science_100301232.html
361. "Worldwide Glacier Melt a Real Concern; Himalaya Controversy Leaves Questions About IPCC Leadership, climatescience-watch.org, January 21, 2010, http://www.climatesciencewatch.org/index.php/csw/details/glacier-melt-ipcc-controversy/
362. "Pachauri Won't Apologies [sic.], Admits IPCC's Credibility Damaged," *India Post*, February 3, 2010, http://www.indiapost.com/international-news/6964-Pachauri-wont-apologies-admits-IPCCs-credibility-damaged.html

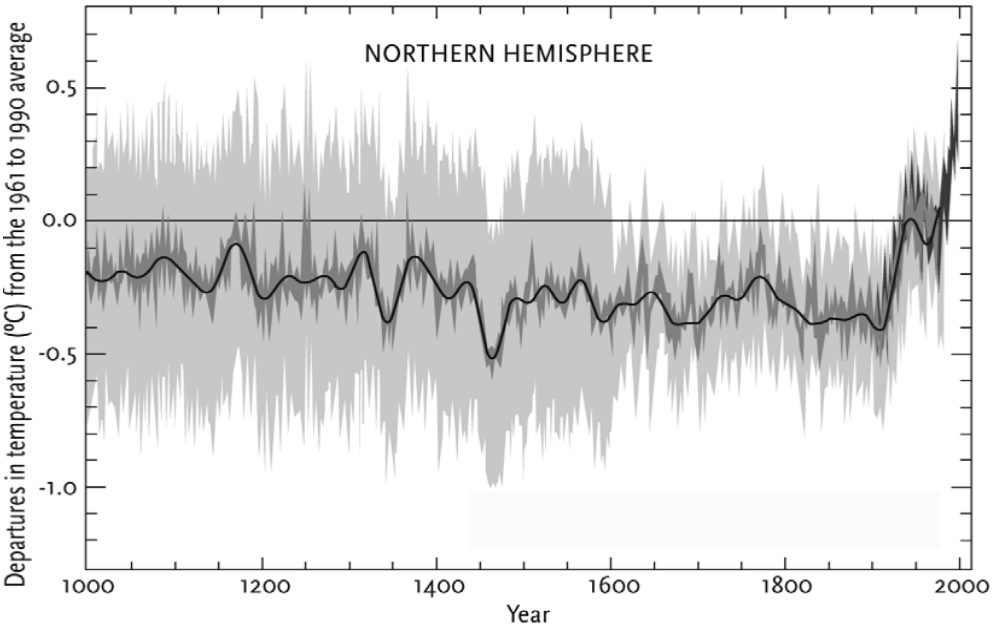


Figure 6. The Michael Mann Hockey Stick Graph as it appeared in the 2001 Assessment Report of the Intergovernmental Panel on Climate Change. 363

on an interview by *New Scientist* magazine of a single Indian scientist, who subsequently admitted his statement was "speculative."[364] The *New Scientist* article was then referred to in a 2005 WWF report on glaciers, which was cited as the only reference in support of the 2035 date.[365]

This has caused something of a crisis of credibility for the IPCC, which had insisted all its predictions were based on peer-reviewed science. As it turns out, the most credible scientists who specialize in the subject of Himalayan glaciers believe it would take at least 300 years for them to melt completely, even if it continues to get warmer. Other indefensible statements in the IPCC report then emerged regarding the disappearance of the Amazon rain forest[366] and the collapse of agricultural production in Africa.[367]

363. "Working Group I: The Scientific Basis," Intergovernmental Panel on Climate Change, 2001, http://www.ipcc.ch/ipccreports/tar/wg1/005.htm

364. Fred Pearce, Debate Heats Up Over IPCC Melting Glaciers Claim, *New Scientist*, January 11, 2010, http://www.newscientist.com/article/dn18363-debate-heats-up-over-ipcc-melting-glaciers-claim.html

365. Jonathan Leake and Chris Hastings, "World Misled Over Himalayan Glacier Meltdown," *Sunday Times*, January 17, 2010, http://www.timesonline.co.uk/tol/news/environment/article6991177.ece

366. Christopher Booker, "Amazongate: New Evidence of the IPCC's Failures," *Telegraph*, January 30, 2010, http://www.telegraph.co.uk/comment/columnists/christopherbooker/7113582/Amazongate-new-evidence-of-the-IPCCs-failures. html

367. Lawrence Solomon, "Climategate Is One of Many Known IPCC Failings," *Financial Post*, February 26, 2010, http://network.nationalpost.com/np/blogs/fpcomment/archive/2010/02/06/392245.aspx

Perhaps the most bizarre case of logical disconnect in the climate change hysteria involves the predictions of disaster if the Himalayan glaciers continue to melt. Lester Brown, president of the Earth Policy Institute, predicts that if this happens there will be mass starvation in Asia.[368] The theory goes like this: the meltwater from the glaciers is essential for irrigation of food crops throughout much of Asia. The Ganges, Indus, Mekong, Yellow, Yangtze, and many other rivers flow from the Himalayas, providing water for over one-third of the human population. If these glaciers were to melt completely, there would be no more meltwater for irrigation, and so food production would plummet, resulting in mass starvation. This seems plausible to many people and has been repeated countless times in the media as another "catastrophic" aspect of climate change.

After hearing Lester Brown speak at length about this doomsday scenario, it dawned on me that his thesis was illogical. On the one hand he is saying the meltwater (from the melting glaciers) is essential for food production, and on the other hand he insists that we must try to stop the glaciers from melting so they will not disappear. Obviously if the glaciers stop melting, there will be no more meltwater from them. So my questions for Lester Brown, and the IPCC, are, Are you saying you want the glaciers to stop melting? Then where would the irrigation water come from? I might add, How about if the glaciers started growing again, reducing water flows even further, perhaps advancing on the towns where the food is grown?

It has since been revealed that only 3 to 4 percent of the water flowing into the Ganges River is glacial meltwater. Ninety-six percent of the river flow is from snow that fell in the previous winter and melted in the summer, and from rainfall during monsoons.[369] Therefore the people will not likely starve if the glaciers melt completely. A warmer world with higher CO_2concentrations, and likely more precipitation, will allow expansion of agricultural land and will result in faster-growing, more productive crops. Forests and crops will grow where now there is only a sheet of ice. I say let the glaciers melt.

Arctic and Antarctic Sea Ice

The Arctic and Antarctic regions are polar opposites in more ways than one. Whereas the Arctic is mainly an ocean surrounded by continents, the Antarctic is a large continent, almost centered on the South Pole, surrounded by seas. The Antarctic is colder than the Arctic largely due

368. Lester R. Brown, "Melting Mountain Glaciers Will Shrink Grain Harvests in China and India," Earth Policy Institute, March 20, 2008, http://www.earthpolicy.org/index.php?/plan_b_updates/2008/update71

369. Palava Bagla, "No Sign of Himalayan Meltdown, Indian Report Finds," *Observatory*, November 15, 2009, http://www.thegwpf.org/the-observatory/91-no-sign-of-himalayan-meltdown-indian-report-finds.html

to its high elevation.[370] The Antarctic ice sheet began to form 20 million years ago and has been a permanent fixture since then, advancing and retreating with the pulses of glaciation over the past 2.5 million years during the Pleistocene Ice Age. The Arctic was largely ice-free until the onset of the Pleistocene and since then has had varying degrees of ice cover as glacial periods have waxed and waned.

Much has been made recently of the fact that the extent of summer sea ice in the Arctic has shrunk substantially. In September of 2007, typically the low month after summer melting, there was about three million square kilometers of ice cover, about two million less than the average since records were first made. Many pundits immediately predicted that the Arctic would be ice-free in the summer within 20 to 30 years, and that this would be our fault entirely. The fact that the area of ice recovered by about one million square kilometers in 2008 and again in 2009 didn't dampen the shrillness of their predictions. In September of 2012 the extent if ice cover again reached a record low, but winter ice cover continued to remain relatively steady, close to the average since measurements began.

Our knowledge of the extent of sea ice in the Arctic and Antarctic began in 1979, the first year satellites were used to photograph the Polar Regions on a continual basis. Before 1979 it is not possible to reconstruct the comings and goings of sea ice, as unlike glaciers, sea ice leaves no trace when it melts. There is an implicit assumption among the true believers that the reduction in sea ice observed in 2007 and 2012 is unique in the historical record and that we are now on a one-way trip to an ice-free Arctic Sea (see Figure 7 on next page). Putting aside the fact that mariners consider an ice-free sea a good thing, it is not possible to conclude a long-term trend in the extent of Arctic sea ice from 30 years of satellite observation.

Between 1903 and 1905 the Norwegian Raold Amundsen became the first person to navigate the Northwest Passage in a 47-ton sailing ship equipped with a small gasoline motor.[371] We do not know the extent of ice over the entire Arctic at that time but the fact that a small boat could sail through the passage indicates the present era was not the only time the area of ice was reduced.

Between 1940 and 1944, years before we had any idea of the extent of sea ice during the summers and winters, a small Canadian trawler name the *St. Roch* navigated the Northwest Passage twice, from west to east and from east to west.[372] [373] It was not an icebreaker and it had only a 150-horsepower diesel engine and sails. From 1910 to 1940 there was a well-documented rise in the average global temperature of nearly half

370. "Antarctic Climate," Wikipedia, http://en.wikipedia.org/wiki/Antarctica#Climate
371. "Roald Amundsen," Wikipedia, http://en.wikipedia.org/wiki/Roald_Amundsen
372. Noel Sheppard, "Reports of Record Arctic Ice Melt Disgracefully Ignore History," NewsBusters, September 9, 2007, http://newsbusters.org/blogs/noel-sheppard/2007/09/09/reports-record-arctic-ice-melt-disgracefully-ignore-history
373. "Second Through the Passage, First West to East," Athropolis, http://www.athropolis.com/arctic-facts/fact-st-roch.htm

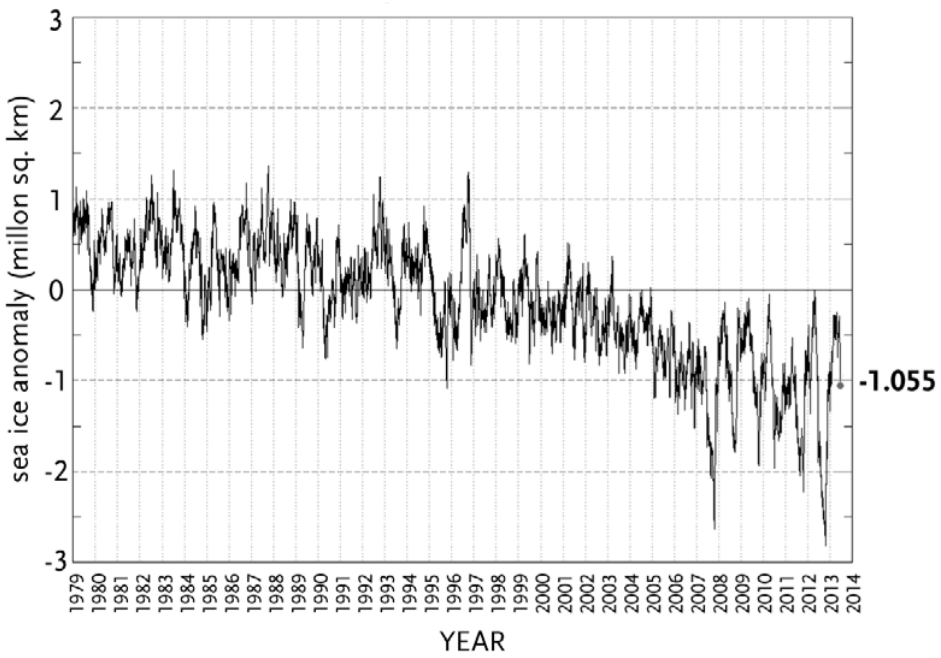
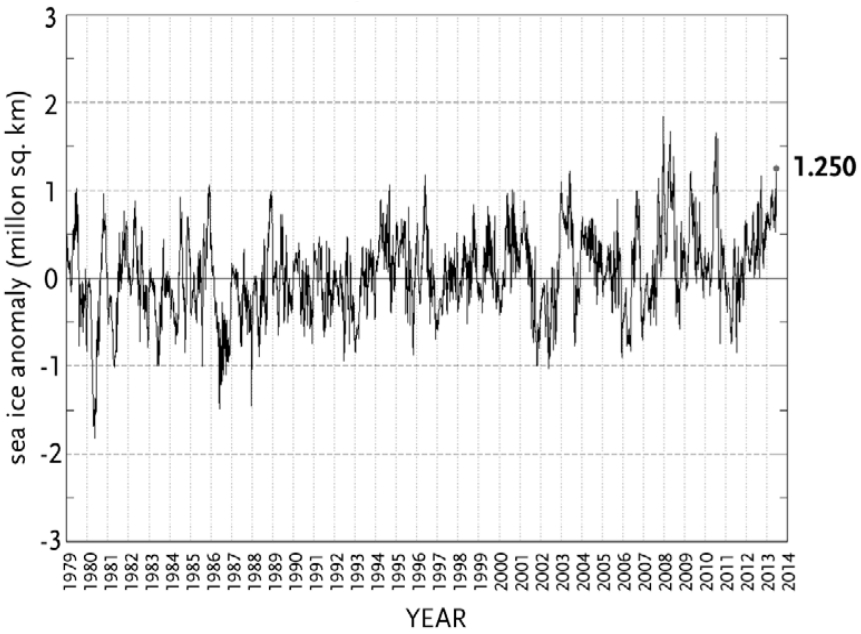


Figure 7. *Northern Hemisphere Sea Ice Anomaly (1979–2008 mean).*The extent of sea ice in the Arctic showed a clear downward trend from 1995 to 2007. Since 2007 it has recovered by about one-third over the lowest area. Only time will tell what the trend will be in the coming decades.

Figure 8. *Southern Hemisphere Sea Ice Anomaly (1979–2008 mean).* Graph showing the deviance from the 1979 to 2008 average extent of sea ice in the Antarctic. The winter of 2007 saw the greatest extent of Antarctic sea ice since measurements were first taken, coincident with the least extent in the Arctic. Whereas the extent of Arctic sea ice has shown a recent downward trend, the extent of Antarctic sea ice has shown an upward trend.



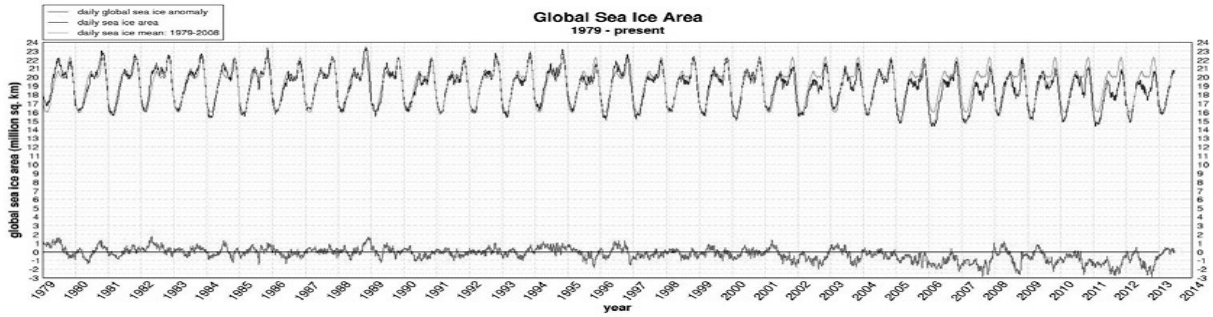


Figure 9. Global sea ice area, 1979 to present. The top line shows the total sea ice cover for the Arctic and the Antarctic. The bottom line shows the divergence from the mean of Arctic and Antarctic sea ice cover. As you can see, there is no significant trend when Arctic and Antarctic sea ice areas are added together.

a degree Celsius. There is every possibility that Arctic ice was as reduced when the *St. Roch* sailed through the passage as it has been in recent years. We will never know.

While all the media's and activist's attention has been on Arctic sea ice, the Antarctic has been playing out its own history in a very different way. The winter sea ice around Antarctica has grown above the average from 1979 to 2008 (See Figure 8). This has proven problematic for believers as it indicates Antarctica is cooling, contrary to what they have been led to believe by predictions based on computer models. In December 2008 *Nature* published an article claiming the Antarctic was warming.[374] Many climate activists, including Al Gore, seized on this article to bolster their belief in human-caused warming.[375] It turned out that the *Nature* article had been largely based on a computer model rather than real measurements of temperature. This represented another turning point in the questioning of the science used to claim humans were definitely causing the earth to warm up.[376]

In 2009 the U.S. Geological Survey (USGS) published a paper in which it reported sea ice had retreated in one part of the Antarctic Peninsula.[377] The paper made it clear that ice was growing in other parts of Antarctica and it was not clear whether the total amount of ice on and around the continent was shrinking or growing. In Greenpeace-like fashion the USGS then issued a media release claiming the sea ice was "disappearing" in Antarctica and that sea level rise was imminent.[378] News services

374. Eric J. Steig et al., "Warming of the Antarctic Ice-Sheet Surface Since the 1957 International Geophysical Year," *Nature* 457 (22 January 2009): 459–462, http://www.nature.com/nature/journal/v457/n7228/abs/nature07669.html 375. Al Gore, "The Antarctic Warming," February 5, 2009, http://blog.algore.com/2009/02/the_antarctic_is_warming.html 376. Christopher Booker, "Despite the Hot Air the Antarctic Is Not Warming Up," *Telegraph*, January 24, 2009, ... http://www.telegraph.co.uk/comment/columnists/christopherbooker/4332784/Despite-the-hot-air-the-Antarctic-is-not- warming-up.html 377. Fenton G. Geological Survey, 2009, http://pubs.usgs.gov/imap/i-2600-c/ Change in Coastal Map of the Palmer Land Area, Antarctica: 1947–2009," U.S. Geological
378. "Ice Shelves Disappearing on Antarctic Peninsula: Glacier Retreat and Sea Level Rise Are Possible Consequences," U.S. Geological Survey Newsroom, February 22, 2010, http://www.usgs.gov/newsroom/article.asp?ID=2409&from=rss_home

picked up this story, which gave the impression Antarctica was melting away. Perhaps the USGS scientists feel the need to sensationalize their otherwise good research in order to get more funding. I don't know, but it certainly misleads the public about what is really happening down there.

The University of Illinois' website, *The Cryosphere Today*, contains the entire record of sea ice since 1979.[379] (The Cryosphere is the area of the earth covered with ice.) Figure 9 (on previous page) shows the global sea ice cover, adding together the Arctic and the Antarctic, from 1979 until the present.[380] This is our total knowledge of the history of sea ice cover on planet Earth. There is no obvious trend up or down because increased ice cover in the Antarctic offsets most of the reduced ice cover in the Arctic. So even the very short record we do have for global sea ice cover provides no evidence of rapid global warming.

Coral Reefs, Shellfish, and "Ocean Acidification"

It has been widely reported in the media, based on a few scientific papers, that the increasing levels of CO_2in the atmosphere will result in "ocean acidification," threatening coral reefs and all marine shellfish with extinction within 20 years.[381] The story goes like this: The oceans absorb about 25 percent of the CO_2we emit into the atmosphere each year. The higher the CO_2content of the atmosphere, the more CO_2will be absorbed by the oceans. When $CO_2$is dissolved in water, some of it is converted into carbonic acid that has a weak acidic effect. If the sea becomes more acidic, it will dissolve the calcium carbonate that is the main constituent of coral and the shells of clams, shrimp, crabs, etc. It is one more doomsday scenario, predicting the seas will "degrade into a useless tidal desert,"[382]

In his latest book, *Eaarth: Making a Life on a Tough New Planet*, Bill McKibben claims, "Already the ocean is more acid than anytime in the last 800,000 years, and at current rates by 2050 it will be more corrosive than anytime in the past 20 million years." In typical hyperbolic fashion, McKibben, the author of the well-know essay, "The End of Nature," uses the words *acid* and *corrosive* as if the ocean will burn off your skin and flesh to the bone if you dare swim in it in 2050. This is just plain fear-mongering.

Results of research published in the journal *Science* by M.R. Palmer et al., indicate that over the past 15 million years, "All five samples record surface seawater pH values that are within the range observed in the oceans today, and they all show a decrease in the calculated pH with depth that is similar to that observed

379. "The Cryosphere Today," Polar Research Group, University of Illinois, http://arctic.atmos.uiuc.edu/cryosphere/
380. "Global Sea Ice Area: 1979 to Present," Polar Research Group, University of Illinois, http://arctic.atmos.uiuc.edu/cryosphere/IMAGES/global.daily.ice.area.withtrend.jpg
381. Frank Pope, "Great Barrier Reef Will Be Gone in 20 Years, Says Charlie Veron," *Sunday Times*, July 7, 2009, http://www.timesonline.co.uk/tol/news/environment/article6652866.ece
382. Richard Girling, "The Toxic Sea," *Sunday Times*, March 8, 2009, http://www.timesonline.co.uk/tol/news/environment/article5853261.ece#cid=OTC-RSS&attr=3392178

in the present-day equatorial Pacific." The five samples recorded pH values for 85,000 years ago and for 2.5, 6.4, 12.1, and 15.7 million years ago.[383]

First, one should point out that the ocean is not acidic, it has a pH of 8.1, which is alkaline, the opposite of acidic. A pH of 7 is neutral, below 7 is acidic, above 7 is alkaline. Researchers have reported in scientific journals that the pH of the seas has gone down by 0.075 over the past 250 years, "Between 1751 and 1994 surface ocean pH is estimated to have decreased from approximately 8.179 to 8.104 (a change of −0.075)."[384] One has to wonder how the pH of the ocean was measured to an accuracy of three decimal places in 1751 when the concept of pH was not introduced until 1909.[385]

It turns out that just as with climate science in general, these predictions are based on computer models. But oceans are not simple systems whose components can just be plugged into a computer. First, there is the complex mix of elements and salts dissolved in the sea. Every element on Earth is present in seawater and these elements interact in complex ways. Then there is the biological factor, tens of thousands of species that are consuming and excreting every day. The salt content of seawater gives the oceans a very large buffering capacity against change in pH. Small additions of acidic and alkaline substances can easily alter the pH of freshwater, whereas seawater can neutralize large additions of acidic and alkaline substances.

One of the most important biological phenomena in the sea is the combining of calcium, carbon, and oxygen to form calcium carbonate, $CaCO_3$, the primary constituent of corals and shells, including the skeletons of microscopic plankton. The formation of calcium carbonate is called calcification. All of the vast chalk, limestone, and marble deposits in the earth's crust are composed of calcium carbonate, which was created and deposited by marine organisms over millions of years. The carbon in calcium carbonate is derived from CO_2 dissolved in seawater. One might therefore imagine that an increase in CO_2 in seawater would enhance calcification rather than destroy it. It turns out this is precisely the case.

As is the case with terrestrial plants, it has been thoroughly demonstrated that increased CO_2 concentration in the sea results in higher rates of photosynthesis and faster growth. Photosynthesis has the effect of in- creasing the pH of the water, making it more alkaline, counteracting any minor acidic effect of the CO itself.[386] The owners of saltwater aquariums

383. M. R. Palmer et al., "Reconstructing Past Ocean pH-Depth Profiles," *Science* 282, no. 5393 (November 20, 1998): 1468– 1471, http://www.scienceonline.org/cgi/content/short/282/5393/1468 (Register with *Science* to see full article free-of-charge)

384. James C. Orr et al., "Anthropogenic Ocean Acidification Over the Twenty-First Century and Its Impact on Calcifying Organisms," *Nature* 437 (September 29, 2005): 681–686, http://www.ipsl.jussieu.fr/~jomce/acidification/paper/Orr_OnlineNature04095.pdf

385. "pH,"Wikipedia,http://en.wikipedia.org/wiki/PH

386. Ocean Acidification—the New Challenge Propaganda Film by The National Resources Defense Council

often add CO_2 to the water in order to increase photosynthesis and calcification, a practice that is similar to greenhouse growers adding CO_2 to the air in their greenhouses to promote the faster growth of plants. The vast bulk of scientific literature indicates increased CO_2 in the ocean will actually result in increased growth and calcification, as opposed to the catastrophe scenario pushed by the NRDC, Greenpeace, and many other activist organizations.[387] [388]

A long list of scientific publications that support the view that increased CO_2 in seawater results in increased calcification can be found on the CO_2 Science website.[389] A paper by Atkinson et al., published in the journal *Coral Reefs*, states that their finding "seems to contradict conclusions ... that high CO may inhibit calcification."[390]

"Ocean acidification" is a perfect example of a contrived catastrophe scenario. The average person does not have a grasp of the complexities of marine chemistry and biology. The activists simply coin a new, scary term like "acidification" and then effectively extort money from people who are concerned for the future. And all this emphasis on the dangers of CO_2tends to divert people from thinking about the real dangers to coral reefs like destructive fishing methods and pollution from sewage.

Our little house by the Sea of Cortez in Cabo Pulmo in southern Baja, Mexico, looks out over a National Marine Park that contains the only large coral reef on the west coast of the Americas. Pulmo Reef is a popular dive site, known for its rich abundance of reef fish, many of which school in the thousands. It was after a dive on the reef during our first visit to Cabo Pulmo in 1999 that Eileen and I decided to make a base there. Since then we have dived and snorkeled on the reef many times each year.

In September of 2002 a tropical storm brought torrential rains that dumped over 20 inches of rainfall in a 24-hour period. It must have been a once in a 100-year event as the flooding was the worst the locals could remember. A lens of freshwater about 20 feet deep spread out over the reef as a result of the runoff from the mountains. This killed all the coral, as coral cannot live in freshwater. Only the corals below the 20-foot depth of the freshwater layer survived.

Fails the Acid Test," Science & Public Policy Institute, January 5, 2010, http://scienceandpublicpolicy.org/images/stories/papers/originals/acid_test.pdf

387. Ocean Acidification: The Other CO2 Problem, Natural Resources Defense Council, September 17, 2009, http://www.nrdc.org/oceans/acidification/default.asp

388. Putting a Stop to the Arctic Meltdown," Greenpeace International, January 26, 2010, http://www.greenpeace.org/international/news/hands-off-the-arctic-260110

389. Global Warming and *Coral Reefs*: Prospects for the Future," *CO_2 Science*, http://www.co2science.org/education/reports/corals/part2ref.php

390. Atkinson, M.J., Carlson, B., Growth in High-Nutrient, Low-pH Seawater: A Case Study of Corals Cultured at the Waikiki Aquarium, Honolulu, Hawaii," *Coral Reefs* 14, no. 4, pp. 215–223, http://www.springerlink.com/content/g2554037454q13wp/

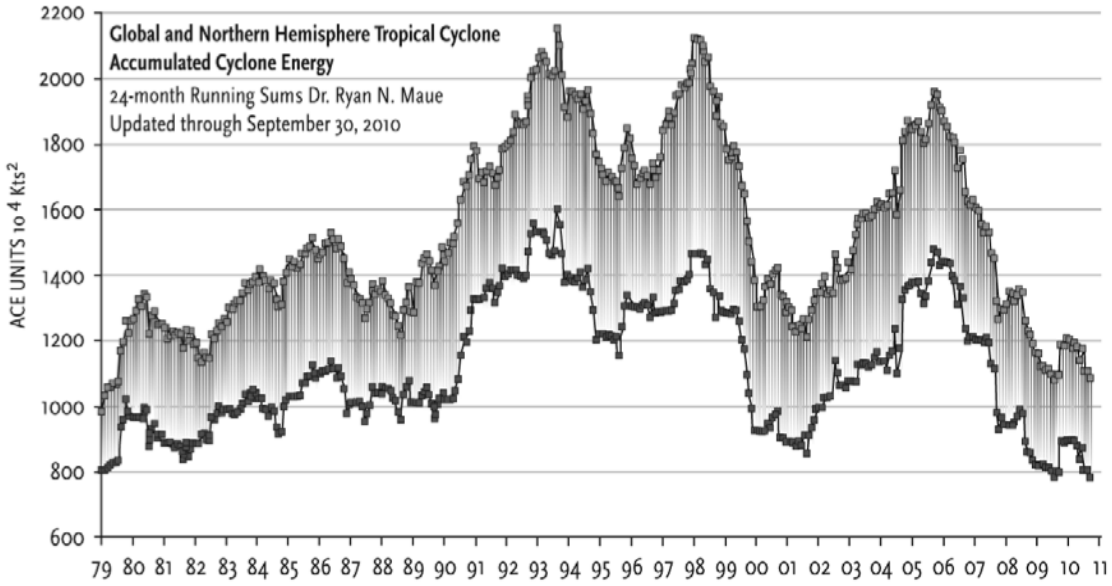


Figure 10. Global and Northern Hemisphere tropical cyclone energy 1979 to 2010. Since the peak during the 1990s, the frequency and intensity of tropical cyclones has diminished considerably.[391]

For a few years after the event virtually no living coral could be seen in the shallower waters. The reef turned white and became covered in green algae, which in turn resulted in an explosion of sea urchins where there had been very few before. By 2006 the reef began to recover noticeably with nodules of new coral becoming established. Coral polyps from the deeper regions of the reef were recolonizing the shallow waters. The sea urchins died out and fish returned in greater abundance. Today the reef is in full recovery as the coral is now growing substantially each year. It may take another 20 years or more to recover completely, and will only do so if there is not another torrential rainstorm.

I imagine some people who believe we are causing catastrophic cli- mate change would suggest we were responsible for the torrential rains that killed part of the reef. I don't believe we can be so certain, especially as such events have been occurring since long before humans began emitting billions of tons of CO_2each year. And regardless of the storm's cause, it is comforting to know that the reef can recover de- spite the dire predictions of the early death of coral reefs worldwide.

Storms, Hurricanes, and Severe Weather Events

Everyone likes to talk about the weather and climate activists are no exception. In the aftermath of Hurricane Katrina in 2005, which caused so much devastation to New Orleans and the surrounding regions, Al Gore gave a rousing speech

391. Ryan Maue, "Ryan N. Maue's 2010 Global Tropical Cyclone Activity Update," Florida State University, http://www.coaps.fsu.edu/~maue/tropical/

in which he predicted hurricanes would continue to become more frequent and more

severe as global warming intensified.[392] Since that speech the intensity of global hurricanes has diminished by about half from the peak years of 1993 and 1998. Still, on the cover of his 2009 book, *Our Choice: A Plan to Solve the Climate Crisis*, Al Gore had four fake hurricanes airbrushed onto a photo of the earth from space.[393] [394] He continues to push the fear of hurricanes when it has become clear there is no longer any basis for such concern. In fact, scientists at the U.S. National Hurricane Center predict that global warming will result in not more but fewer hurricanes.[395] Al Gore must be aware of this.

Sea Level Rise

There is conclusive proof that increased CO_2levels will be good for plants both on the land and in the sea. If increased CO_2does make the world warmer, it will almost certainly make it wetter, which will also be good for plants and most animals, including us. Then what is so bad about global warming anyway, whether it is natural or caused by humans? The prospect that sea levels will rise in a warmer world is the main draw- back as this would threaten the infrastructure we have built in low-lying coastal areas.

The seal level has fluctuated a great deal during the Pleistocene, as ice sheets have advanced and retreated and as temperatures have risen and fallen. At the height of the last glaciation, which ended 18,000 years ago, the sea was about 120 meters (nearly 400 feet) lower than it is today (See Figure 11). There was relatively rapid glacial melting and subsequent sea level rise between 15,000 and 6000 years ago as large, lower elevation ice sheets melted and disappeared. During the past 6000 years, the rise has been slower but steady. In recent times the sea level has risen by about 20 centimeters (8 inches) per century.[396]

Clearly human activity was not responsible for the end of the last glaciation, subsequent warming, and the retreat of the world's glaciers during the past 18,000 years. To date we have no indication that the rate of sea level rise is increasing, whether by natural causes or by our impact on climate. Many predictions of future sea level rise have been based on computer models. In its 2007 report the IPCC predicted sea level would rise between 18 and 59 centimeters (7 to 23 inches) during the

392. Al Gore, "On Katrina, Global Warming," Common Dreams, December 12, 2005, http://www.commondreams.org/views05/0912-32.htm

393. Al Gore, *Our Choice: A Plan to Solve the Climate Crisis*, (Rodale Press, November 2009). http://ourchoicethebook.com/

394. Noel Sheppard, "Al Gore Photoshops Hurricanes Into New Book's Cover," Newsbusters, November 19, 2009, http://newsbusters.org/blogs/noel-sheppard/2009/11/19/al-gore-photoshops-hurricanes-new-books-cover?page=1

395. Jonathan Leake, "UN's Climate Link to Hurricanes in Doubt," *Sunday Times*, February 28, 2010, http://www.timesonline.co.uk/tol/news/environment/article7044158.ece

396. "Current Sea Level Rise," Wikipedia, http://en.wikipedia.org/wiki/Current_sea_level_rise

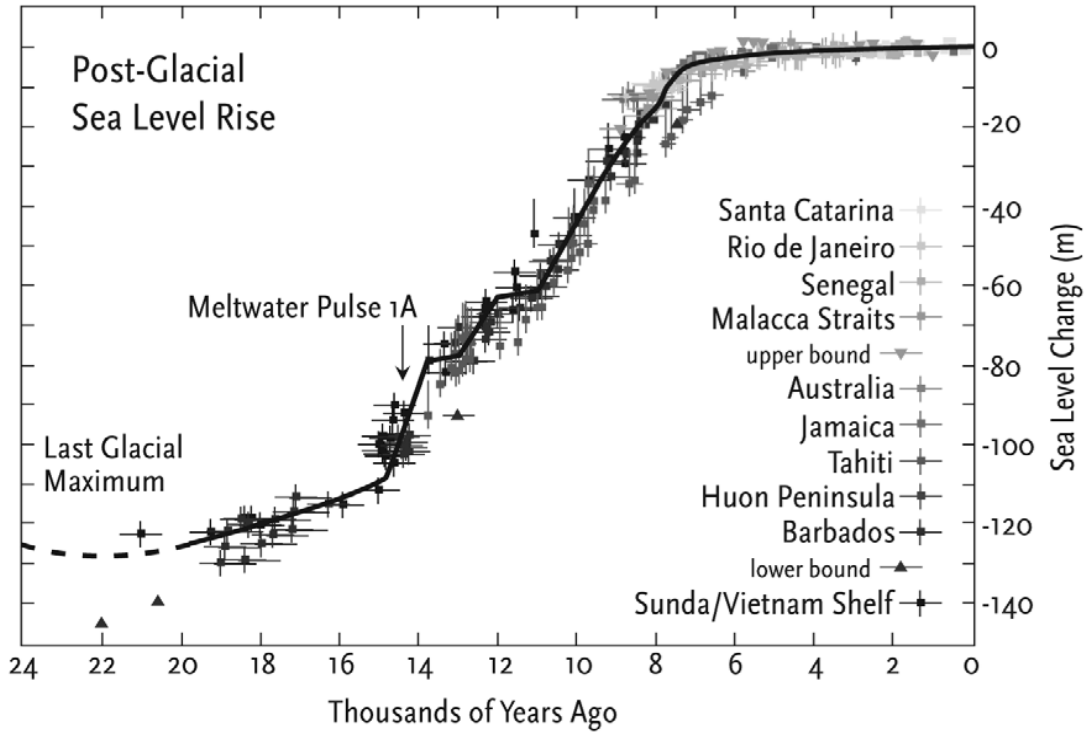


Figure 11. Graph showing that sea level was 120 meters (nearly 400 feet) lower at the height of the last glaciation.[397]

next century. The low end is entirely reasonable as this is about equal to the present rate. The high end is three times the present rate and would require a considerable amount of warming during this century. As yet there has been no warming in this century and sea level rise has not been increasing.

If the sea were to rise nearly two feet as the IPCC suggests in its extreme case, there would be disruptions to infrastructure and related activities. While natural ecosystems would adapt with little difficulty, coastal infrastructure would definitely be impacted negatively, especially our wharfs, buildings, farms, and industries. It wouldn't matter whether or not the sea level rise was due to natural or human causes.

The 120-meter (400-foot) sea level rise during the past 18,000 years did not damage the environment and was not a significant factor in human survival. We have managed to cope with the 20-centimeter (8-inch) rise over the past century. But we have built vastly more coastal infrastructure over the past century than we have in all of human history, and we will continue to do so during the next century.

What should we do about this? Is it wise to assume we are the cause of sea level rise and then to end the activities we think are responsible? Or would it make more sense

397. "Post-Glacial Sea Level," Wikipedia, http://en.wikipedia.org/wiki/File:Post-Glacial_Sea_Level.png"

to plan for a sea level rise of, say, 30 centimeters (12 inches) over the next century. If we are not the cause of sea level rise, which I believe is likely, then there is not much we can do to stop it any- way. If we plan for continued sea level rise at 50 percent above the present rate, we could avoid all or most damage by thinking ahead. We could build the dykes a little higher, not develop suburbs in areas that are susceptible to sea level rise, and generally plan our infrastructure to withstand sea level rise. How could that cause more negative impacts than an 80 percent or larger reduction in fossil fuel use worldwide in the next decade?

I repeat my assertion that we should make an effort to reduce our reliance on fossil fuels and switch to alternatives where this is technologically feasible and reasonably cost-effective. But anything approaching an 80 percent reduction in fossil fuel use over the next decade or two would do more to destroy our civilization than any plausible impact of climate change, even if we were responsible for it. Yet that is what many climate activists, including Greenpeace and Al Gore, are calling for. I believe there are more practical and logical steps that can be taken to find a balance between our environmental, social, and economic priorities. I believe it would be possible to reduce fossil fuel use by 80 percent over the next 50 to 75 years, but we must consider the economic and social cost of doing so.

Pacific Islands and Sea Level Rise

Climate change activists have made great fanfare about the possibility that many island states, such as the Marshall Islands, Kiribati, Tuvalu, and the Maldives, will be inundated and disappear due to rising sea levels caused by human-induced climate change.[398] The government of the Maldives has made the case that rich, carbon-emitting industrial nations should provide financial compensation for the loss of their countries. None of the projections of sinking island states has taken into account the fact that most of them are built on coral reefs and atolls and that coral reefs are alive. A recent survey of 27 Pacific Islands, comparing aerial photographs from up to 61 years ago with current photographs, demonstrated that 23 islands maintained the same land area or increased in size, while only four islands suffered a net loss in size. [399] [400] During this period there was a rise in sea level of 2 mm per

398. “Sea Level Rise Will Claim Island States.” Seaweb, Vol. 15, no. 7 (April 6, 2010), http://www.seaweb.org/news/ou15_7.php#sealevel

399. “Tuvalu and Many Other South Pacific Islands are Not Sinking, claims they are Due to Global Warming Driven Sea Level Rise are Opportunistic,” Watts Up With That, Anthony Watts, June 2, 2010, http://wattsupwiththat.com/2010/06/02/tuvalu-and-many-other-south-pacific-islands-are-not-sinking-claims-they-are-due-to- global-warming-driven-sea-level-rise-are-opportunistic/

400. “Pacific Islands ‘Growing not Shrinking’ Due to Climate Change,” Paul Chapman, the *Telegraph*, June 3, 2010, http://www.telegraph.co.uk/news/worldnews/australiaandthepacific/tuvalu/7799503/Pacific-islands-growing-not-shrinking-due- to-climate-change.html

year. This indicates that the coral is able to grow as fast or faster than the rising sea, and that coral islands grow as a result of coral breaking off and forming reefs that in turn catch more coral and grow in size. Many of the coral islands in the tropics have existed for thousands of years, while during that time the sea has risen by hundreds of feet. It is therefore likely that yet another doomsday scenario regarding the impact of climate change is wildly overblown and may actually have no impact even if the sea does continue to rise.

The "Trick" to "Hide the Decline"

The most quoted email among the thousands released from the Climatic Research Unit, which led to the "Climategate" crisis, was one from the CRU's head, Phil Jones, referring to "Mike's *Nature* trick...to hide the decline."[401] [402] Mike is Michael Mann, the creator of the infamous and, to many, discredited hockey stick graph. *Nature* is the science journal that shows a marked bias in support of human-caused climate change. The "trick" was to discard tree-ring data that did not fit the true believer's bias, data that showed a drop in temperature in recent decades. These climate scientists clearly colluded to hide the data that showed the decline and to substitute data that indicated unprecedented warming over the past 50 years.

In response to the "Climategate" emails the U.K. House of Commons Science and Technology Committee held hearings to determine if Phil Jones and his staff at the Climatic Research Unit had done anything un- toward. They concluded that "trick" and "hide the decline" were "colloquial terms used in private emails and the balance of evidence is that they were not part of a systematic attempt to mislead."[403] [404] This is an obvious white- wash, because whether or not they are colloquial terms, "trick" means "trick" and "hide the decline" means "hide the decline." The committee did not provide an explanation of what it thought the terms meant in a "colloquial" context. It is amazing what deceptions can be perpetrated in broad daylight by people in responsible positions.

Another "independent inquiry" conducted by the University of East Anglia, where the Climatic Research Unit is housed, and supported by the Royal Society, concluded with the statement, "We saw no evidence of

401. Steve McIntyre, "IPCC and the 'Trick'," climateaudit.org, December 10, 2009, http://climateaudit.org/2009/12/10/ipcc-and-the-trick/

402. Terry Hurlbut, "Context for 'Hide the Decline' Discovered," examiner.com, December 10, 2009, http://www.examiner.com/x-28973-Essex-County-Conservative-Examiner~y2009m12d10-Context-for-hide-the-decline-discovered

403. "The Disclosure of Climate Data From the Climatic Research Unit at the University of East Anglia," Science and Technology Committee, U.K. Government, March 31, 2010, http://www.parliament.uk/parliamentary_committees/science_technology/s_t_cru_inquiry.cfm

404. "British Parliamentary Inquiry Clears 'Climategate' Scientists," Environmental News Service, March 31, 2010, http://www.ens-newswire.com/ens/mar2010/2010-03-31-02.html

any deliberate scientific malpractice in any of the work of the Climatic Research Unit."[405] The inquiry was headed by Lord Oxburgh, who has deep personal and financial interests in climate policy. He is the chair of a multinational wind energy company and the chair of the Carbon Capture and Storage Association.[406] Missing from the inquiry's report is the fact that the inquiry did not examine the "Climategate" emails or consider evidence from anyone other than the CRU staff. In this report the "trick" "to hide the decline" was not even mentioned; never mind the many other indications of impropriety that were contained in the emails.[407] Phil Jones himself clearly requested that his colleagues delete previous emails containing damaging information.[408]

The Enigmatic Dr. Lovelock

James Lovelock is one of the most insightful and at the same time most enigmatic of scientists. He is certainly one of the leading experts on atmospheric chemistry. Earlier passages in this book have shown Lovelock to be profoundly pessimistic about the future of civilization and the earth's environment. In an interview in 2006, he stated, "We have given Gaia a fever and soon her condition will worsen to a state like a coma...Before this century is over, billions of us will die, and the few breeding pairs of people that survive will be in the Arctic where the climate remains tolerable... a broken rabble led by brutal war lords".[409] [410] Nice visuals! Cue James Cameron! I feel a Hollywood blockbuster coming on. Yet recently, in the wake of the "Climategate" scandal and the failure of the Copenhagen climate summit, Lovelock has had some change of heart.

Speaking at the London Science Museum in March 2010 Lovelock said, "It is worth thinking that what we are doing in creating all these car- bon emissions, far from being something frightful, is stopping the onset of a new ice age.... If we hadn't appeared on the earth, it would be due to go through another ice age and we can look at our part as holding that up. I hate all this business about feeling guilty about what we're doing." This sounds surprisingly like the line of thinking I challenged him with

405. "Report of the International Panel Set Up by the University of East Anglia to Examine the Research of the Climatic Research Unit," University of East Anglia, April 12, 2010, http://www.uea.ac.uk/mac/comm/media/press/CRUstatements/SAP

406. Lawrence Solomon, "Climate-Change Partisans Find Mere Sins of Omission," *National Post*, April 16, 2010, http://network.nationalpost.com/NP/blogs/fullcomment/archive/2010/04/15/lawrence-solomon-climategate-scientists-we-re-not-guilty.aspx

407. James Delingpole, "Climategate: the Final Nail in the Coffin of 'Anthropogenic Global Warming'?" *Telegraph*, November 20, 2009, http://blogs.telegraph.co.uk/news/jamesdelingpole/100017393/climategate-the-final-nail-in-the-coffin-of-anthropogenic- global-warming/

408. Bishop Hill, "Climate Cuttings 33," November 20, 2009, http://bishophill.squarespace.com/blog/2009/11/20/climate-cuttings-33.html

409. Michael McCarthy, "Environment in Crisis: 'We Are Past the Point of No Return'," *Independent*, January 16, 2006, http://www.independent.co.uk/environment/environment-in-crisis-we-are-past-the-point-of-no-return-523192.html

410. James Lovelock, "The Earth Is About to Catch a Morbid Fever That May Last as Long as 100,000 Years," *Independent*, January 16, 2006, http://www.independent.co.uk/opinion/commentators/james-lovelock-the-earth-is-about-to-catch-a-morbid-fever-that- may-last-as-long-as-100000-years-523161.html

during my visit to his home in 2002. His other colleagues have undoubtedly raised similar points, that there is a possibility we are a positive force rather than an entirely negative one.

It is clear Lovelock was rattled by the revelations in the thousands of leaked emails from the Climatic Research Unit. During his first interview after the "Climategate" scandal he stated, "Fudging the data in any way whatsoever is quite literally a sin against the holy ghost of science. I'm not religious, but I put it that way because I feel so strongly. It's the one thing you do not ever do." And he was surprisingly warm toward skeptics, allowing, "What I like about skeptics is that in good science you need critics that make you think: 'Crumbs, have I made a mistake here?' If you don't have that continuously, you really are up the creek...If you make a [computer] model, after a while you get suckered into it. You begin to for- get that it's a model and think of it as the real world."[411]

Some of his recent statements are chilling. Lovelock contends that, "We need a more authoritative world...even the best democracies agree that when a major war approaches, democracy must be put on hold for the time being. I have a feeling that climate change may be an issue as severe as a war. It may be necessary to put democracy on hold for a while."[412] If we are indeed preventing a new ice age, then why is it like a war, and why must we suspend democracy? Perhaps Lovelock just can't make up his mind which it is, catastrophe or salvation. In any case he provides good reason why brilliant scientists who have been cloistered in labs and research institutes most of their lives should not be running the government.

Conclusion

Beginning in the 1980s a widespread alarmist view has developed regard- ing future climate change. The United Nations, most national academies of science, the majority of political parties, the mainstream media, many scientists, and virtually all environmental activist groups have come to believe that if human emissions of CO_2 continue at present levels the global temperature will soar, resulting in untold destruction to civilization and the environment. This has caused many countries to consider, and even to adopt, policies to reduce fossil use to levels that could cripple their economies.[413]

As of 2013 it has become clear that the global temperature stopped rising 16 years ago, after a 20-year period of increasing temperature. This is despite the fact that CO_2 emissions have continued to rise at an increasing

411. Leo Hickman, "James Lovelock: 'Fudging Data Is a Sin Against Science'," *Guardian*, March 29, 2010, http://www.guardian.co.uk/environment/2010/mar/29/james-lovelock

412. Ibid.

413. New Energy for America

rate. No scientist professes to know why global warming has stopped, but many continue to believe humans are driving a "climate catastrophe." Experts and opinion leaders who have publicly bought into the climate crisis hypothesis are obviously reluctant to change their views. They can't do so without losing face, having invested their reputations in such a high- profile issue. There is a sense that the true believers have become the real deniers.[414]

Considering that the increase in temperature has stopped for the time being, and noting the three issues of the "Climategate" scandal, the col- lapse of the Copenhagen conference, and the errors in the 2007 IPCC report, it seems clear that the foundation of climate change alarmism has been shaken. Many top scientists have made public statements to distance themselves from the supposed prevailing view.[415] [416] [417] One of the most influential skeptical voices is that of physicist Freeman Dyson, considered one the world's most brilliant thinkers by many of his peers.[418] A feature article that made his views on climate clear appeared in the *New York Times Magazine* in March 2009 and turned a lot of heads.[419] He said, "The cli- mate-studies people who work with models always tend to overestimate their models," and "They come to believe models are real and forget they are only models." He explained, "Most of the evolution of life occurred on a planet substantially warmer than it is now, and substantially richer in car- bon dioxide." Dyson referred to Al Gore as climate change's "chief propagandist," and as someone who preaches "lousy science, distracting public attention from more serious and more immediate dangers to the planet."

While the author of this article politely derided Dyson's point of view, there was no doubt about where one of the great thinkers of our time stands on the subject. I think one Freeman Dyson is worth 10,000 true believers who mimic one another, falsely claiming that there is an "over- whelming consensus" and extolling, "the vast body of evidence showing the world is warming because of man-made greenhouse gas emissions" without providing any details of the "vast body of evidence."

In recent months a number of mainstream media outlets, including many British and American newspapers, have abandoned their strong biases and are now publishing articles that are balanced and even skeptical of human-caused warming. The collapse of the "overwhelming

414. "In Denial: The Meltdown of the Climate Campaign," Steven F. Hayward, *The Weekly Standard*, March 15, 2010, http://www.weeklystandard.com/articles/denial

415. "The Deniers," Wikipedia, http://en.wikipedia.org/wiki/The_Deniers:_The_world-renowned_scientists_who_stood_up_against_global_warming_hysteria,_political_persecution,_and_fraud

416. Marc Morano, "Scientists Write Open Letter to Congress," ClimateDepot, July 1, 2009, http://climatedepot.com/a/1745/Scientists-Write-Open-Letter-to-Congress-You-Are-Being-Deceived-About-Global-Warming–Earth-has-been-cooling-for-ten-years

417. Neil Reynolds, "Please Remain Calm: The Earth Will Heal Itself," *Globe and Mail*, July 19, 2010, http://www.theglobeandmail.com/news/opinions/please-remain-calm-the-earth-will-heal-itself/article1642767/

418. "Freeman Dyson," Wikipedia, http://en.wikipedia.org/wiki/Freeman_Dyson

419. Nicholas Dawidoff, "The Civ
York Times, March 25, 2009, http://www.nytimes.com/2009/03/29/magazine/29Dyson-t.html

consensus" is good news for everyone who believes this topic should be discussed openly and objectively. There is a breath of fresh air in the climate change debate.

There is much work to do in trying to validate or reject the assertions of the major players in climate science. They include the Climatic Research Unit of the University of East Anglia, the U.S. National Oceanic and Atmospheric Administration, the Goddard Institute of Space Science of the U.S. National Aeronautics and Space Agency (NASA), and the Intergovernmental Panel on Climate Change. All these top agencies are implicated in the "Climategate" scandal and are being investigated by various authorities. The U.K. Institute of Physics' submission to the Parliamentary Committee investigating the leaked emails from the Climatic Research Unit made these observations:[420]

1. The Institute is concerned that, unless the disclosed e-mails are proved to be forgeries or adaptations, worrying implications arise for the integrity of scientific research in this field and for the credibility of the scientific method as practised in this context.

2. The CRU e-mails as published on the Internet provide prima facie [at first sight] evidence of determined and coordinated refusals to comply with honourable scientific traditions and freedom of information law. The principle that scientists should be willing to expose their ideas and results to independent testing and replication by others, which requires the open exchange of data, procedures and materials, is vital. The lack of compliance has been confirmed by the findings of the Information Commissioner. This extends well beyond the CRU itself – most of the e-mails were exchanged with researchers in a number of other international institutions who are also involved in the formulation of the IPCC's conclusions on climate change.

3. It is important to recognize that there are two completely different categories of data set that are involved in the CRU e-mail exchanges:

- those compiled from direct instrumental measurements of land and ocean surface temperatures such as the CRU, GISS and NOAA data sets, and
- historic temperature reconstructions from measurements of 'proxies', for example, tree-rings.

4. The second category relating to proxy reconstructions are the basis for the conclusion that 20th century warming is unprecedented.

420. Steve McIntyre, "Institute of Physics Submission," *Climate Audit*, February 26, 2010, http://climateaudit.org/2010/02/26/institute-of-physics-submission/

Published reconstructions may represent only a part of the raw data available and may be sensitive to the choices made and the statistical techniques used. Different choices, omissions or statistical processes may lead to different conclusions. This possibility was evidently the reason behind some of the [rejected] requests for further information.

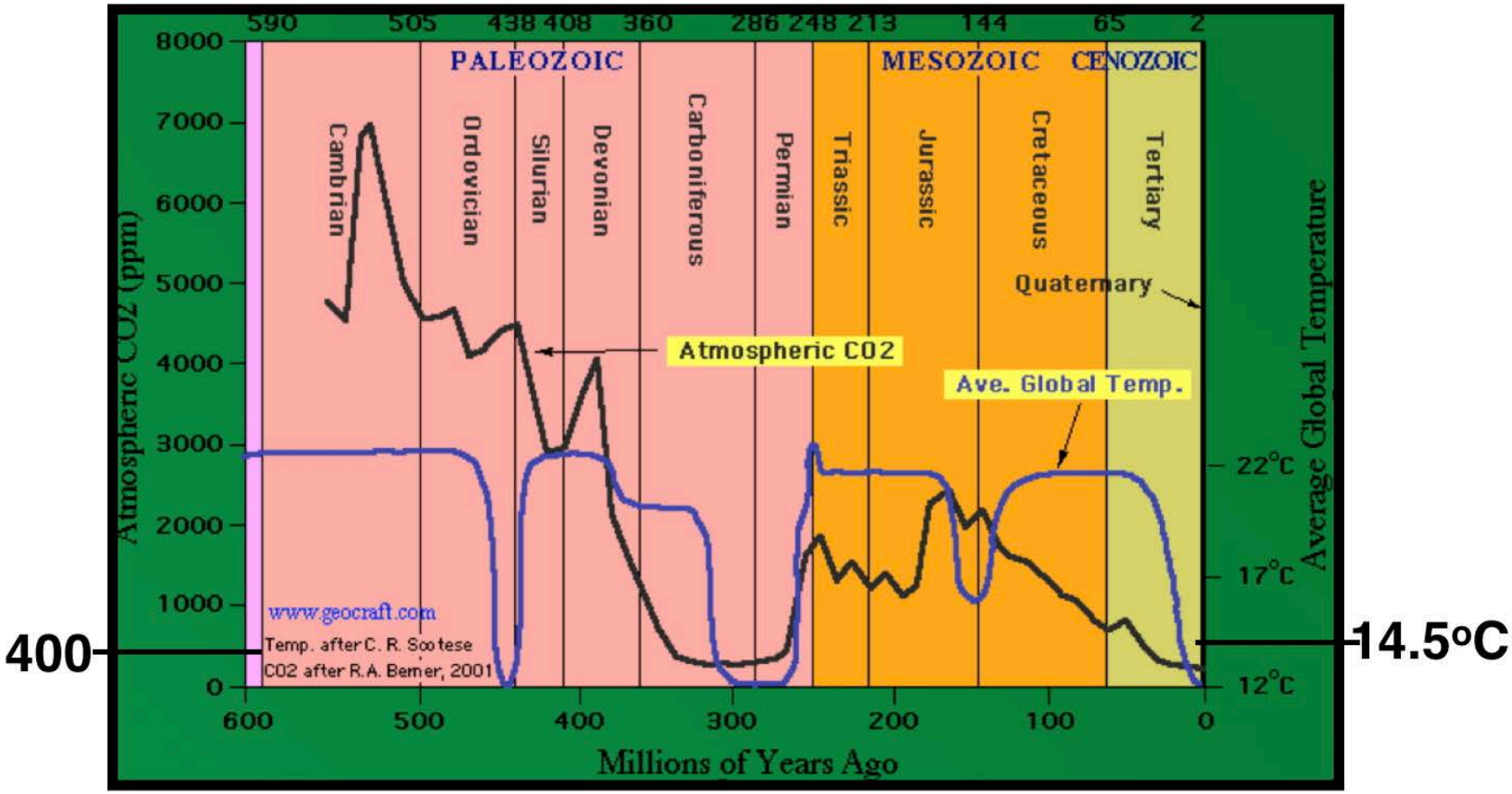
5. The e-mails reveal doubts as to the reliability of some of the re- constructions and raise questions as to the way in which they have been represented; for example, the apparent suppression, in graphics widely used by the IPCC, of proxy results for recent decades that do not agree with contemporary instrumental temperature measurements.

The Institute of Physics has no reason to exaggerate or to hold any bias. The Institute makes it clear that the information provided by the Climatic Research Unit may not be credible or trustworthy. Clearly it will be some time before the “science is settled.”

On May 29, 2010, Britain’s top science body, the Royal Society, an- nounced it would review its literature on climate change in order to reflect the skeptical view. The Royal Society stated, “Any public perception that science is somehow fully settled is wholly incorrect—there is always room for new observations, theories, measurements.” Along with the change of tone by the London Science Museum this marks a sharp turning point, from certainty and “overwhelming consensus,” to a balanced dialogue on the subject. One can only hope that other major science bodies will adopt the same policy.

At this writing the developments in the climate change debate are changing faster than the climate itself. The public is becoming more skeptical by the day, while the believers work doubly hard to shore up their position, assuring us warming will eventually return in earnest. This may be, but it is not happening now, and even If warming does recur in future, that by itself won’t prove that we are the main cause. I remain open to new information and continue to follow the discussion on a daily basis.

Some readers will argue that I have only presented the skeptical side of the debate. This is only because the historical evidence, what has actually occurred, does not support the idea that we are the primary cause of global warming, never mind that its impacts will be “catastrophic.” All the pre- dictions based on computer models in this world can’t change history or manufacture the future. For that we must patiently wait. Meanwhile we should embark on the path toward a future that focuses on sustainable energy as outlined in Chapter 15. We could gradually reduce our over-whelming reliance on fossil fuels and replace some of them with cleaner, sustainable energy sources. This will satisfy many agendas, including the agenda of the believers in human-caused climate change.



Global CO2 and Temperature Over the Past 600 Million Years

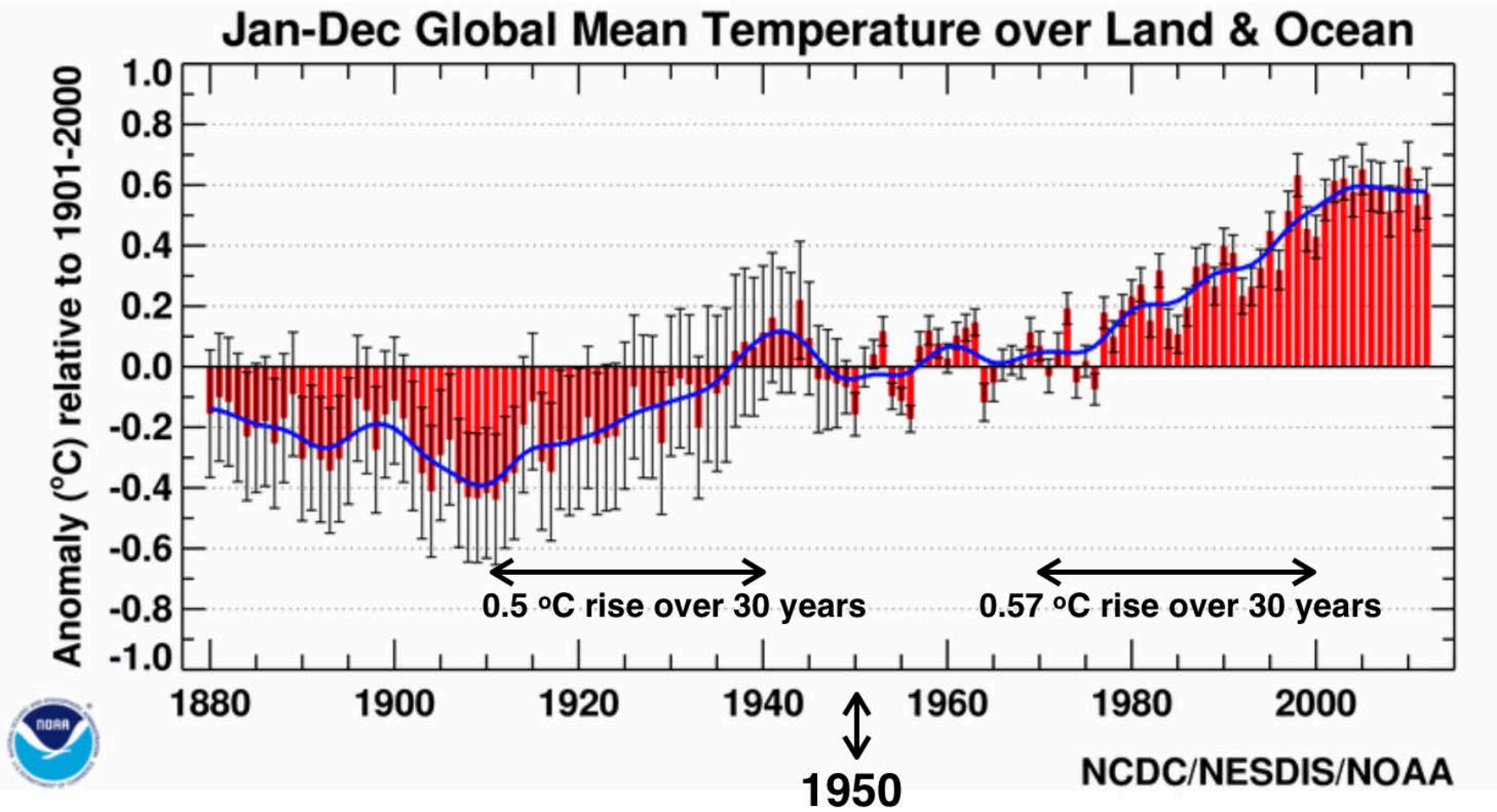
http://www.scotese.com/climate.htm
http://www.aps.org/units/fps/newsletters/200807/monckton.cfm

"Some Degree of Expert Judgement is Inevitable"

Table 1.2 | Likelihood terms associated with outcomes used in the AR5.

Term	Likelihood of the Outcome
Virtually certain	99–100% probability
Very likely	90–100% probability
Likely	66–100% probability
About as likely as not	33–66% probability
Unlikely	0–33% probability
Very unlikely	0–10% probability
Exceptionally unlikely	0–1% probability

Notes:
Additional terms that were used in limited circumstances in the AR4 (*extremely likely* = 95–100% probability, *more likely than not* = >50–100% probability, and *extremely unlikely* = 0–5% probability) may also be used in the AR5 when appropriate.



"It is **extremely likely** that human influence has been the **dominant cause** of the observed warming **since the mid-20th century". IPCC 2013**