

Area Experts Debate Global Warming

Editor's Comment:

While the issue of man-caused global warming is much more than a local issue, we are fortunate to have two leading authorities on climate science in Northern Colorado. Each has a different view of the issue and agreed to this in-paper debate. The Forum believes this type of direct debate is all too rare on this topic and thank doctors Gray and Trenberth for their efforts. The Forum also wants to thank columnist Ray Harvey for bringing them together for this debate.

We Are Not In Climate Crisis

Bill Gray

Professor Emeritus of Atmospheric Science at Colorado State University

Ask ten people on the street if mankind's activities are causing global warming, and at least eight will say yes. This is because nearly 20 years of gross exaggeration on the part of scientists, environmentalists, politicians, and media; most of whom wish to profit in some way from the public's lack of knowledge on the topic-have distorted the subject of human-induced global warming out of all sensible proportion. Many have been lead to believe that Al Gore's movie and book *An Inconvenient Truth* provides incontrovertible evidence that human-induced global warming is a real threat. Yet, contrary to what is heard from warming advocates, there is considerable evidence that the global warming we have experienced over the last 30 years and over the last 100 years is largely natural. It is impossible to objectively determine the small amount of human-induced warming in comparison to the large natural changes which are occurring.

Many thousands of scientists from the US and around the globe do not accept the human-induced global warming hypothesis as it has been presented by the Intergovernmental Panel on Climate Change (IPCC) reports over the last 15 years. The media has, in general, uncritically accepted the results of the IPCC and over-hyped the human aspects of the warming threat. This makes for better press than saying that the climate changes we have experienced are mostly natural. The contrary views of the many warming skeptics have been largely ignored and their motives denigrated. The alleged "scientific consensus" on this topic is bogus. As more research on the human impact on global temperature change comes forth, more flaws are being found in the hypothesis.

It must be pointed out that most climate research is supported by the federal government. All federally- sponsored researchers need positive peer-reviews on their published papers and grant proposals. This can be difficult for many of the "closet" warming skeptics who receive federal grant support. Many are reluctant to give full expression of their views, primarily because of worries over continuing grant support. It is difficult to receive federal grant support if one's views differ from the majority of their peers who receive support to find evidence of the warming threat. The normal scientific process of objectively studying both sides of the question has not yet occurred. Such open discussion has been largely discouraged by warming advocates.

Implementation of the proposed international treaties restricting future greenhouse gas emissions by as much as 20 to 80 percent of current emissions would lead to a large slowdown in the world's economic development and, at the same time, have no significant impact on the globe's future temperature.

Many of the Global Climate Model (GCMs) simulations by large US and foreign government laboratories and universities, on which so much of these warming scenarios are based, have some very basic flaws. These global models are not able to correctly model the globe's small-scale precipitation processes. They have incorrectly parameterized the rain processes in their models to give an unrealistically enhanced warming influence to CO₂. This is the so-called positive water-vapor feedback. The observations I have been analyzing for many years show that the globe's net upper-level water vapor does not increase but slightly decreases with warming. These GCMs

also do not yet accurately model the globe's deep ocean circulation which appears to be the primary driving mechanism for most of the global temperature increases that have occurred over the last 30 and last 100 years.

GCMs should not be relied upon to give global temperature information 50 to 100 years into the future. GCM modelers do not dare make public short-period global temperature forecasts for next season, next year, or a few years hence. This is because they know they do not have shorter range climate forecasting skill. They would lose credibility if they issued shorter-range yearly forecasts that could be objectively verified. Climate modelers live mostly in a "virtual world" of their own making. This virtual world is isolated from the real world of weather and climate. Few of the GCM modelers have any substantial weather or short-range climate forecasting experience.

It is impossible to make skillful initial-value numerical predictions beyond a few weeks. Although numerical weather prediction has shown steady and impressive improvement since its inception in 1955, these forecast improvements have been primarily made through advancements in the measurement (i.e. satellite) of the wind and pressure fields and the advection/extrapolation of these fields forward in time 10-15 days. For skillful numerical prediction beyond a few weeks, it is necessary to forecast changes in the globe's complicated energy and moisture fields. This entails forecasting processes such as amounts of cloudiness, condensation heating, evaporation cooling, cloud-cloud-free radiation, air-sea moisture-temperature flux, etc. It is impossible to accurately code all these complicated energy-moisture processes, and integrate these processes forward for hundreds of thousands of time-steps and expect to obtain anything close to meaningful results. Realistic climate forecasting by numerical processes is not possible now, and, because of the complex nature of the earth's climate system, they may never be possible.

Global temperatures have always fluctuated and will continue to do so regardless of how much anthropogenic greenhouse gases are put into the atmosphere.

The globe has many serious environmental problems. Most of these problems are regional or local in nature, not global. Forced global reductions in human-produced greenhouse gases will not offer much benefit for the globe's serious regional and local environmental problems. We should, of course, make all reasonable reductions in greenhouse gases to the extent that we do not pay too high an economic price. We need a prosperous economy to have sufficient resources to further adapt and expand energy production.

Even if CO₂ is causing very small global temperature increases there is hardly anything we can do about it. China, India, and Third World countries will not limit their growing greenhouse gas emissions. Many experts believe that there may be net positive benefits to humankind through a small amount of global warming. It is known that vegetation and crops tend to benefit from higher amounts of atmospheric CO₂, particularly vegetation which is under temperature or moisture stress.

I believe that in the next few years the globe is going to enter a modest cooling period similar to what was experienced in the 30 years between the mid-1940s and the mid-1970s. This will be primarily a result of changes in the globe's deep-ocean circulation. I am convinced that in 15-20 years we will look back on this period of global-warming hysteria as we now look back on other popular and trendy scientific ideas that have not stood the test of time.

Global Warming: Coming Ready Or Not

Kevin E Trenberth

Head of the Climate Analysis Section at the National Center for Atmospheric Research

Bill Gray suggests that we are not in a climate crisis. He should speak for himself. Maybe there is not a crisis in the sense that the world's weather is falling apart now. But there is a major crisis in the failure to act to prevent potentially catastrophic changes in the future, in the times of our grandchildren, and their children. Changes in the climate are already evident.

The Intergovernmental Panel on Climate Change has spoken: "Warming of the climate system is unequivocal" and it is "very likely" due to human activities. Those were the key conclusions approved by 113 nations in Working Group I, which studies the science of climate change and the role of humans in affecting climate. The full report that

is the basis for the summary was drafted by 154 lead authors and more than 450 contributing authors and runs to over 1,000 pages. Two other IPCC working groups deal with impacts of climate change, vulnerability, and options for adaptation to such changes, and options for mitigating and slowing the climate change, including possible policy options. In recognition of the stalwart work over 20 years, the 2007 Nobel Peace Prize was awarded to the IPCC and Al Gore.

Global mean temperatures have increased since the 19th century, and especially since the mid-1970s. Temperatures have increased nearly everywhere over land, and sea temperatures have also increased, reinforcing the evidence from land. However, global warming does not mean that temperatures increase steadily or uniformly because the atmospheric circulation also changes. As Gray suggests, natural variability has always been around and will continue. But we can now clearly demonstrate with climate models (and replicate this in many different countries and groups) that since about 1970 observed climate change is well outside the realm of natural variability.

Some changes arising from global warming may be benign or even beneficial, such as a longer growing season. But warming means increased heat waves and drying that increases risk of drought and reduces snowpack and water resources, a major concern in the West. It also increases water vapor in the atmosphere leading to more intense storms, heavier rains and greater risk of flooding, something observed to be happening in the US and elsewhere. Moreover, as noted by IPCC, there is clear evidence that upper level water vapor is increasing.

The scientific understanding of climate change is now sufficiently clear to show that specific global and regional changes resulting from global warming are already upon us. The future projections are for much more warming, but with rates of change perhaps a hundred times as fast as those experienced in nature over the past 10,000 years. Just how fast depends on how humans as a whole respond to these warnings. There are uncertainties (although these cut both ways). However, the inertia of the climate system and the long life of carbon dioxide in the atmosphere mean that we are already committed to a significant level of climate change.

Bill Gray suggests that there has been a gross exaggeration and major distortion on climate change. IPCC scientists come from all parts of the political spectrum and dozens of countries; climate “skeptics” can and do participate, some as authors, and their goal is to produce the best scientific statements possible. Yet Gray implies that these scientists somehow no longer act independently, as scientists are wont to do, but instead conspire to mislead the public on climate change for their own selfish reasons. I don’t know anyone who has so profited. Gray’s comments about peer review fail to recognize that scientists are naturally very skeptical. However, it is not “views” that matter but rather evidence and reasoning, the very basis of science. Open discussion based on sound science is widely encouraged.

Gray is correct that global climate models are flawed and are just that, a model of the real world. By design, the resolution of the models can not deal with small-scale (less than about 100 miles) phenomena well. But they are by far the best tool we have for examining the enormously complex weather and climate system, and to replace model results by someone’s belief that has no physical basis does not cut it. The models continue to improve, especially as computers get faster and enable finer structure to be resolved, and many of the observed changes are simulated in climate models run for the past 100 years, adding confidence to understanding of the relationship with the agents that alter the climate and human-induced changes in atmospheric composition, and adding confidence to future projections. It may be impossible to model climate, as Gray suggests, but we are doing it anyway.

I have found that the only scientists who disagree with the IPCC report are those who have not read it and are poorly informed. The IPCC is a body of scientists from around the world convened by the United Nations jointly under the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) and initiated in 1988. Its mandate is to provide policy makers with an objective assessment of the scientific and technical information available about climate change, its environmental and socio-economic impacts, and possible response options. The IPCC reports on the science of global climate and the effects of human activities on climate in particular. Major assessments were made in 1990, 1995, 2001, and now 2007. Each new IPCC report reviews and assesses the state of knowledge, while trying to reconcile disparate claims and resolve discrepancies, and document uncertainties. The IPCC process is very open.

Two major reviews were carried out in producing each IPCC report. Every one of the thousands of comments submitted, including those by skeptics, are answered and the action taken is documented (in a huge Excel spread-

sheet that is publicly available), in a process overseen by independent review editors. Of course, many comments received are in conflict and many are demonstrably wrong. To get the IPCC authors to make changes, there has to be documented evidence and a reason. Opinion alone, such as Gray's, does not make the grade. Many of the skeptics accept the IPCC report, and their arguments have changed from it is not happening to it is happening but it will be good for us!

The strength of the IPCC report is that it is a consensus report. Far from being a "gross exaggeration" as claimed by Gray, the IPCC report is really solid and conservative. It is not the latest "trendy scientific idea," Rather it has been widely criticized for underestimating the recent observed changes in the Arctic (record low Arctic sea ice in 2007), and many scientists believe that sea level rise (from melting glaciers) will be much greater than projected by IPCC. Since 1992 when a new satellite was launched that can provide true global measurements, sea level has risen at a rate of one foot per century, confirming the reality of global warming.

Gray goes on to claim, out of the blue, "restricting future greenhouse gas emissions by as much as 20 to 80 percent of current emissions would lead to a large slowdown in the world's economic development ..." On the contrary, saving energy and doing things more efficiently helps the economy substantially while reducing future climate change. It also helps preserve a non-renewable resource, and improves security by cutting dependence on foreign oil.

Gray then goes on to suggest that even if global warming is happening, there is nothing we can do about it because developing countries will continue growth and increase carbon dioxide emissions. Indeed this is a major concern and our government over the past eight years has failed us badly by not negotiating with these countries to protect our global atmosphere through international treaties such as the Kyoto Protocol.

The atmosphere is a global commons. The "Tragedy of the Commons" occurs when it is in everyone's interest to use and exploit the commons but at the expense of the commons itself. Unfortunately, this is what is happening. In 2007 it is estimated that China will be the largest emitter of carbon dioxide into the atmosphere. As Americans, we should be outraged that the Chinese are dumping huge amounts of carbon dioxide into the atmosphere, sharing their emissions with everyone else and changing every one else's climate! And we should be outraged that our politicians have not represented us well in that way. By the same token, the Chinese ought to be just as outraged that Americans are putting about as much carbon dioxide into the atmosphere. Since it is the accumulated amount that matters most, the United States more than any other nation, is responsible for the climate change underway. The United States emissions per capita are two and a half times those in Europe, and emissions per capita in Texas are three times what they are in California, highlighting the scope for major progress. Sixteen US states are keen to follow California into reducing carbon dioxide emissions from vehicles but are prevented from doing so by the EPA and the Bush Administration.

There is much that can be done, and America should lead. If done in the right way, benefits to the climate through reduced emissions save energy and promote the economy, while increasing sustainability.

We Are Not In Climate Crisis

(Gray's rebuttal to Trenberth's comments)

Kevin Trenberth has given the standard response that human-induced global warming advocates always give to their critics. He cites the large number of people and the broad effort involved in the last 15 years of IPCC reports, which have shown little variation in their expectations of large amounts of human-induced temperature rise during the rest of the 21st century. He also cites the recognition of the IPCC warming advocates' views through their award of the 2007 Nobel Peace Prize. The Nobel Peace Prize Award is a political judgment award and is thus different from the traditional Nobel scientific awards. The Peace Award is not based on the usual verifiable scientific standards of the Nobel awards for chemistry, physics, medicine, etc.

I will respond to 10 statements which Trenberth has made in his rebuttal to my initial comments. His statements are given in quotations and my response.

1. "The scientific understanding of climate change is now sufficiently clear to show that specific global and regional changes resulting from global warming are already upon us. The future projections are for much more warming, but

with rates of change perhaps a hundred times as fast as those experienced in nature over the past 10,000 years.”

It is by no means clear that the global warming we have experienced over the last 30 and last 100 years is due primarily to human-induced CO₂ rises. The globe experienced many natural temperature changes before the Industrial Revolution. How do we know the recent warming is not due to one or a combination of many natural changes that were experienced in the past? There is no way Dr. Trenberth or anybody else can, with any degree of confidence, say that future global warming may be a hundred times faster than anything we have seen in the past. This is pure conjecture.

2. “I don’t know anyone who has so profited” (from the warming scare) Millions of dollars in federal grants and private money have been spent on the study of global warming. It is in the interest of thousands of committed warming advocates that the global warming threat be made credible and be continued.

3. “Open discussion based on sound science is widely encouraged.” Discussion with global warming skeptics has not at all been encouraged. Most skeptics have been ignored and/or denigrated as tools of the fossil-fuel industry. Dr. Trenberth himself has said that I myself am no longer a credible scientist because I doubt the human-induced warming hypothesis. I know of no conferences that have encouraged an open and honest debate between warming advocates and warming skeptics. It has been difficult for warming skeptics to obtain federal research grant support. The warming advocates define “sound science” as science that agrees with them, and they restrict it to only this.

4. “But they (GCMs) are by far the best tool we have for examining the enormously complex weather and climate system, and to replace model results by someone’s belief that has no physical basis does not cut it.”

Being the best tool we have does not mean we should necessarily believe the GCMs. I and many of my warming-skeptic colleagues do not put much stock in the GCMs. These models have a number of basic flaws. To wit: important sub-grid scale processes such as individual thunderstorm activity are parameterized. I have previously noted that the GCMs don’t issue public forecasts of global temperature one or two-five years in the future because they know they do not have skill at these shorter range time scales. They would lose credibility if they publicly made forecasts that could be verified. Yet the models want us all to believe their forecasts 50-100 years in the future!

5. “I have found that the only scientists who disagree with the IPCC report are those who have not read it and are poorly informed.”

This is simply untrue. Thousands of scientists from around the globe who have closely followed the IPCC statements believe that they have grossly exaggerated the influence of CO₂ rises on global warming. The IPCC has largely ignored the potential natural processes of global-temperature change, such as the deep ocean current changes. The IPCC continues to assume a positive rain-enhanced water vapor feedback loop when the observations indicate it is slightly negative. There has recently been a coming together of 400 prominent climate scientists from around the globe who have written an open letter to the Secretary General of the UN which voices strong disagreement with the IPCC’s warming conclusions.

6. “The IPCC process is very open.”

Not true. The IPCC has not been open. Known warming skeptics have not been invited to participate. Despite my over 50 years of meteorology experience and 25 years of making seasonal hurricane forecasts I was never approached by the IPCC. This also applies to many of my older experienced meteorology colleagues who tell me they have never been contacted by the IPCC. In general, any climate or meteorological colleague who had previously tipped his hand concerning skepticism about human-induced global warming was not invited to participate in the IPCC process.

7. “The strength of the IPCC report is that it is a consensus report. Far from being a ‘gross exaggeration’ as claimed by Gray, the IPCC report is really solid and conservative.”

Kevin Trenberth has been a long-term major player in the IPCC process, and it is to be expected that he views his and his many IPCC colleagues efforts in this way. But there are thousands of experienced climate and meteorology

experts who, for very solid reasons, see it otherwise. In science, the majority or the consensus can be and is often wrong. In addition to which, much of the uncertainty included in the actual IPCC report is removed in the Summary for Policymakers (SPMs). Very few individuals (and especially politicians) ever read material beyond the SPM.

8. "As Americans, we should be outraged that the Chinese are dumping huge amounts of carbon dioxide into the atmosphere."

Why should we Americans, with our elevated standard of living, be outraged at the Chinese for trying to elevate their standard of living from the poverty they have had to endure for so long?

9. "And we should be outraged that our politicians have not represented us well in that way. By the same token, the Chinese ought to be just as outraged that Americans are putting about as much carbon dioxide into the atmosphere."

This statement shows how Trenberth (and the warming advocates in general) have isolated themselves from the economic reality of the global economy. Being "outraged" in Dr. Trenberth's context means that you believe rising levels of CO₂ have been the primary cause of global temperature rise, and that this will continue in the future. I and many of my colleagues do not believe this to be true. We owe our industrial society and elevated standard of living to fossil fuels. Fossil fuels have won out over other energy sources because they are the most economic and the most efficient form of energy. We need to maintain a vibrant growing economy so that we can afford a large commitment to research alternate energy sources. This will entail emitting higher amounts of CO₂ into the atmosphere. To cut fossil-fuel use so drastically would cause a global upheaval beyond anything Dr. Trenberth imagines. It would also create extreme economic hardship and, at the same time, do virtually nothing to alter global temperatures, as no less than global-warming alarmist Dr. Jim Hansen recently admitted in a court of law. It would keep the non-developed and developing world in a state of grinding poverty. In addition, studies have shown that full adoption of, for example, the proposed Kyoto Protocol would reduce warming only six percent by 2100 compared with "business as usual."

10. "If done in the right way, benefits to the climate through reduced emissions save energy and promote the economy, while increasing sustainability."

This is a pie-in-the-sky pipedream. "Done the right way"? How so, precisely? By subverting the most fundamental economic laws, like cost effectiveness, and supply and demand? If the globe were to reduce current CO₂ amounts by 20 percent by 2020, and by 80 percent by 2050, as has been proposed, we would see a massive slowdown in global economic development, and the condition of humanity would immediately be made worse. Additionally, there would no longer be the capital – i.e. venture capital – in the economy with which to explore and develop new forms of energy. Technology and progress require money. If something is economically tenable, government doesn't need to subsidize it, or make its use compulsory: the market will naturally provide for it because it is cost-effective. The idea that society would prosper from cutting fossil fuel emissions is an utter illusion. Alternate energy sources are more costly right now, and their compulsory use will only lead to a lower standard of human living – to say nothing of the fact that this sort of governmental coercion is Constitutionally prohibited.

Global Warming: Coming Ready Or Not *(Trenberth's rebuttal to Gray's response)*

I will let the Nobel Peace Prize to the IPCC stand on its own merits. Responses to Bill Gray's other comments follow by number.

1) Natural variability does not happen by magic. The energy for warming has to come from somewhere. Ice Ages come and go but have causes associated with changes in the Earth's orbit around the sun, proving that such natural variability has a cause. El Niño is an example of natural variability associated with rearranging heat by ocean currents and we can track where the heat in the warm regions has come from. Similarly, surface ocean warming might occur if the deep ocean cools as currents redistribute heat. Instead we know that the whole ocean is warming and sea level is rising at unprecedented rates. The pattern of observed warming is unlike any natural variation and the rates of change are faster. Hence we can prove that the observed warming is not natural and we can point to the cause: observed increases in greenhouse gases in the atmosphere that trap infrared radiation from

escaping to space.

2) Grants to scientists to understand climate are not synonymous with studying global warming. Moreover studying how and why our planet is warming is actually important – or we could not answer silly beliefs that claim otherwise. A grant is to carry out prescribed work and is very different than a gift to an individual to do what one likes with.

3) Conferences and discussions about warming, climate models, and what, if anything, to do about it occur all the time. However, a scientific approach takes evidence into account. Beliefs that are not consistent with evidence discredit the person who continues with them, and such a person is less likely to be invited to participate in the events.

4) It has been said that “all models are wrong, some are useful.” We think it is better to use models demonstrated to have skill. Today’s best climate models are now able to reproduce the observed major climate changes of the past century. When the models are run without human changes in the atmosphere, the natural forcings and intrinsic natural variability fail to capture the increase in global surface temperature over the past 35 years or so. But when the anthropogenic effects are included, the models simulate the observed global temperature record with impressive fidelity. Observed changes in storms and precipitation are also replicated only by models with human changes in atmospheric composition.

5) I stand by my comment. It is not correct that IPCC assumes anything of the sort claimed. Whether the 400 scientists have any climate credentials or are prominent I leave to others. I wonder if they have collectively published as many climate papers as I have?

6) Open invitations to review the IPCC drafts are widely broadcast. I am sorry Bill was not personally invited. He would obviously be very surprised if I named all the skeptics who have participated in IPCC.

7) Language in the Summary for Policy Makers is not technical by design but calibrated language expressing confidence and likelihoods is included. The IPCC reports are widely used as reference works and have thousands of citations.

8) I agree that an increased standard of living is a fine goal. However, acceptable ways to achieve that goal do not include short-term gains at the expense of long-term disaster.

9) Fossil fuels have won out in part because much of their true cost is not borne by the user, but rather the air pollution and environmental damage is borne by all. We need a sustainable economy that serves the people, not one that continues to grow for its own sake and which damages the environment.

The right way refers especially to the timetable over which changes are implemented along with appropriate incentives and penalties. The average life of a car is 12 years in the United States and so a fleet of cars can be changed on that timeframe. Changing coal-fired power stations takes the order of their typical lifetime: 35 to 40 years. How is it that, unlike other states, California since 1973 has continued to grow without increasing energy use per capita? Conservation and reducing waste through very practical measures works, as is demonstrated by differences among states and countries with similar standards of living but very different per capita energy use.

Gray’s Closing Comments

I greatly commend Kevin Trenberth for agreeing to debate me on this global warming issue. Many global warming advocates will not engage in such open and opposite dialogs. I think it is in the public’s interest that such back and forth debates continue and expand with other scientists of opposite persuasions on the warming topic. I also commend Ray Harvey of the Fort Collins Forum for suggesting and moderating this exchange between myself and Kevin Trenberth.