



THE IPCC VS. THE FACTS

THE CASE FOR CLIMATE REALISM

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Foreword

By Paul MacRae

In this essay, retired engineer Ken Wilson, a member of Climate Realists of Victoria, B.C., examines the science underlying the reports of the Intergovernmental Panel on Climate Change (IPCC) from a realist perspective.

This science is supposed to be “settled,” “certain,” and beyond question, based on a reported “consensus” of more than 2,000 scientists who contribute to the IPCC’s reports. The IPCC’s findings are, we’re often told, “the Science,” and non-scientists—politicians, the media and the public—are supposed to accept “the Science” without question.

For their part, alarmist climate scientists are highly resistant to debating “The Science” in public with critics, even though debate and criticism are the life blood of science. And, indeed, why should scientists debate critics if the science is “settled” and “certain”? For example, Dr. Andrew Weaver, a climate modeler who is one of the leading figures in climate alarmism in Canada, has written:

There is *no ... debate* [over the human causes of global warming] in the atmospheric or climate scientific community, and ... making the public believe that such a debate exists is precisely the goal of the denial industry. ... *Scientific debate over global warming would therefore imply uncertainty.*¹ [emphasis added]

This Doctrine of Certainty² may explain why there has *never been* a full-dress debate in any of the major Canadian television networks on the merit (or lack of merit) of “consensus” climate science, even though climate scientists’ and politicians’ crusade against fossil fuels will have major impacts on the economic well-being of Canadians.

And, because the public, media and politicians still have faith in science and scientists, there is also *popular* resistance to criticisms of the IPCC and its message of doom.

This resistance to criticism means it’s not easy being a climate realist. Climate realists are called climate “deniers,” comparing people who question apocalyptic computer-model predictions with those who deny the historical fact of the Holocaust.³ Or climate realists are called deluded, or insane, or just dishonest, purveyors of “fake news,” and “scientifically illiterate.” A *Guardian* article divides “deniers” into four categories: the shill, the grifter, the egomaniac and the ideological fool.⁴

In other words, climate alarmists consider it *impossible* to criticize the IPCC's science while also being an intellectually honest, scientifically informed and sane individual.

Yet Wilson is a former professional engineer with a long and successful career; it's hard to believe he is deluded, intellectually dishonest, or unaware of the norms of science as he presents his arguments. It makes more sense to believe that he, like many other climate realists, has looked at and assessed the IPCC's evidence in some depth and found it wanting. And so, in this article, Wilson offers a readable and detailed analysis of The Science, based on scientific principles.

In fact, in his analysis, and using data similar to the IPCC's own long-term weather records, Wilson uncovers a surprising number of problems with this supposedly rock-solid "science." These problems seriously undermine the IPCC's argument that increased carbon dioxide is dangerously warming the planet, and that we need to wean ourselves off fossil fuels in the next three decades—"Net Zero by 2050"—or face "oblivion" (as a former UN secretary-general put it in 2007)⁵. In the process, the IPCC's groundless doomsday predictions have many people (including children) scared to death that they and the planet have no future (for example, Extinction Rebellion, Greta Thunberg).

Wilson begins by discussing the history of climate alarmism, beginning with Thomas Malthus' "Essay on the Principle of Population." Malthus predicted that a rising population will inevitably overrun its ability to feed that population, leading to famine and a rebalancing of the system through starvation. History has proved Malthus wrong. Perhaps the modern Malthusians are wrong as well?

In a similar vein, biologist Paul Ehrlich's *The Population Bomb* (1968) predicted mass starvation by the end of the 1970s, and *The Limits to Growth* study (1971) predicted a massive shortage of raw materials by the 2000s. Thanks to scientific advances, eight billion people are currently being fed and we have not run out of raw materials. In fact, virtually all alarmist predictions in the past have proven false; why would we assume the current climate alarmism is any different?

Wilson looks at warming in the recent geological past, our Holocene interglacial, and notes at least four times in the last 12,000 years when the planet was as warm or warmer than today: the Holocene Optimum (6,000 years ago); the Minoan Warm Period (3,500 years ago); the Roman Warm Period (2,000 years ago); and the Medieval Warm Period (1,000 years ago).

All of these warmings occurred without carbon emissions from industry—they were part of the climate's cyclical "natural variation." If warming greater than today's could occur in the past without human input, there is a strong possibility that the Modern Warm Period (1850-now) is simply another one of climate's natural ups and downs.

Wilson details how environmental and climate alarmism led to the creation of the Intergovernmental Panel on Climate Change in 1988, aided by the growing power of environmentalist Non-Governmental Organizations.

He points out that the IPCC's "Science" is not traditional science but "Post-Normal Science," which relies more on computer modelling and the "consensus" of scientists than the empirical evidence and rigorous testing of hypotheses of traditional science.⁶ Based on this "consensus"-based science, and with great consistency, the IPCC's reports that appear every five years or so have predicted far more warming than has actually occurred.

This abandonment of traditional scientific norms, Wilson suggests, should make us—politicians, media and the public—very suspicious when climate science claims to be "settled" and "certain" and beyond debate.

Wilson gives a detailed analysis of the IPCC's claims as they apply to the Modern Warm Period. He offers a series of graphs showing that many of these apocalyptic claims are misleading, wildly exaggerated, or simply false.

For example, sea levels have been rising since the end of the Little Ice Age, but the *rate* of sea-level rise has been steady. Extreme weather events like hurricanes and tornados are not showing any marked increase; nor are forest fires. He also notes that over deep geological time there is almost no correlation between temperature and carbon dioxide, and what correlation there is almost always has CO₂ increases *following* temperature increases, not *causing* temperature increases.

Furthermore, as Wilson points out, the concentration of CO₂ is near its "saturation" level with regard to global warming. This means that any further increase in CO₂ levels has a diminishing global-warming effect.

Wilson provides convincing evidence that climate factors other than CO₂ are far more plausible as "control knobs" for the current warming (which is rather mild in geological terms). These factors include variations in solar intensity, warming and cooling cycles in ocean currents, continental drift, the planetary Milankovitch Cycles that trigger cycles of ice-age glaciations and interglacials, and even the variations in the flux of incoming cosmic rays that affect cloud cover (more cloud cover means cooler; less cloud cover means warmer).

Further, Wilson notes that the planet is, in fact, starved for carbon dioxide. Plant life (and therefore animal life) will die at CO₂ levels of less than 150 ppm, a threshold almost reached during the depth of the most recent glacial maximum. The current level of 420 ppm is not too high; it is too *low*. That's why hothouse growers raise CO₂ levels to 1,000-1,200 ppm in their greenhouses—most plants, including key food plants like corn and rice,

grow larger and more rapidly at these levels. Our industrial additions of carbon dioxide are actually “greening” the planet, not destroying it.

Finally, Wilson looks at current attempts to rapidly replace fossil-fuel energy with solar and wind-turbine energy and, again, finds this policy misguided because making energy more expensive means we will all be poorer, rather than better off. We know that wealthier nations not only feed and house their citizens better than poorer nations, but wealthier nations can afford environmental controls, while also reducing birth rates. Prosperity is *good* for the environment, not the enemy of the environment.

In a democracy, the public will, in the last analysis, should determine political policies. As noted above, the public, politicians and the media still have faith in scientists and resist criticism of the IPCC’s “Science.”

But this positive attitude could change if, faced with major problems in the IPCC’s scientific methodology and policy proposals, climate scientists remain unwilling to admit that the science is not “settled,” and remain unwilling to consider more realistic approaches to dealing with climate change.

It’s more likely that once the enormous economic costs of Net Zero 2050 hits Canadians in the pocketbook, as is happening in Europe and increasingly in Canada, the public will revolt against extremist and damaging climate policies and begin to favor realistic policies based on traditional scientific principles and observed empirical data. We have not reached the breaking point in Canada yet, but Europe and particularly Great Britain are very close.

But until that paradigm shift happens, non-scientists who take the time to read Wilson’s analysis will at least be more aware that “the Science” is, in fact, not “settled” or “certain”, and be more open to considering less extreme, more realistic approaches to dealing with a “climate crisis” that, if Wilson is correct, is not a crisis at all.

Paul MacRae is a former journalist (Globe and Mail, Victoria Times Colonist), a former instructor in writing at the University of Victoria, and author of False Alarm: Global Warming Facts Versus Fears, a detailed examination of the science behind the IPCC.

References

- 1 Andrew Weaver, *Keeping Our Cool: Canada in a Warming World*. Toronto: Viking Canada, 2008, pp. 22-23.
- 2 A term used by mathematician Christopher Essex and economist Ross McKittrick in their book *Taken by Storm: The Troubled Science Policy and Politics of Global Warming* (Key Porter Books, Toronto, 2002, p. 18).
- 3 For example, see "Climate 'Realism' is the New Climate Denial," by Stella Levantesi and Guilio Corsi, *The New Republic*, Aug. 6, 2020.
- 4 Damien Carrington, "The four types of climate denier and why you should ignore them all". *The Guardian*, July 20, 2020.
- 5 Ban Ki Moon at a news conference after the 2007 Bali climate conference. His exact words: "Today, we are at a crossroads, one path leading towards a comprehensive new climate agreement, and the other towards oblivion." Source: UN website, "UN Climate Change Conference represents crossroads, Secretary-General says," Dec. 11, 2007.
- 6 The gold standard in science is Karl Popper's *The Logic of Scientific Discovery* (1959). In it, Popper argued that good science tries to *falsify* an hypothesis through rigorous testing, not prove it. An hypothesis that resists falsification then takes on the status of a theory, but is always open to challenge. It is notable that climate science does not follow the Popper model for good science, but Post-Normal Science. For example, IPCC contributor Mike Hulme notes in "The IPCC, consensus and science," Feb. 19, 2010: "Reaching consensus about climate change, recognizing that these statements emerge from processes of deliberation and discussion rather than from pure observation, experimentation and *falsification*, can therefore be an uncomfortable thing for scientists and public alike. Scientists need to be prepared to argue about their 'considered opinions', to embrace consensus but *without closing down argument or suggesting that matters are settled*. [emphasis added] Hulme is exactly describing Post-Normal Science, but, unfortunately, and despite Hulme's cautions, Post-Normal climate science continues to "close down argument" and suggest "matters are settled."

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Executive Summary

A key assumption driving the computer models in Intergovernmental Panel on Climate Change (IPCC) studies is that rising CO₂ levels from the burning of fossil fuels produces a strong positive feedback response from water vapor.

The IPCC's computer-modeling results are not supported by weather-balloon data, satellite data, long-term surface weather records, or by the physics of the saturation curve for CO₂. The computer models are running too hot and they therefore do not provide a reliable basis for governments to use in determining their global warming policies.

We have been living in the Modern Warm Period since the end of the Little Ice Age (1300-1850). This is a moderate warming trend that is similar in character to that of the Medieval Warm Period about 1,000 years ago, the Roman Warm period about 2,000 years ago, and the Minoan Warm Period about 3,500 years ago.

This is all happening within the Holocene Interglacial period, which ended almost 100,000 years of glaciation about 12,000 years ago. At the Holocene maximum, about 6,000 years ago, northern summers were about 4° Celsius warmer than today, almost all the glaciers had melted, a spruce forest was growing at Tuktoyaktuk, Northwest Territories, and sea levels were about 2 metres (6 feet) higher than today.

We entered a Neoglacial cooling phase about 3,000 years ago. New glaciers began to form during temperature dips like the Little Ice Age.

This essay describes why the IPCC was created, how it operates, the issues that it has failed to address, and the misallocation of the West's economic and intellectual resources that has resulted from the IPCC's and environmentalist Non-Governmental Organizations' (NGOs) single-minded demonization of CO₂.

About half of the essay is focused on technical and scientific data. Readers who are already familiar with why and how the IPCC came to be created may wish to concentrate on the technical data in their first reading of the document. I would suggest they read the following sections in the following order:

The Scientific Method on p. 8. This section outlines the fundamental difference between a study based on the Scientific Method and one based on Post-Normal Science procedures. The IPCC studies are based on Post- Normal Science procedures that rely on a consensus of experts to define how the atmosphere should behave. Data will show that the expert consensus for the IPCC studies is wrong. This is the fatal flaw underlying the IPCC's studies.

The IPCC: Its Structure and Some of its Findings on p. 14. This section provides insight into the administrative procedures underlying how IPCC studies are conducted and their results incorporated into the IPCC's key document, "Summary for Policymakers" (SPM). A sampling of statements from previous SPM statements is provided.

The Modern Warm Period on p. 16. This key section compares IPCC statements and graphs against long-term weather data from a variety of sources.

Summary of the Modern Warm Period on p. 37. This section summarizes the key flaws in the IPCC's computer modeling studies. This concludes the discussion of climate changes in the Modern Warm Period.

The Holocene on p. 40. This broadens out the discussion to climate changes over the past 12,000 years. It discusses some of the natural forcings that were not recognized or dealt with adequately in the IPCC studies.

Deep Geological Time on p. 49. This section gives graphic evidence of conditions at the Last Glacial Maximum of our current ice age 20,000 years ago. It also outlines why we may slip back into another advancing phase of our ice age when the Holocene ends.

The Demonization of CO₂ on p. 54. This section outlines the substantial benefits being gained from rising CO₂ levels on crop yields and the greening of the Earth.

Economic Issues on page 65 and **Conclusion** on page 69. The last parts of the essay deal with some of the disastrous and potentially disastrous economic impacts of the IPCC's attempts to throttle fossil fuels before we have an adequate alternative.

Background

The Intergovernmental Panel on Climate Change's doctrine on global-warming issues is the dominant narrative pushing the Paris Accords and the initiative to achieve the Net Zero CO₂ emission goal by 2050. The voices of authority defining and disseminating the IPCC's narrative are the IPCC's Executive Panel and the Secretary-General of the UN.

National governments, at least in the West, and the European Commission are developing the necessary legislation and regulations to meet the Net Zero CO₂ 2050 goal.

Skeptics have noted that the IPCC's computer models are running too hot, so that the computer-model results are not supported by evidence from weather records. In other words, the IPCC's computer models are not providing a reliable evidence base for governments to use in formulating their own global-warming policies.

This essay presents the skeptic's counter-narrative. It is a complex tale, involving science, institutions, money, people, and passions.

I am a retired former water-resources engineer with the B.C. Ministry of Environment. My professional career was based on trying to glean insights from weather records and metering data to design and implement water control measures to deal with either too much water or too little water in specific catchments. B.C.'s challenging topography and multiple climate zones made for an interesting career. I have had a natural interest in the IPCC's work and have followed its progress since the IPCC was created in 1988.

The first part of the essay provides some historical information on climate change, the scientific method, and the events that led to the creation and structure of the IPCC. The middle part of the essay is a series of graphs of present and past climate data with comparisons of the IPCC's claims versus observed weather data. The final part of the essay examines some of the consequences resulting from the IPCC's flawed assumptions that carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) are the primary drivers of modern global warming

I hope that readers will find this presentation interesting and readily understandable. I have included web links to several videos so that readers can see what some skeptical scientists and critics say about their own analysis, and in some cases their critique, of IPCC-supported studies. This will give readers an opportunity to make their own assessment of the quality of the arguments presented by either side. I would recommend that readers look at these videos if they wish to get a deeper understanding of the issues being debated.

Historical Note

To understand our approach to climate issues today, we need to understand climate issues in the past. A convenient place to begin is with “An Essay on the Principle of Population,” published by Thomas Malthus in 1798.

The ‘Malthusian Trap’

Malthus’ work was based on a carefully researched study on the tendency of population to grow exponentially, whereas the food supply would grow linearly. The ideas were easy to grasp, and the concept lodged deeply in the minds of successive generations of Europeans.

Malthus observed: “The power of population is so superior to the power of the earth to produce subsistence for man, that premature death must in some shape or other visit the human race.” The population of the Earth in 1798 was about one billion.

What Malthus did not grasp was that the Industrial Revolution, which was in its infancy, would greatly increase human productivity in the growing and distribution of food, allowing both population and the standard of living to rise at the same time.

Thomas Malthus lived in the depths of the Little Ice Age, which lasted from about 1300 AD to 1850 AD. In the earlier Medieval Warm Period (MWP), between 950 AD and 1250 AD, crops were plentiful and the MWP was generally considered to be a good era for people to live in. During the MWP, two Viking settlements were established in Greenland, starting about 985. These were European-style livestock farms.

About 1300, the MWP ended and Europe and North America slipped into the Little Ice Age. Crops failed. Populations became malnourished and more vulnerable to plagues. The death toll from starvation began to mount as the cold became more intense. The Greenland farms could no longer support their livestock or their farmers. Both settlements were abandoned by about 1450. In subsequent years, glaciers continued to advance in the Alps, destroying farms and villages.

Pioneering climate researcher Hubert Lamb, in his classic book, *Climate, History and the Modern World*, wrote the following on conditions in Scotland at this time:

For more than sixty years dearths and famines were less frequent in Scotland than they had been in the last forty years of the previous century. But from about 1670 the situation deteriorated again, with tremendous snows and frosts in that year and huge losses of sheep in the thirteen days of continuously drifting snow in early March (by the modern calendar)

1674. Worse was to come in the last years of the century, when between 1693 and 1700 the harvests (largely oats) failed in seven years out of eight in all the upland parishes of Scotland.

There are many accounts of those years parish by parish in the volumes of the Statistical Account of Scotland compiled by Sir John Sinclair a hundred years later. “The poorer sort of people frequented the churchyard to pull a mass of nettles, and frequently fought over it ... which they greedily fed upon...” (parish record of Duthil and Rothiemurchus in north central Scotland).

Some were reported to have sold their children into slavery. In parishes all over the country from one-third to two-thirds of the population died—a greater disaster in many places than the Black Death—and great was the fear of being buried in a mass grave. Whole villages and wide tracts of the countryside were depopulated at this time.¹

Sometimes today, environmentalists express a fond yearning to return to an imagined earlier, gentler period, with humans living in harmony with Nature. Well, in the northern latitudes in Europe, at least in the 17th and 18th centuries, humanity found itself engaged in a brutal struggle with Nature just to survive. Many didn’t.

In the 19th century, with the growing pace of the Industrial Revolution and with the beginning of the Modern Warm Period, living conditions began to improve, and growing wealth began to percolate through societies.

By the beginning of the 20th century, steel ships powered by steam engines had largely replaced wooden ships driven by sail for transporting passengers and bulk cargos.

Environmentalists express a fond yearning to return to an imagined earlier, gentler period, with humans living in harmony with Nature. In fact, humanity was engaged in a brutal struggle just to survive.

The wind was still free, but its low power density, intermittent availability, and its inability to get travellers by the most direct route to and from where they wanted to go, by a given date, made wind power uncompetitive against coal-fired steam engines.

The Scientific Method

The spreading industrial revolution was greatly facilitated by the general adoption of the scientific method to determine the validity of scientific hypotheses. Once confidence was gained in one hypothesis, it could become a building block for a new hypothesis.

One of the foundational documents for the scientific method was put forward by Sir Francis Bacon in 1620 in his book *Novum Organum*. Up until Bacon's time, the recognized authorities were the Church in spiritual matters and the ancient Greeks, especially Aristotle, in scientific matters.

Bacon noticed that Aristotle's conclusions were based primarily on deductive reasoning, and that although Aristotle's conclusions were widely believed, they had rarely been verified by actual observations. Bacon proposed an alternative approach based on observation, inductive reasoning, formulation of a hypothesis, testing of the hypothesis by more observation and experimentation, re-evaluation of the results, and further refinement if required.

Post-Normal Science is employed when the facts are uncertain, values are in dispute, stakes are high, and decisions urgent.

Before a hypothesis could be conditionally accepted as a likely truth, the chain of reasoning, hypothesis formulation, and testing had to be replicated by others. This iterative process has proved to be a powerful instrument for creating transparency and the verification of hypotheses.

Verified hypotheses remain conditional truths, always subject to further confirmation in the future. As Albert Einstein once noted, "No amount of experimentation can prove me right; a single experiment can prove me wrong."

Richard Feynman, an outstanding 20th-century physicist, had a succinct summary of these points: "It doesn't matter how beautiful your theory is, it doesn't matter how smart you are, if it doesn't agree with experiment, it is wrong." This is the gold standard for distinguishing between a belief and a fact.

In recent years a fuzzy new area called Post-Normal Science (PNS) has arisen.

Post-Normal Science is being used in situations where the facts are uncertain, values are in dispute, stakes are high, and decisions urgent. It relies on a consensus of experts to provide the governing assumptions, equations, and data to be applied and analyzed in a given study.

The IPCC's modeling groups rely on Post-Normal Science procedures to fill in the gaps in our knowledge of how the atmosphere and oceans behave and how they interact with one another. We will see later how successful the IPCC's approach has been.

Steps into the Present

In 1896, Svante Arrhenius,² who was awarded the Nobel Prize for Chemistry in 1903, published calculations showing that the emission of CO₂ from the burning of coal could contribute to a greenhouse effect and might eventually raise temperature on Earth by about 4⁰ Celsius in the distant future. Given that Europe was still in the early stages of recovering from the Little Ice Age, he thought that on the whole, this might be a good thing.

In subsequent decades, other scientists did not agree with Arrhenius' calculations. They found that too much CO₂ would dissolve too quickly back into the oceans.

In 1959, a study by two Swedish meteorologists, Bert Bolin and Erik Eriksson³, found that evaporation of seawater returned much of the newly dissolved CO₂ back into the atmosphere, which markedly slowed down the net loss of CO₂ into the oceans. When this information was combined in the early 1960s with the exponential rise in CO₂ levels being collected by Charles Keeling at the Mauna Loa observatory in Hawaii, a possible mechanism was established for global warming to occur at a much faster rate than suggested by Arrhenius.

Bert Bolin became a Professor of Meteorology at Stockholm University, and he was an influential figure on global-warming issues in subsequent years.

The Growing Concern over Pollution

In 1962, Rachel Carson published her book, *Silent Spring*. This book had a galvanizing effect on the growth of the embryonic environmental movement in the U.S. The public outcry led to the U.S. banning the insecticide DDT in 1972.

More environmental concerns surfaced in the 1960s and early 1970s, including the dumping of 21,000 tons of chemical waste in the Love Canal, the declaration that Lake Erie was dying due to industrial wastes discharging from Buffalo and other industrial cities around the Lake, as well as growing pollution in many of the nation's rivers.

Smog, which had become a perennial problem in the Los Angeles basin, was now becoming a regular summer event in heavily industrialized cities in the East. Acid rain as a result of air pollution was also beginning to emerge as a growing air-quality issue.

In 1968, Paul Ehrlich published *The Population Bomb*, which predicted that by the end of the 1970s, hundreds of millions of people would die of starvation. This was Thomas

Malthus redux. The book was widely read and it contributed to a rising level of angst in the public mind. The population of the world in the mid-1960s was about 3.5 billion people.

Ehrlich's study was followed in 1971 by the Club of Rome publishing its hallmark study, *Limits to Growth*.

The Club of Rome was formed after World War II by notable citizens appalled by the carnage wrought by two world wars, and by the evidence of continuing problems of poverty and unresolved social and political problems still existing around the world. Members of the Club of Rome were prominent scientists, economists, businessmen, businesswomen,

Limits to Growth predicted the world would exhaust its minerals, oil and gas by the 2000s. It didn't happen.

high-level civil servants and former heads of state from around the world. The Club of Rome commissioned a study called *Limits to Growth* to examine what might lie ahead if we continued on our present path.

Limits to Growth was a computer study of the consequences of exponential economic and population growth in a world with finite resources. The study concluded that by the 1990s and the 2000s, the world would have exhausted the supply of most industrial minerals, oil, and gas, and that food prices would rise rapidly as increased population overwhelmed the output from the land suitable for agriculture. It was a grim forecast and it had a major impact on the thinking of media outlets, academic institutions, leading industrialists, and political leaders.

In response to these many concerns, the U.S. passed the Clean Air Act in 1970 and the Clean Water Act in 1972. Also in 1972, the UN held the Stockholm Conference on the Human Environment, also known as the First Earth Summit.

Events leading up to the creation of the IPCC

The Stockholm Conference was a major step in bringing environmental concerns to the forefront of the world's attention. Maurice Strong,⁴ a successful Canadian businessman who served in both the private and public sectors and was a strong supporter of the UN, was invited to be Secretary-General for the Stockholm Conference.

He quickly brought vitality and vision to the conference. He had a unique ability to reach out to national leaders. The conference was attended by 122 countries.

He was a strong believer that Non-Governmental Organizations (NGOs) could help to push forward a strong environmental agenda. A quote from a publication on NGOs is of interest:

NGOs have changed from being peripheral advisers of secondary status in the diplomatic system to being high-status “social partners” at the centre of policymaking. Before the 1970s, UN conferences were generally low-key events and some were more like academic conferences than intergovernmental political events. A substantial change occurred when Maurice Strong was appointed Secretary-General for the 1972 United Nations Conference on the Human Environment (UNCHE) in Stockholm.⁵

The quote reflects a major change in how communications, politics and public policy are being done in the current era.

The Stockholm Conference issued a Declaration with 26 principles concerning environment and development, and an Action Plan with 109 recommendations.

The UN judged the Stockholm Conference a great success. The UN established the new UN Environmental Program (UNEP) with its headquarters in Nairobi, Kenya, and Maurice Strong as its first Director. In subsequent years Strong held a number of other major posts at the UN.

Following the Stockholm Conference, initiatives rippled out in many directions, including a push to follow up on Bert Bolin's suggestion that CO₂ might pose a significant threat of global warming due to the exponential growth of CO₂ emissions from burning fossil fuels.

In succeeding years, a number of national and international meetings and conferences were held to assess the issue. One of these meetings in 1979 was chaired by Jule Charney, a prominent meteorologist at the Massachusetts Institute of Technology, who was concerned about the anthropogenic global-warming issue. The following is from a synopsis of the meeting:

Charney found that the modelling predicts carbon-dioxide doubling would drive up temperatures by around 3°C by sometime in the first half of the

21st century. This warming rate was based on an assumption of strong positive feedback from increased water vapour, while the “cloud effect” was only noted as “a difficult question to answer.” The report’s foreword, by the chairman of the Climate Research Board, Verner Suomi, warns that “a wait-and-see policy might mean waiting until it is too late”.⁶

Three points are noteworthy about this excerpt. The first is that Charney’s estimates and assumptions became the consensus values for most of the subsequent IPCC’s modeling studies. The modelers appeared to feel most comfortable if their model results were close to Charney’s values. The second point is that the “cloud effect” was only noted as “a difficult question to answer”. And the third point was the Climate Research Board Chairman Suomi’s warning that “a wait-and-see policy might mean waiting until it is too late.”

In effect, Suomi was saying that the proposed study should proceed on a Post-Normal Science basis otherwise irreversible damage might occur if the study was delayed. This approach became quite common in the 1970s and 1980s when scientists wanted to create a sense of alarm to get funding freed up for their studies.

As an example of this attitude, Stephen Schneider, a meteorologist at Stanford University and a vocal proponent of a potential global-warming crisis, made the following statement:

On the one hand, as scientists we are ethically bound to the scientific method, in effect promising to tell the truth, the whole truth, and nothing but — which means that we must include all the doubts, the caveats, the ifs, ands, and buts. On the other hand, we are not just scientists but human beings as well. And like most people we’d like to see the world a better place, which in this context translates into our working to reduce the risk of potentially disastrous climatic change.

To do that we need to get some broad-based support, to capture the public’s imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have. This “double ethical bind” we frequently find ourselves in cannot be solved by any formula. Each of us has to decide what the right balance is between being effective and being honest. I hope that means being both.⁷

This is both a frank statement and a troubling one. Are Schneider’s statements to be trusted as being based on an objective review of the best available scientific evidence that he knows of? Or is he advocating for a personal belief, which he may personally hold dear, but which is still a personal belief rather than a recognized likely fact within the framework of the scientific method as outlined by Francis Bacon?

Because the IPCC's modelling groups were reluctant to speak openly about their modeling difficulties, a lingering cloud of doubt is left over the veracity of many of their pronouncements.

Another initiative from the Stockholm Conference was a study on sustainable development by a commission headed by Gro Brundtland, a former prime minister of Norway.

The Brundtland Report was released in 1987. This led in turn to the evolution of the Precautionary Principle in considering whether proposals met sustainable development criteria. Under the Precautionary Principle, an action that *might* cause harm is treated as if it *will* cause harm.

The sustainable-development initiative and the global-warming initiative began to merge in many areas, sharing joint concerns. In the spring of 1988, a major conference was sponsored in Toronto by the Canadian government. The following excerpts are taken from an account of the meeting:

Among the 300 guests from 46 countries who were invited to participate, there were many scientists and experts in the relevant fields. On the policy side, the contingent of environmental policy advocates was most significant, alongside UN and government agency officials. New with this conference would be government representation at the ministerial level. The Brundtland Commission was well represented, with Brundtland herself giving an opening address right after the Prime Minister of Canada, Brian Mulroney. This meant that the conference opened with the endorsement of two prime ministers, as Brundtland herself had been returned to that office in Norway even before submitting her report. ...

As for Brundtland, she again urged the need for international regulation to cover all atmospheric pollutants, but this time the emphasis came down hard on global warming: "... It is established beyond doubt that we will experience a global change in climate. ... The impact of climate change may be greater and more drastic than any other challenges that mankind has faced with the exception of the threat of nuclear war. ... Humanity is conducting an unintended, uncontrolled, globally pervasive experiment whose ultimate consequences could be second only to a global nuclear war."

8

The rhetoric was of high alarm, of looming dire consequences, and of the need for swift action to address an imminent crisis.

'We have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have.'

-Stephen Schneider

The IPCC: Its structure and some of its findings

The IPCC was established in the Fall of 1988. Bert Bolin was its first Director. It is divided into three "Working Groups" (WG), each covering a section of the human-caused climate-change topic:

Working Group I: The Physical Science Basis

Working Group II: Impacts, Adaptation and Vulnerability

Working Group III: Mitigation of Climate Change.

About every five years, each Working Group prepares a full "assessment report" by collating all the available research results. These assessment reports can run to hundreds or thousands of pages. Few people have the time or knowledge to examine them in detail.

The IPCC Panel itself is composed of representatives appointed by governments and by the UN Environmental Program. Plenary sessions of the IPCC and IPCC Working Groups are held at the level of government representatives. Non-governmental and Intergovernmental organizations admitted as observer organizations may also attend. Sessions of the Panel, IPCC Bureau, workshops, expert and lead authors meetings are by invitation only.

As an example of a Panel meeting, about 500 people from 130 countries attended the 48th Session of the IPCC Panel in Incheon, Republic of Korea, in October 2018, including 290 government officials and 60 representatives of observer organizations. The opening ceremonies of sessions of the Panel and of lead authors meetings are open to media, but otherwise IPCC meetings are closed.⁹

When a new series of assessment reports is issued, the IPCC also issues a *Summary for Policymakers* report. Its stated intention is to synthesize and summarize the work of the three Working Groups for Governments and policymakers. The Summary Report is approved line by line by governments: "Negotiations occur over wording to ensure accuracy, balance, clarity of message, and relevance to understanding and policy."¹⁰

The Summary for Policymakers is usually less than 50 pages in length. It is often referred to in public as being an authoritative scientific document on the status of global-warming issues. In reality, it is a political document, usually containing alarming statements about how much worse the global-warming situation is becoming. The document is intended to shore up support for the IPCC's narrative and the IPCC's preferred policy options.

It has been interesting to follow the growing confidence of the IPCC in its analysis over succeeding reports. The Summary for Assessment Report 1 (AR1) in 1992 stated:

They judged that global mean surface air temperature had increased by 0.3° to 0.6°C over the last 100 years, broadly consistent with prediction of climate models, but also of the same magnitude as natural climate variability. *The unequivocal detection of the enhanced greenhouse effect was not likely for a decade or more.*¹¹ [emphasis added]

The AR5 assessment in 2014 stated:

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. ... Atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. ... Human influence on the climate system is clear. *It is extremely likely (95–100% probability) that human influence was the dominant cause of global warming between 1951 and 2010.*¹² [Emphasis added]

This sounds like an alarming situation. The next section will give us an opportunity to test the IPCC's analysis against observed data.

Climate in the Modern Warm Period

Most observers agree that CO₂ emissions from fossil fuels are the main contributor to this rise in CO₂ levels (see Figure 1). The five main greenhouse gases in descending order of their importance to the greenhouse-gas effect are water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and ozone (O₃).

Greenhouse gases are crucial for the existence of life on our planet. The Earth would have an average temperature of about minus-20°C.¹³ without greenhouse gases.

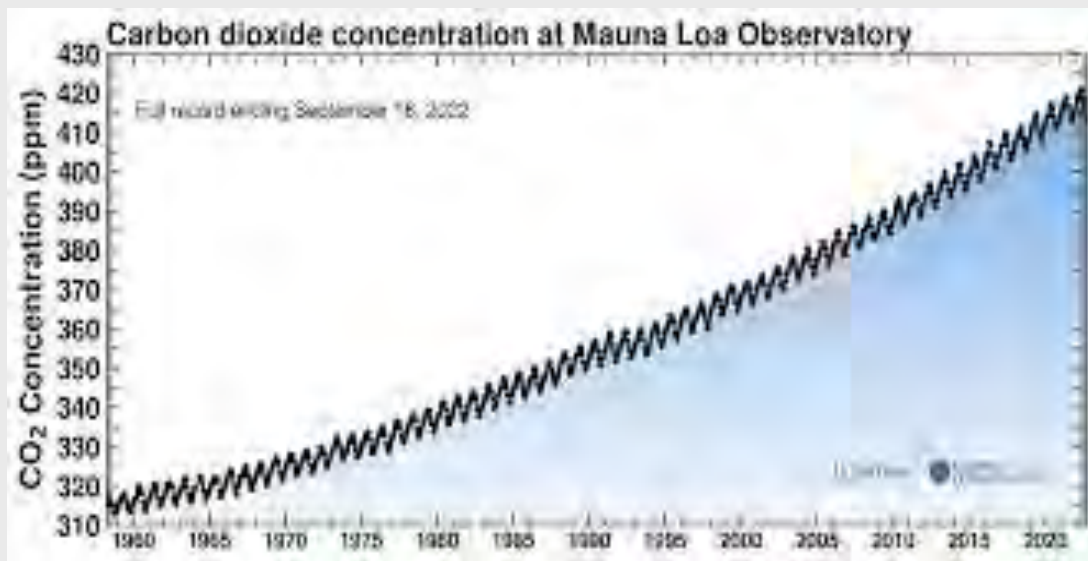


Figure 1: Rising carbon-dioxide concentration as measured at Mauna Loa Observatory

The IPCC's hypothesis, articulated by Bert Bolin and Jule Charney and expressed in the Summary for Policymakers, is that the anthropogenic emission of CO₂ and the other minor greenhouse gases produces a strong positive feedback response from water vapor, which then becomes the main driver of global warming. In other words, CO₂ acts as a global thermostat, controlling the rate of global warming by controlling the amount of water vapor in the atmosphere. Yet, a great deal of evidence shows that CO₂ does not control the climate.

Central England Temperature record not rising

The Central England Temperature (CET) record is the longest instrument record of temperature in the world. The CET record in the red line of Figure 2 shows a moderately rising temperature curve with temperature fluctuations along the way. The CET record is predominately a linear trend, rising at an average rate of $0.28^{\circ}\text{C}/\text{century}$.

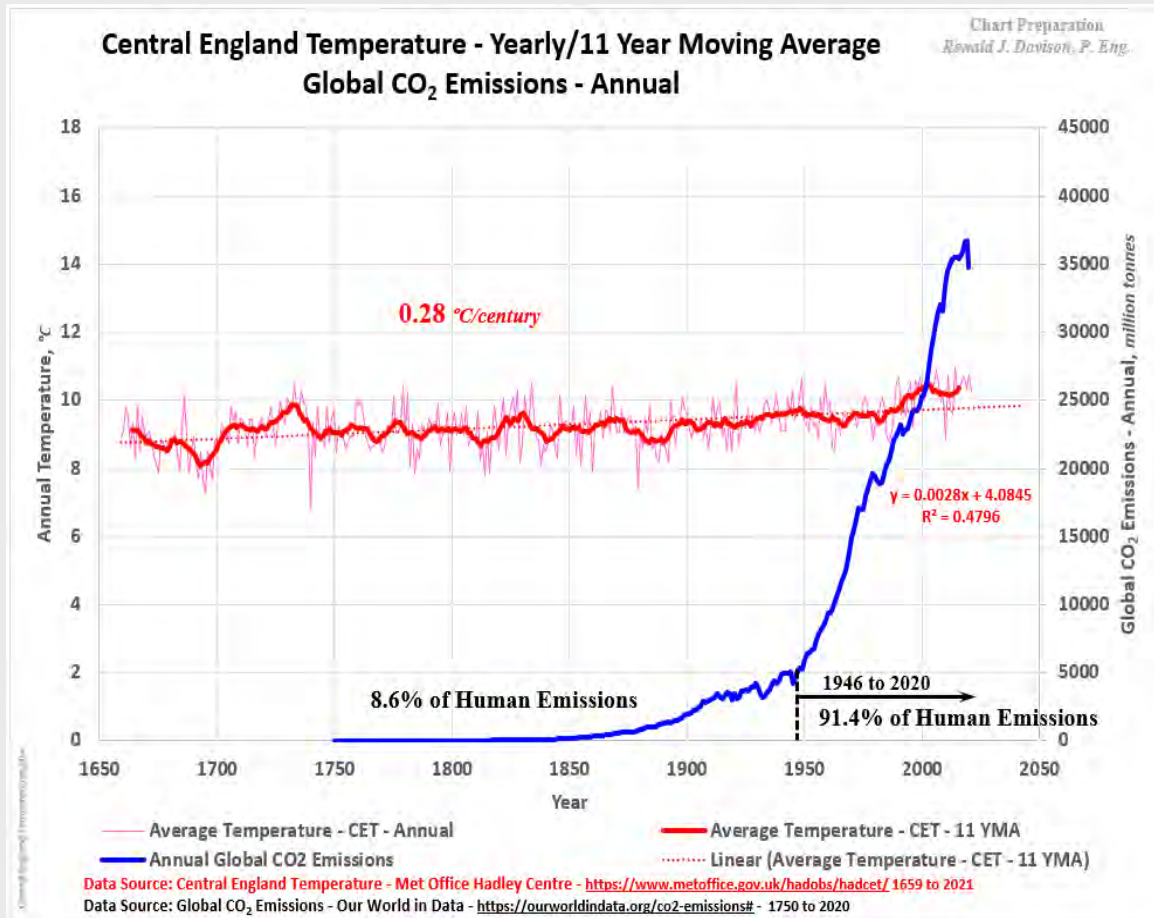


Figure 2: Central England Temperature Record 1659 to 2021 (red line): Global CO₂ emissions 1750 to 2020 (blue line)¹⁴

According to the IPCC's modeling hypotheses, the rapidly rising blue curve of CO₂ emissions after 1946 should be producing some sort of a corresponding marked rise in the CET record. But it isn't. The CET curve after 1946 is pretty much an extension of the CET record before 1946.

If Bolin and Charney are correct, there should be evidence of some obvious correlation between the CET record and the CO₂ emissions curve. The lack of any obvious correlation

invalidates the IPCC's modeling hypotheses that CO₂ is the major driver of recent temperature change.

Rate of sea-level rise not increasing

Figure 3 shows that the global sea level has been rising about 20 mm (less than an inch)/decade since about 1860. The IPCC's computer models predict unprecedented global warming after 1946 due to rising CO₂ emissions, leading to an unprecedented melting of glaciers, and to an unprecedented rate of rise in the global sea level.

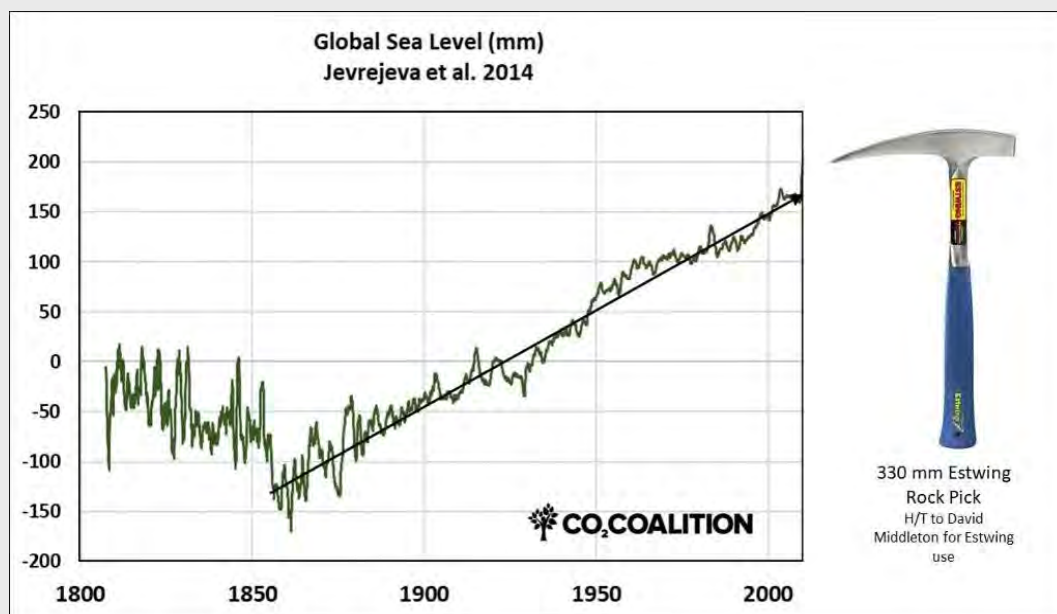


Figure 3: Rising sea level (Source: CO₂ Coalition)¹⁵

The observed data, however, shows a relatively orderly linear rise in sea level from about 1860 through to 2014. *There is no alarming change in the rate of rise in the global sea level after 1946.* This finding invalidates the IPCC's modeling hypotheses that rapidly rising CO₂ emissions are causing an unprecedented recent rise in sea level.

If the global sea level continues to rise at its current rate, this rise can be readily dealt with by relatively modest adaptation measures, such as raising flood-protection works and discouraging development in vulnerable areas.

IPCC model results well above measured temperatures

All IPCC computer models claim that the strongest evidence of rising CO₂ levels causing global warming will be found in the Tropical Troposphere, 18 kilometers up in the atmosphere.

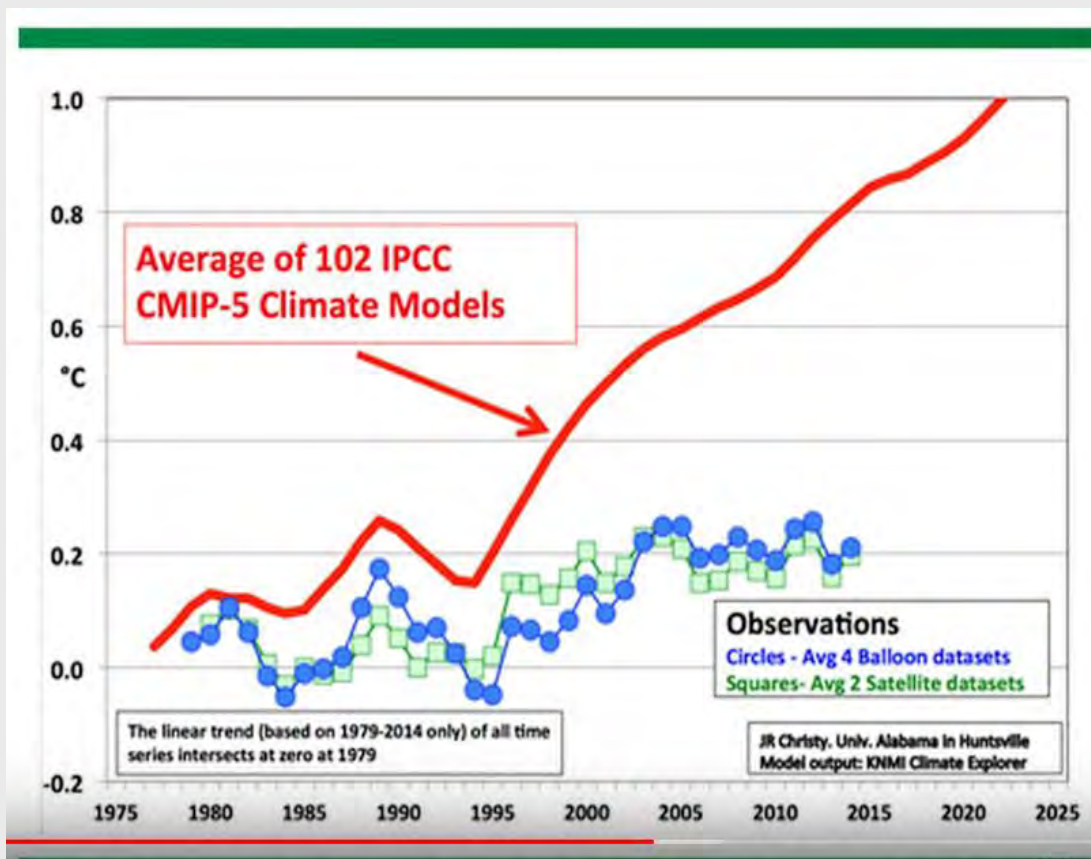


Figure 4: Observed temperatures in the tropical troposphere compared to IPCC modeling results for CMIP-5 climate models (Source: Dr. John Christy, UAH)¹⁶

The red curve in Figure 4 shows the temperature rise that should be occurring in the Tropical Troposphere according to the computer models based on the IPCC's modeling hypotheses. The green and blue satellite and radiosonde (weather balloon) curves show the actual temperatures measured in the Tropical Troposphere.

It is clear that the IPCC's models are running too hot. As a result, the IPCC computer models are not providing reliable data for governments to use in determining what their long-term climate policies should be.

Figure 4 is based on CMIP-5 (Coupled Model Intercomparison Project) models that were released in 2014. Dr. John Christy of the University of Alabama at Huntsville (UAH), one of two climate-monitoring agencies that uses satellites, has done a similar analysis for the CMIP-6 models released in 2021. Dr. Christy gave a video presentation of his analysis at <https://www.youtube.com/watch?v=D2Cd4MLUoN0>.

The green curves and green arrow at the lower part of the Figure 5 (next page) show the observed data, rising at an average rate of $0.17^{\circ}\text{C}/\text{decade}$. The deviation of the green curves from the green arrow is relatively small, indicating that negative feedbacks quickly come into play when actual temperatures begin to deviate from their trend line.

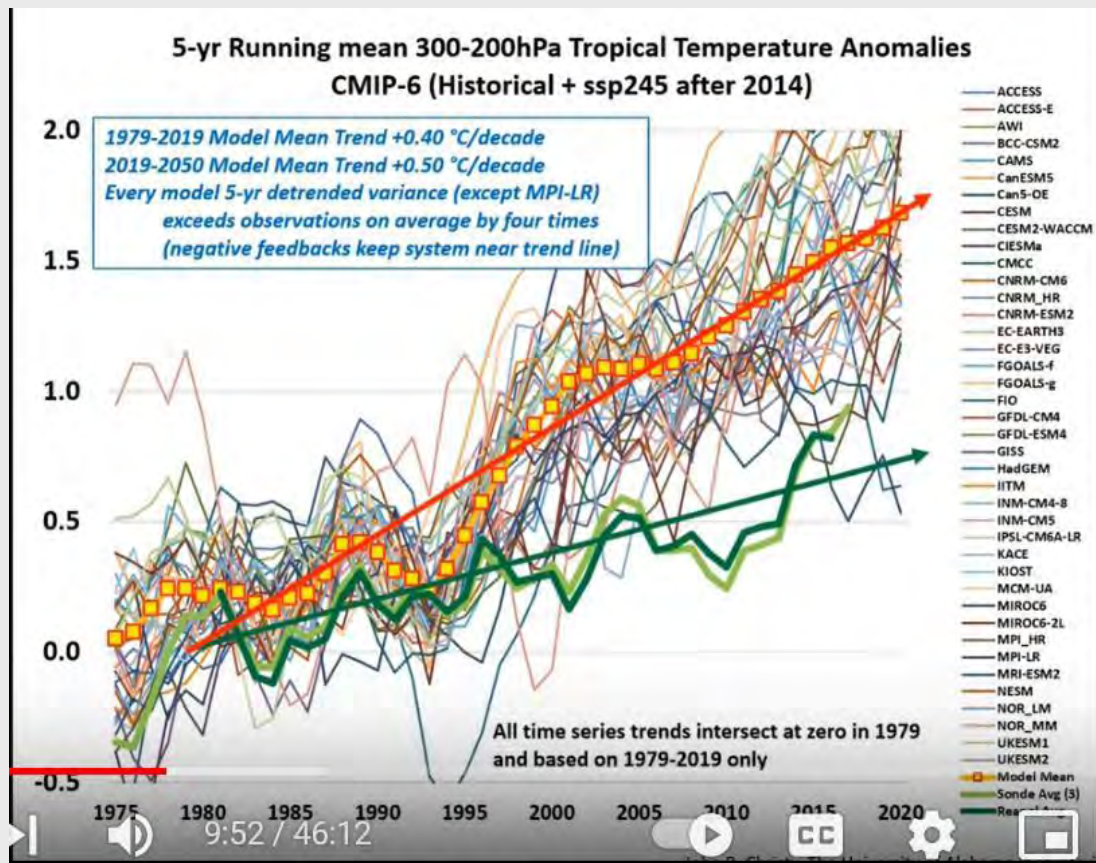


Figure 5: Details of 39 IPCC modelling runs with CMIP-6 criteria, versus observed data (Source: Dr. John Christy)¹⁷

The spaghetti of model runs in the upper part of the graph show much larger deviations from the models mean value (red line), indicating that the IPCC models lack the responsive feedback mechanisms that are actually present in the atmosphere. Dr. Christy noted in the

video that the newer CMIP-6 models, which have a finer grid resolution than the CMIP-5 models, have larger variances from their mean than the CMIP-5 models do, indicating that the CMIP-6 models are more erratic than the CMIP-5 models.

Despite all the money and effort going into IPCC modeling studies, the results are not showing improvements over time, which indicates that the IPCC's expert consensus of how the atmosphere should behave is not capturing the essence of how the atmosphere actually does behave. The great variation between the different model results means that little confidence can be placed on the results of any one model.

Tropical storms and hurricanes are not more frequent

The IPCC and its supporters claim that the planet is experiencing unprecedented recent changes in extreme weather. Figure 6 shows lots of annual variability in the *frequency* of tropical storms and hurricanes, but the observed records don't show any noticeable change in *trend* over 50 years of record.

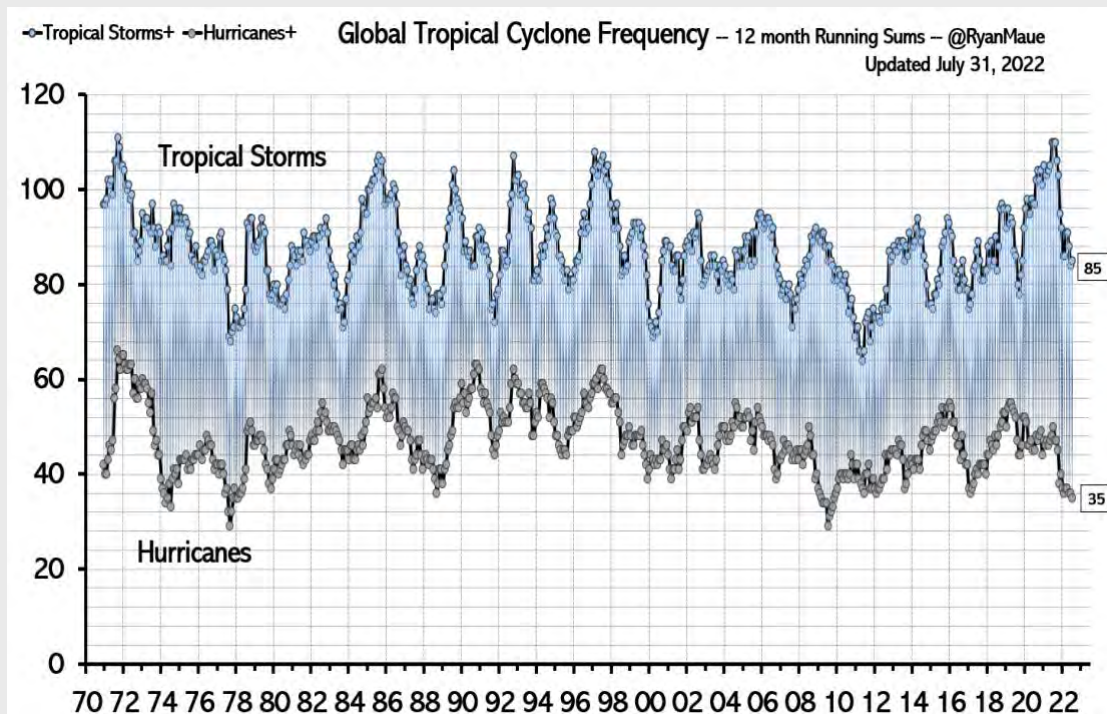


Figure 6: Global tropical storm and hurricane frequency (Source: Dr. R. Maue)¹⁸

The cost of hurricanes is increasing over time but that is due to more people and infrastructure being located in vulnerable areas. This is a land-use issue, not a rising CO₂ issue.

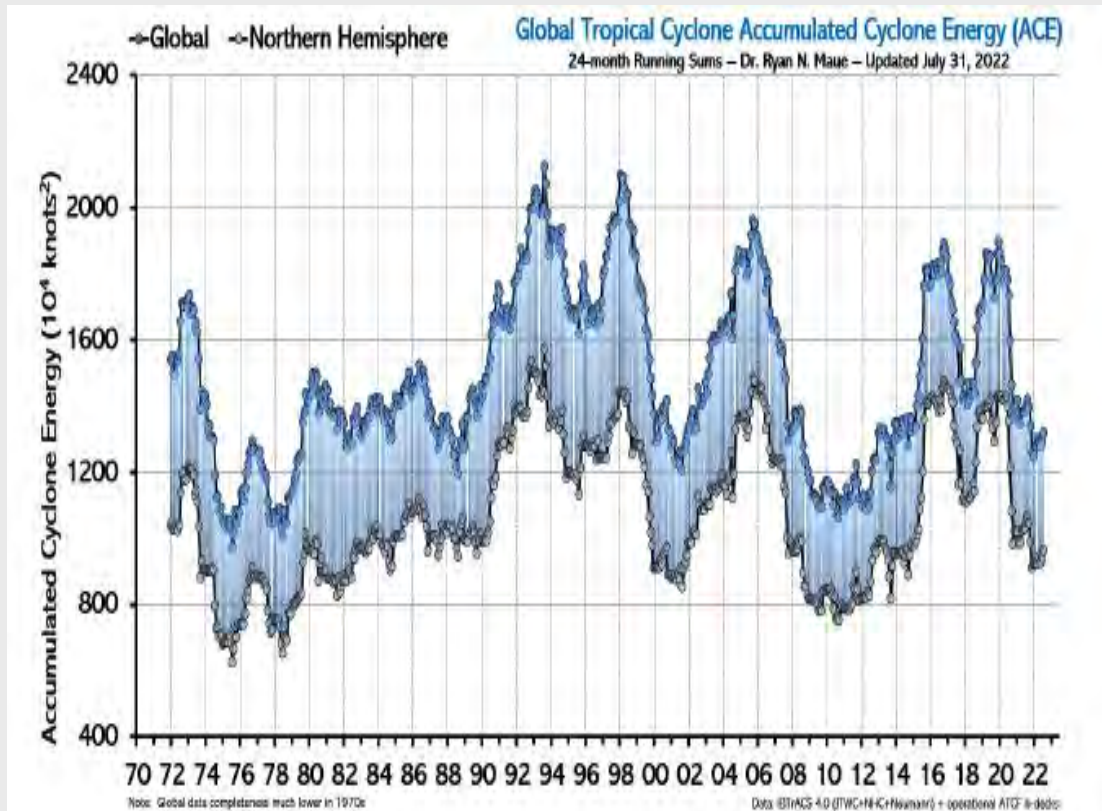


Figure 7: Global accumulated cyclone energy (ACE)¹⁸

Figure 7 shows that despite considerable variation over time in cyclone energy, the overall trend is sideways. There is no alarming, unprecedented rise in hurricane strength in recent years, as is claimed by the IPCC's Executive Committee and its supporters.

Frequency of tornadoes has not increased

The frequency of major U.S. tornadoes has actually *decreased* in recent years (see Figure 8). The damage and costs of tornadoes, however, has increased due to more people and infrastructure being located in vulnerable areas. Again, this is a land-use issue and building-standards issue, not a CO₂ issue.

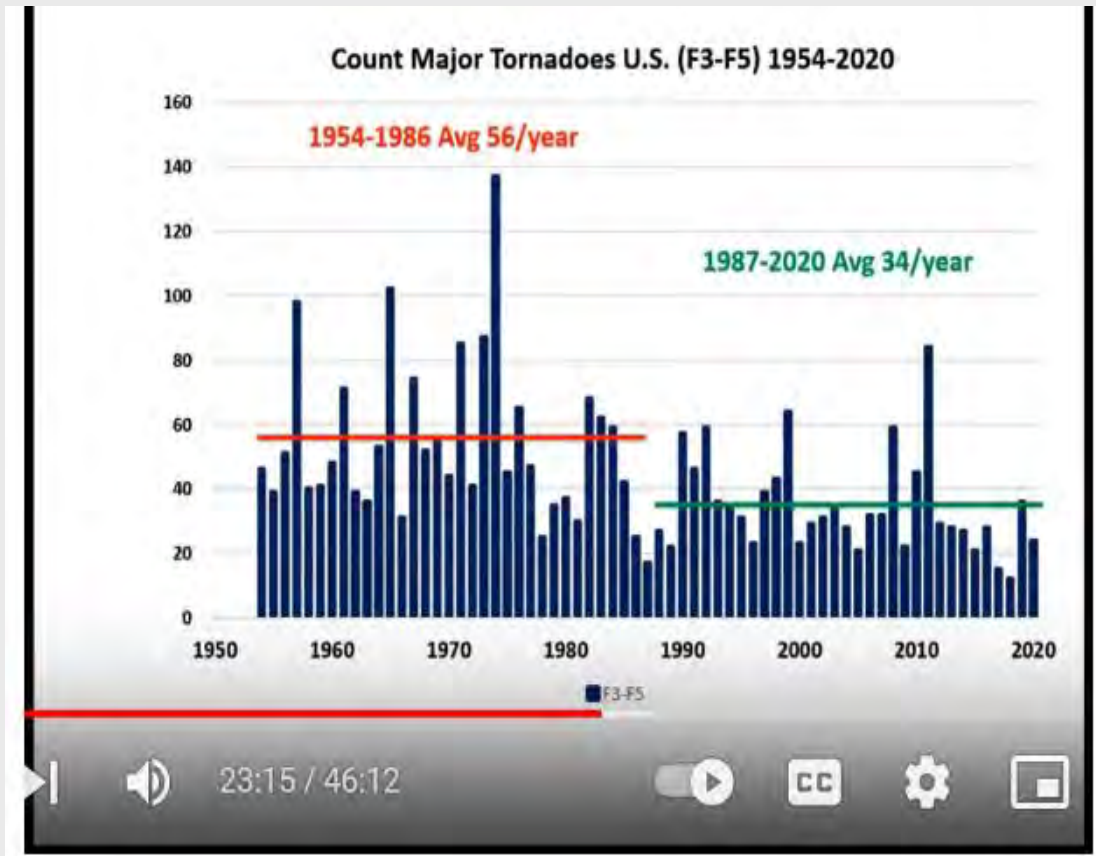


Figure 8: Frequency of major U.S. tornadoes (Source: Dr. John Christy, UAH)¹⁹

Snow cover is not melting away

A few years ago, IPCC-supported computer studies predicted that snow cover would soon be a thing of the past in the Northern Hemisphere. Although snow cover can vary from year to year, Figure 9 shows no significant melting trend underway in snow cover, and ski-hill operators do not appear to be at any imminent risk of going out of business due to lack of snow.

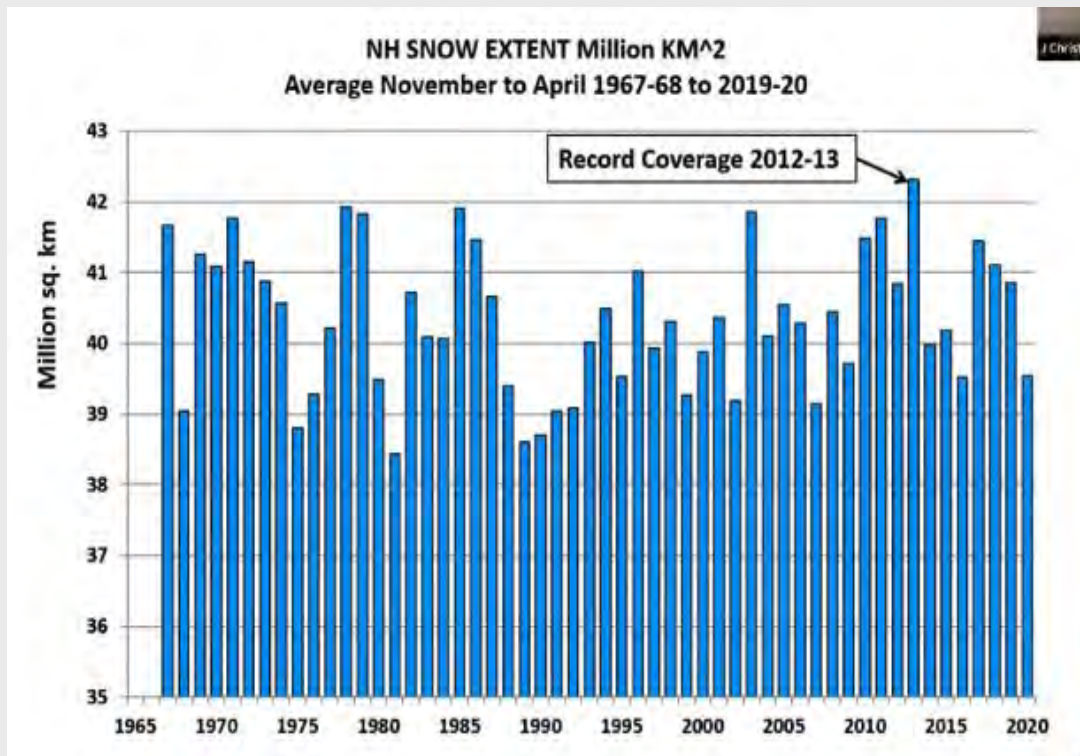


Figure 9: Snow cover in the Northern Hemisphere (Source: Dr. John Christy)²⁰

Modern warming is not ‘unprecedented’

As Figure 10 shows, the 1930s were clearly the time of the most intense hot days in the U.S. in the past century. Today’s records are about on a par with what they were 100 years ago, which contradicts claims by the IPCC and its supporters that we are currently experiencing unprecedented modern warming.

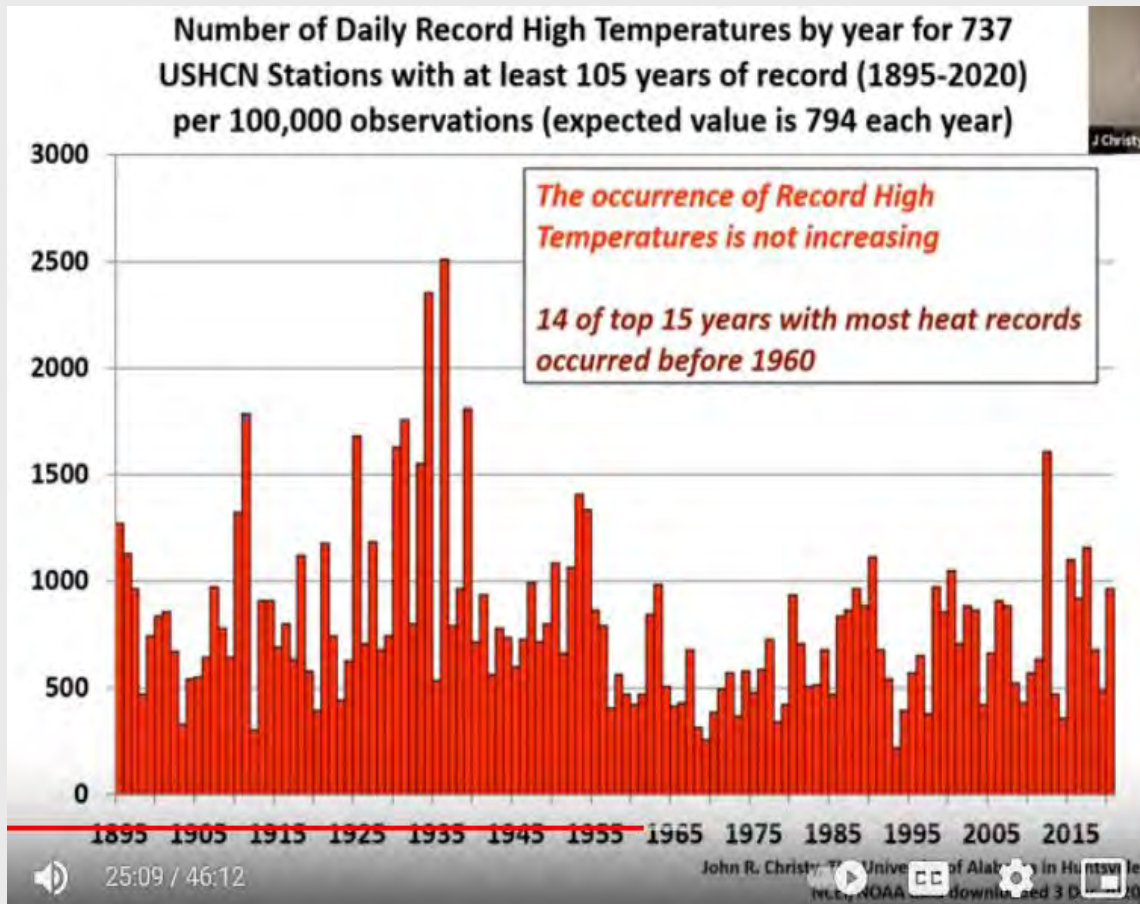


Figure 10: Number of record high days each year in the U.S. (Source: Dr. John Christy)²¹

Drought is not increasing

Figure 11 shows annual values of the Palmer Drought Severity Index, averaged over the entire area of the contiguous 48 states.

Positive values represent wetter-than-average conditions, while negative values represent drier-than-average conditions. A value between -2 and -3 indicates moderate drought, -3 to -4 is severe drought, and -4 or below indicates extreme drought. The thicker line is a nine-year weighted average. The severity of the 1935 drought stands out in the record.

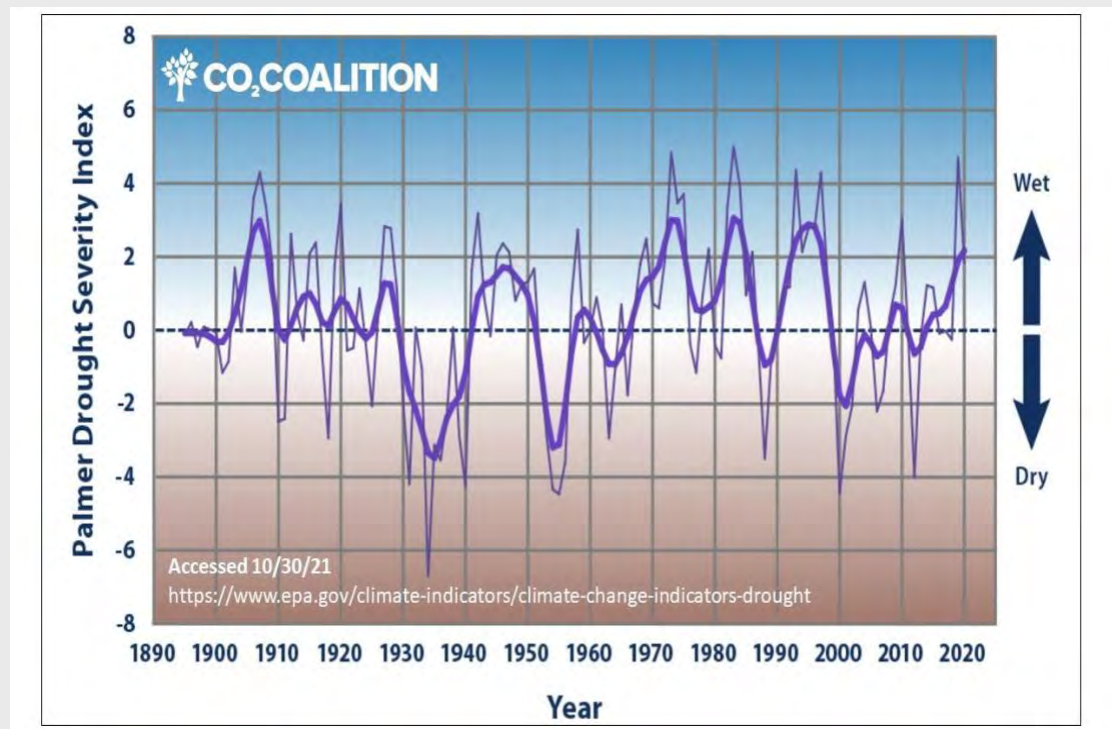


Figure 11: Palmer Drought Severity Index (PDI). Source: CO2 Coalition.²²

Despite numerous alarming claims of increasing drought, the United States Environmental Protection Agency's (EPA) Palmer Drought Severity Index (PDI) shows zero increase in dry conditions over the last 120-plus years.

Wildfire acres not increasing

Forest management practices brought wildfires largely under control after 1930 with fire-suppression measures and controlled burns of forest litter (see Figure 12). During the 1980s and 1990s, thinking changed and opposition grew to having controlled burns of forest litter on a regular basis.

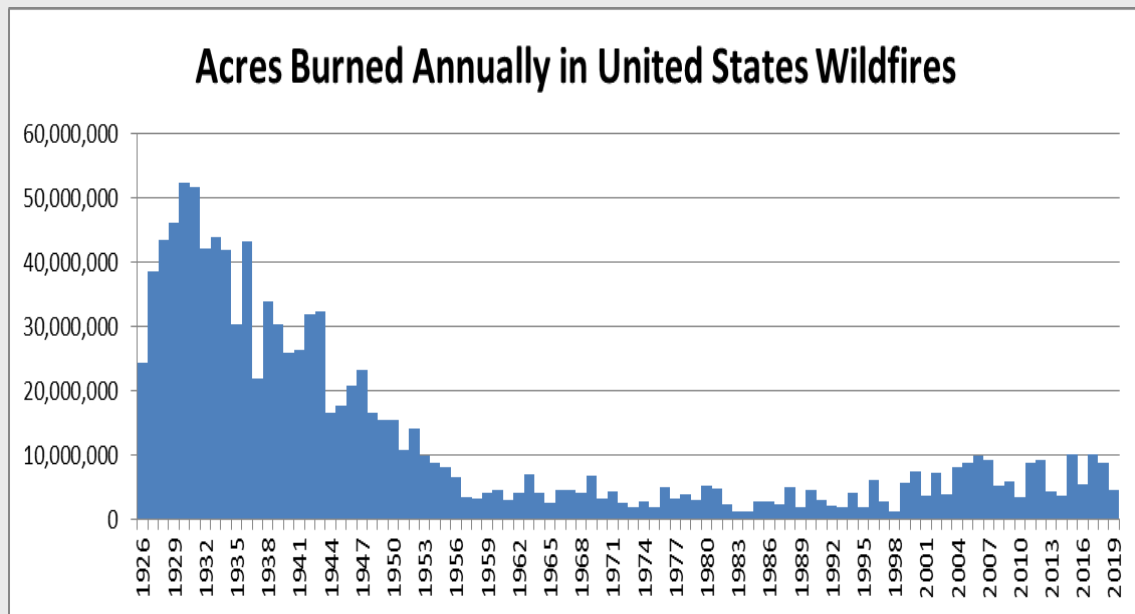


Figure 12: Total wildland acres burned annual (1226-2019) in the USA²³

At the same time, in semi-arid areas like California and South Australia, more subdivisions were created in forested areas. Forest litter was allowed to accumulate. When fires do occur in these built-up areas now, damages and loss of life can be very high. This is primarily a land-management issue, not a CO₂ issue.

Rate of warming is not increasing

The linear warming trend since January, 1979, remains at $+0.14^{\circ}\text{C}/\text{decade}$ ($+0.12^{\circ}\text{C}/\text{decade}$ over the global-averaged oceans, and $+0.18^{\circ}\text{C}/\text{decade}$ over global-averaged land) (see Figure 13). These values are for temperatures in the tropical troposphere and they are in the same range as Dr. John Christy's average observed temperature rise of $0.17^{\circ}\text{C}/\text{decade}$ shown in Figure 5.

Surface temperatures are another matter.

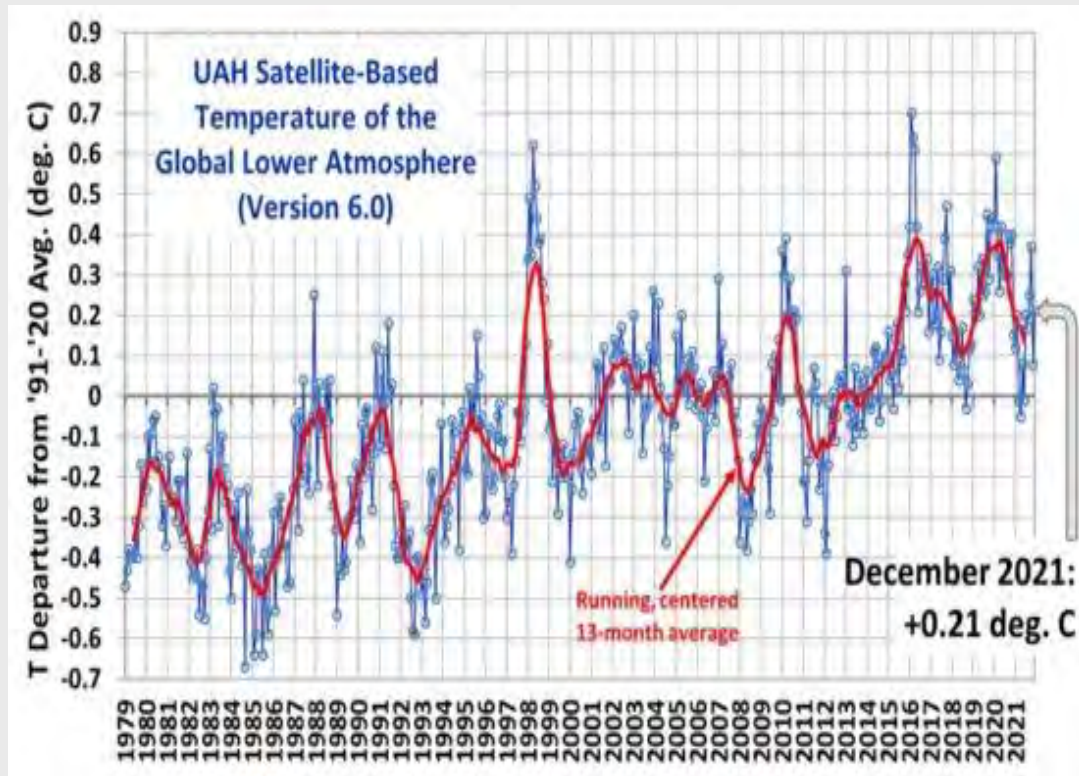


Figure 13: More detailed look at the UAH satellite temperature record to December 2021 (Source: Dr. Roy Spencer, UAH)²⁴

Land covers about 30% of the earth's surface and water about 70%. This has presented many difficulties, both natural and manmade, to creating a strong surface-based network of weather stations that can reliably give us a worldwide measure of the Earth's surface temperature and of how it is changing over time.

Satellite data is regarded as the best method of monitoring and representing worldwide weather data going forward, but it has the disadvantage for now of still having a comparatively short period of record (post-1979).

Surface weather stations can have much longer records, going back to the 1800s. They can have their own set of problems since changes to the local weather-station's environment over time can bias any temperature trends showing up in a weather station's record.

Weather-station placement can bias temperature data

Albedo is a measure of the reflectiveness of different surfaces (see Figure 14). Water and forests absorb a lot of incoming solar radiation that warms the Earth, whereas fresh snow reflects a lot of solar radiation back into space, limiting any warming effect on Earth.

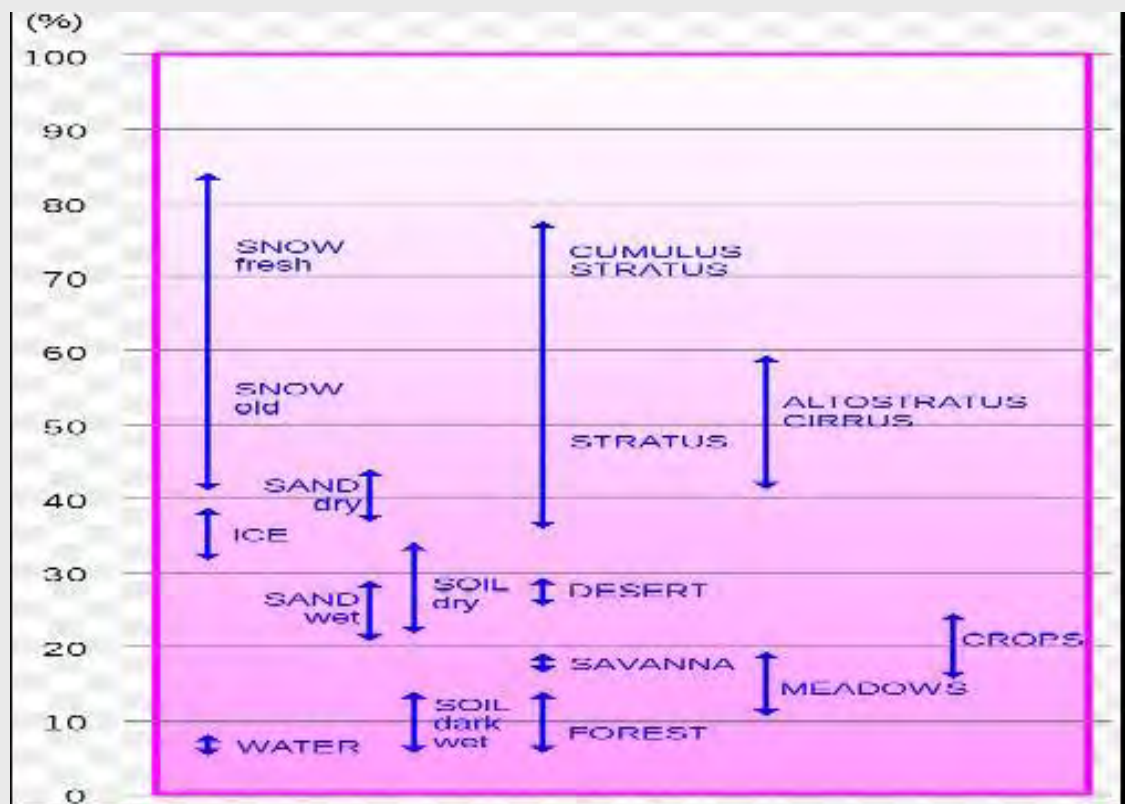


Figure 14: Albedo of different surfaces²⁵

If a weather station is sited on the edge of a forest back in the 1890s, which then becomes meadow, then cropped, then suburban, then a commercial area by the 2010s, its albedo will have changed. Its local heat-retaining characteristics will also have changed because of nearby road surfaces, concrete buildings, heating and air-conditioning vents, and waste heat from the transportation system, including airports. This latter effect is commonly called the Urban Heat Island (UHI) effect.

This changing environment also affects the ability of weather stations to accurately record representative temperature data in their immediate locality. It has been estimated that up to 96% of today's weather stations in the U.S. no longer meet the NOAA criteria for

“acceptable” weather station placement²⁶ due to changes in their immediate local environment, biasing the weather records that are being collected.

To compensate for these deficiencies, weather agencies will sometimes try to correct for biases to create a more reliable long-term temperature record for modeling purposes, and for distinguishing between rising CO₂ effects on temperature from changes occurring in a local weather stations environment due to changing albedo effects and urban-heat-island effects.

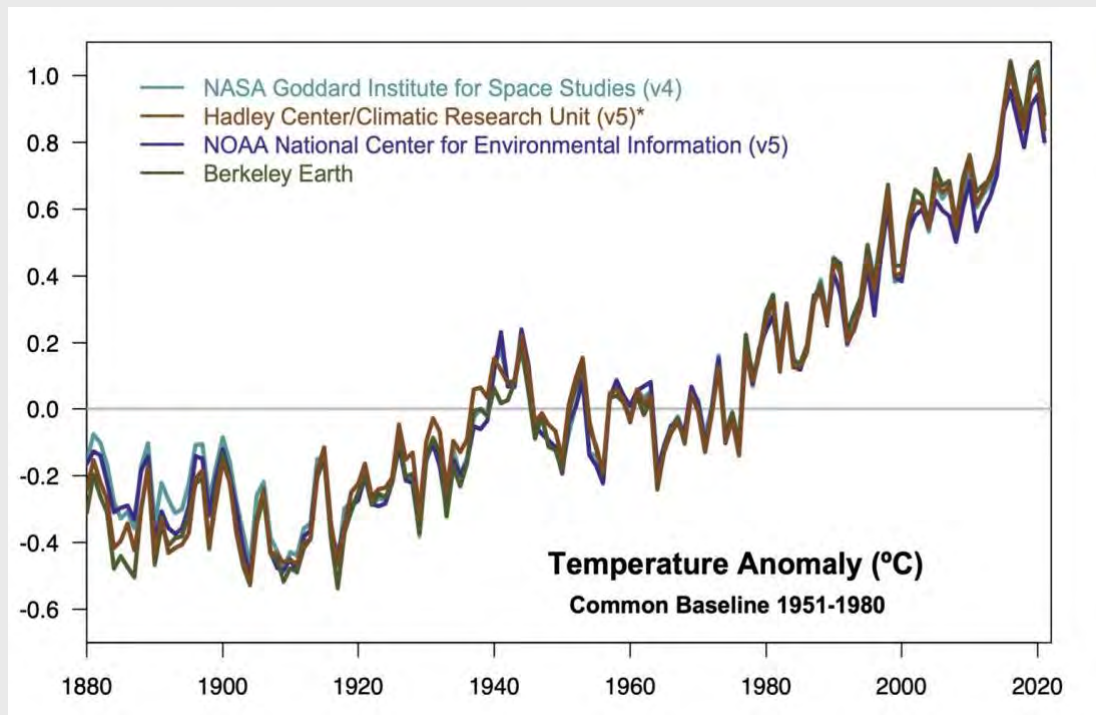


Figure 15: Consensus temperature anomaly of major weather agencies
(Source: NASA)²⁷

Figure 15 shows an exponentially rising temperature curve that supports the IPCC’s modeling assumptions that rising CO₂ is causing an exponential rise in temperature. This graph appears quite frequently now as evidence for the IPCC’s computer-modeling temperature projections.

The graph is puzzling in several respects. The exponential rise in temperature that Figure 15 shows is not evident in either Figure 2 of the Central England Temperature record or of the weather balloon and satellite temperature data in Figure 4. Also, Figure 15 shows current temperatures substantially higher than temperatures in the 1930s, whereas Figures 10 and 11 offer strong evidence from observed temperature records and drought records that conditions in the U.S. were significantly hotter in the 1930s. Why is there this discrepancy?

A long-time critic of most government temperature records is Tony Heller. He has a strong database of original weather-station records and of old newspaper stories of floods, droughts, and wildfires around the world. He has issued a video with the title “Are Official U.S. Temperature Graphs Credible?” (see <https://www.youtube.com/watch?v=163GEIh74T4>). The video is only 17 minutes long and is worth watching for the criticisms that Tony makes and for the evidence he presents to support his case that graphs like Figure 15 are effectively manufactured temperature data, not real data.

The process by the Goddard Institute for Space Studies (GISS), under former director James Hansen, of adjusting temperature data to “improve” temperature records has been done over a period of several years and in several steps. With each step older temperatures are often lowered and more recent temperatures gradually raised, therefore changing the overall shape and trend of temperature curves.

What fuels suspicion of these “improvements” is that neither GISS nor the other agencies making similar changes to their data are open about why the specific changes are being made and how they are being made.

If Heller’s assertions are correct, the major weather agencies are bending the surface temperature data curve to better match the IPCC’s expert consensus of how the atmosphere should behave, rather than the modelers trying to modify their models to conform to observed data. This is a strange situation that should be resolved in favor of observations prevailing over theory.

The major weather agencies are altering the surface temperature data to match the IPCC’s view of how the atmosphere should behave, rather than modifying their models to conform to observed data.

If the Agencies that produced the Figure 15 curves stand behind their analysis, then the onus should be on them to show why their analysis is correct and the weather-balloon and satellite data is wrong. Likewise, they should be able to readily show what is wrong with the temperature data and newspaper clippings that Tony Heller uses in his analysis.

This issue has arisen because of the IPCC’s modeling groups’ and government agencies’ persistent lack of openness and transparency in providing details of what they are doing, and why their analyses is deviating so much from weather-balloon and satellite data.

As carbon-dioxide increases it has less warming effect

Figure 16 shows this saturation effect happens very quickly. By the time the CO₂ concentration in the atmosphere has risen from 0 ppm to 60 ppm, *most of the CO₂-induced warming has already occurred*.

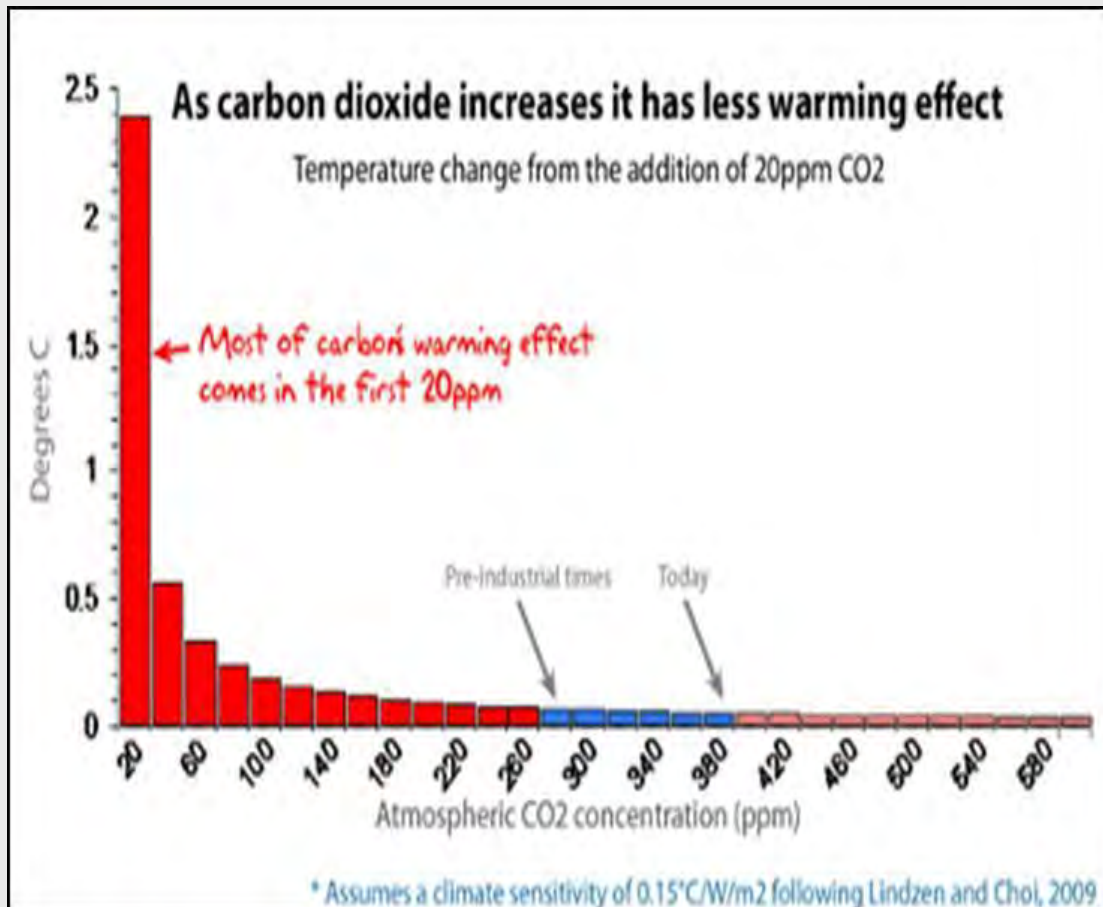


Figure 16: Saturation effect showing exponential decay of CO₂'s ability to absorb more heat²⁸

The blue segment of the graph, between the CO₂ concentration of 280 ppm prior to industrialization and current 420 ppm concentration, illustrates the limited effect that CO₂ can have on global warming at this time.

On a per-molecule basis, the other greenhouse gases, methane and nitrous oxide, can cause more warming than a CO₂ atom, but both gases have low concentrations compared to CO₂

and their saturation ability also decays exponentially as their concentration grows. They have little practical effect on global warming.

The behavior of greenhouse gases in the atmosphere has been examined in detail by Drs. William Van Wijngaarden and William Happer in a recent paper.

Dr. Tom Sheahan²⁸ has produced a concise presentation on the scope and significance of the study by Wijngaarden and Happer, which he presented to the Irish Climate Science Forum on September 21, 2022: <https://www.youtube.com/watch?v=CqWv26PXqz0>. This video will give readers a deeper understanding of how greenhouse gases actually work in the atmosphere

The Wijngaarden and Happer study concluded that at their present concentrations, carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) have negligible ability to cause global warming, and that this will be the case even if their concentrations are doubled.²⁹ In this reference, Dr. Happer gives more details of how he and Dr. Wijngaarden carried out their calculations.

CO₂ has produced significant warming in the atmosphere in the past but because of saturation effects, it can no longer do so. Satellite observations of Earth's radiation into space provides strong support for the calculations by Wijngaarden and Happer.

Climate change isn't causing more deaths

Figure 17 shows a remarkable improvement over the past 100 years in reducing the number of lives lost to climate-related deaths. This improvement is due in large part to the growing wealth and knowledge of societies, which have devised warning procedures, zoning regulations, and structural means that have allowed governments around the world to greatly improve the welfare of their citizens.

This has happened despite the fact that the world's population is now over eight billion people.

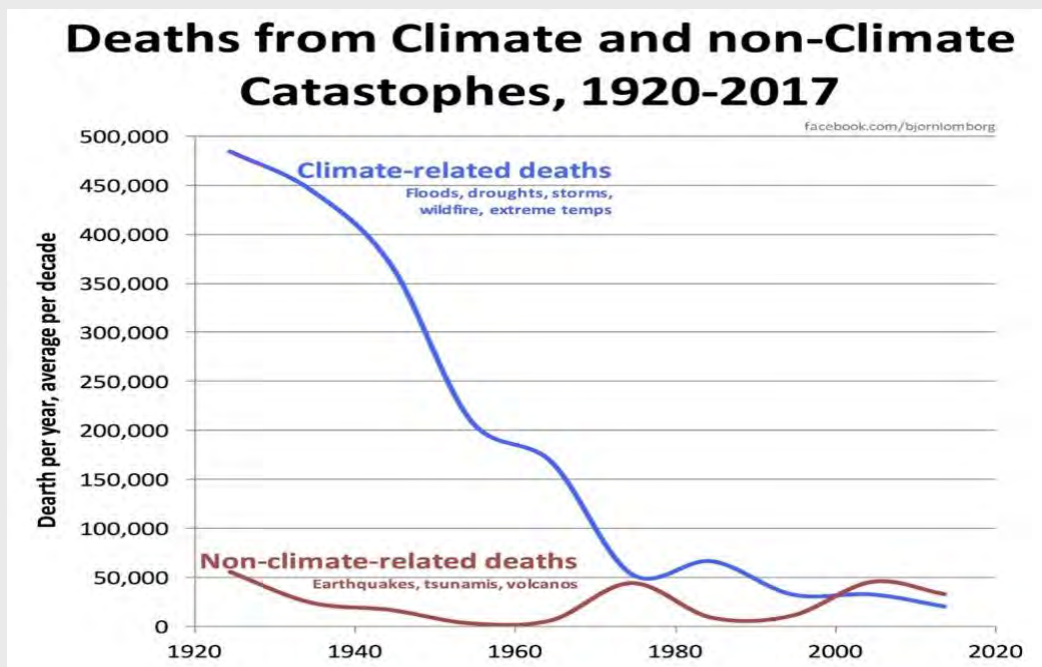


Figure 17: Loss of lives from climate and non-climate disasters 1920-2017 (Source: Bjorn Lomborg)³⁰

Summary of the Modern Warm Period

The Modern Warm Period began about 1850. According to the National Aeronautics and Space Administration (NASA)³¹, the temperature has risen about 1.1⁰ C since 1880.

Since the 1970s, the pre-eminent concern of the environmental movement has become Anthropogenic Global Warming (AGW), leading to the creation of the IPCC in 1988 to assess and recommend measures to deal with AGW. Since then, hundreds of billions of dollars have been spent on IPCC studies and green-energy studies, and now trillions of dollars are being mobilized to replace fossil fuels with green energy. Two questions arise: Are we on the right track? Is this effort serving humanity?

Figures 2 and 3 show that long-term temperature rise and sea-level rise are showing little, if any, response to rapidly rising CO₂ levels. There is no obvious sign of any significant correlation.

Figure 4 shows that the predicted average temperature trend for IPCC models is rising much faster than the observed radiosonde and satellite data for the IPCC's RCP 4.5 scenario in 2014 (this scenario stabilizes warming at 4.5 Watts per square meter).

There must have been people at the senior scientific and modeling levels within Working Group 1 in 2014 who were aware of this growing discrepancy. Yet, when the IPCC released its AR5 Summary Report for Policymakers that year, it stated:

Human influence on the climate system is clear. It is extremely likely (95–100% probability) that human influence was the dominant cause of global warming between 1951 and 2010.¹²

This raises significant questions: Why was this discrepancy between theory and observations not thrashed out when the IPCC Panel was preparing the AR5 Summary Report? And why was this expression of a high degree of confidence that “human influence was the dominant cause of global warming” included in the final IPCC (SPM) AR5 release, when Figure 4 clearly shows otherwise?

Why was the discrepancy
between theory and
observations not thrashed out
when the IPCC panel was
preparing the Fifth
Summary report?

Most people reading the AR5 SPM statement above would likely get two impressions from it: the first is that the IPCC people seem to have a good handle on the problem; and the second is that the statement “... *extremely likely (95-100% probability)*” sounds pretty serious and something should be done about it.

Next time a strong climate alarm statement is issued by the IPCC or the UN Secretary General, readers should recall Figure 4 and the deceptive statements that the IPCC was making in earlier SPM reports.

The AR5 SPM misstatement was made at a pivotal time. The Paris Conference of Parties (COP) in 2015 began with a proposal to limit future global warming to less than 2°C since the beginning of the Industrial Revolution. In the enthusiasm of the gathering, delegates voted to further limit the future increase in global warming to less than 1.5°C.

Both numbers were aspirational goals that were never seriously analyzed as to costs, feasibility, or desirability, and both were based on the deeply misleading information that had been provided in the IPCC's AR5 SPM report in 2014.

Climate targets were aspirational goals that were never seriously analyzed as to cost, feasibility, or desirability.

The Paris Accord led to the adoption of the net zero goal by 2050 of 1.5°C by many Western countries. The Accord has also contributed greatly to the current energy chaos now unfolding in Europe.

Figure 5 shows that the IPCC computer models are, if anything, even less reliable in AR6 released in 2021 than in AR5 in 2014.

Figure 6 through Figure 12, show graphs of Hurricanes, Tornados, Snow Cover, Record Number of Hot Days, Droughts, and Acres Burned Annually that show no recent significant changes to their trends that could be related to rising CO₂.

Figure 13 through Figure 15 examine the relative merits of space temperature data versus surface temperature data and of some of the questionable adjustments that major government agencies have made to observed historical surface temperature data in order to “improve” it, but without providing a clear and transparent accounting of what they are doing, why they are doing it, and how they are doing it. This is especially troubling since the resulting consensus adjusted temperature data diverges substantially from observed data.

Figure 16 takes a much closer look at the behavior of CO₂, including the saturation curve for CO₂, which explains why any further addition of CO₂ into the atmosphere will have only a limited effect on global warming.

This insight is based on a major study of outgoing radiation from Earth undertaken by William Van Wijngaarden and William Happer, looking into the behavior of the main greenhouse gases, H₂O, CO₂, CH₄, and N₂O in the atmosphere.

Their calculations show that CO₂, CH₄ and N₂O at their current concentrations in the atmosphere make only minor contributions to AGW today, and that this will continue to

be the case even when their current concentrations are doubled or tripled. The Wijngaarden and Happer calculations are strongly supported by observed satellite data.

Figure 17 on the Reduction of Deaths from Climate and Non-Climate Catastrophes shows the extraordinary progress made globally over the past century in reducing human losses, including losses due to changes in weather and climate.

This brings an end to the section on The Modern Warm Period. At this time, it seems clear that carbon dioxide, methane, and nitrous oxide do not have the power to control temperature in the atmosphere in any significant way. *There is no reason on the basis of current knowledge to fear that any sort of climate catastrophe is imminent.* This raises the question: If CO₂ and the other greenhouse gases are not causing significant climate change, then what is? The next two sections: The Holocene and Deep Geological Time will delve more deeply into this question.

The Holocene

Our first step back in time will be a closer look at the current Holocene Interglacial period, starting with a more detailed look at the Little Ice Age (Figure 19), then going back to 12,000 years ago.

In the 1600s, the depth of the Little Ice Age was marked by a particularly cold period called the Maunder Minimum. This was followed in the early 1800s by another shorter cold period called the Dalton Minimum.

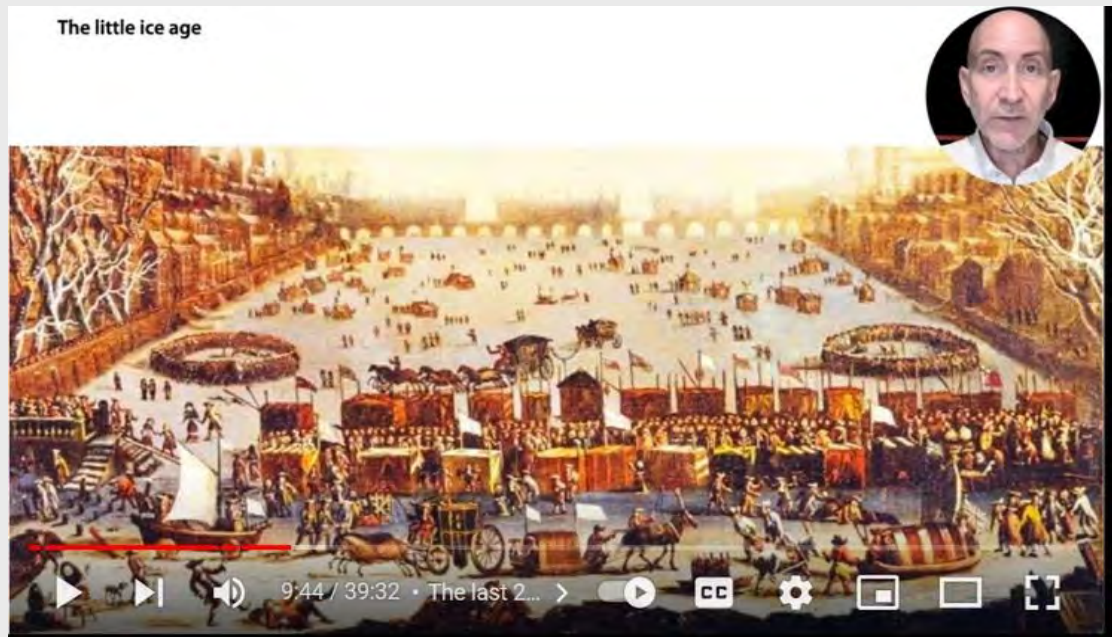
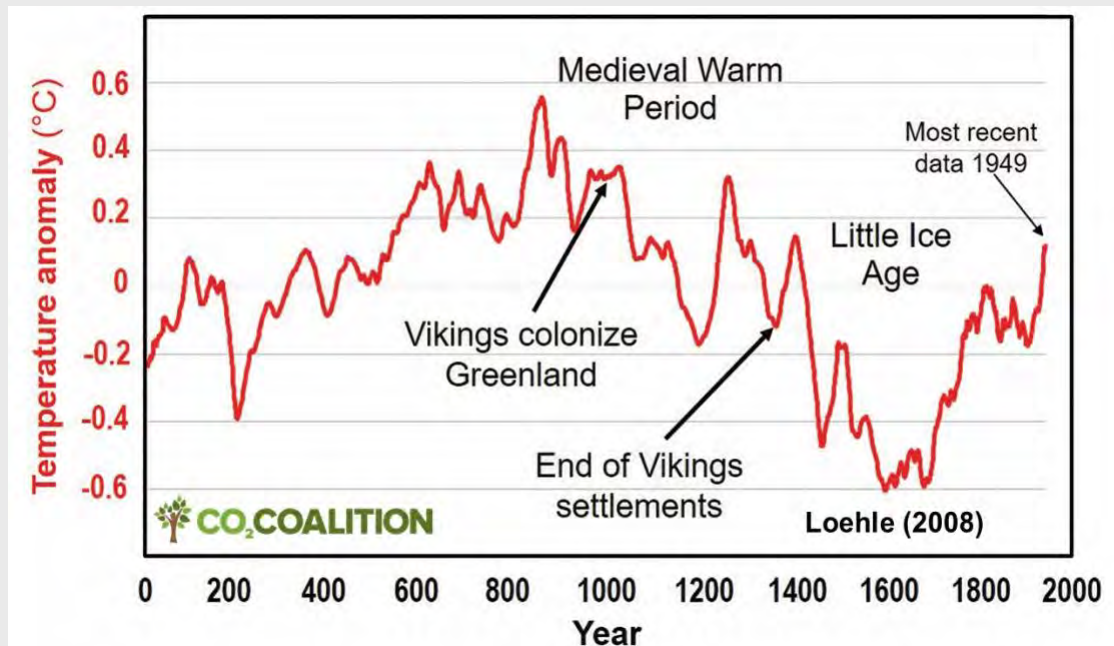


Figure 18: Winter fairs were common on the Thames River around 1700 during the Little Ice Age (Source: D. Siegel)³²



People at the time noticed that during both of these cold periods, there were few if any sun spots. Speculation arose as to whether there could be some connection between the lack of sunspots and the intensely cold weather that was causing so much hardship.

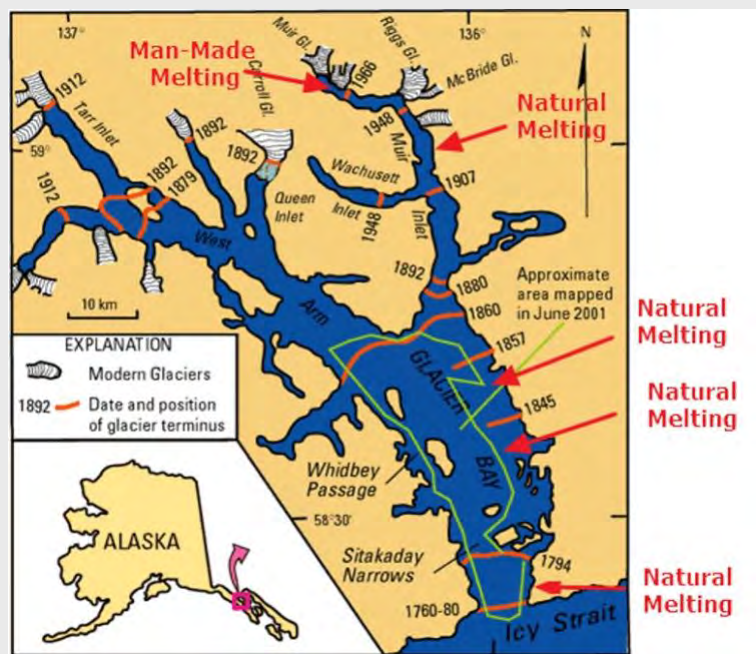


Figure 21 shows a strong correspondence between the lack of sunspot activity and intense cold periods, at least in the 1700s and 1800s.

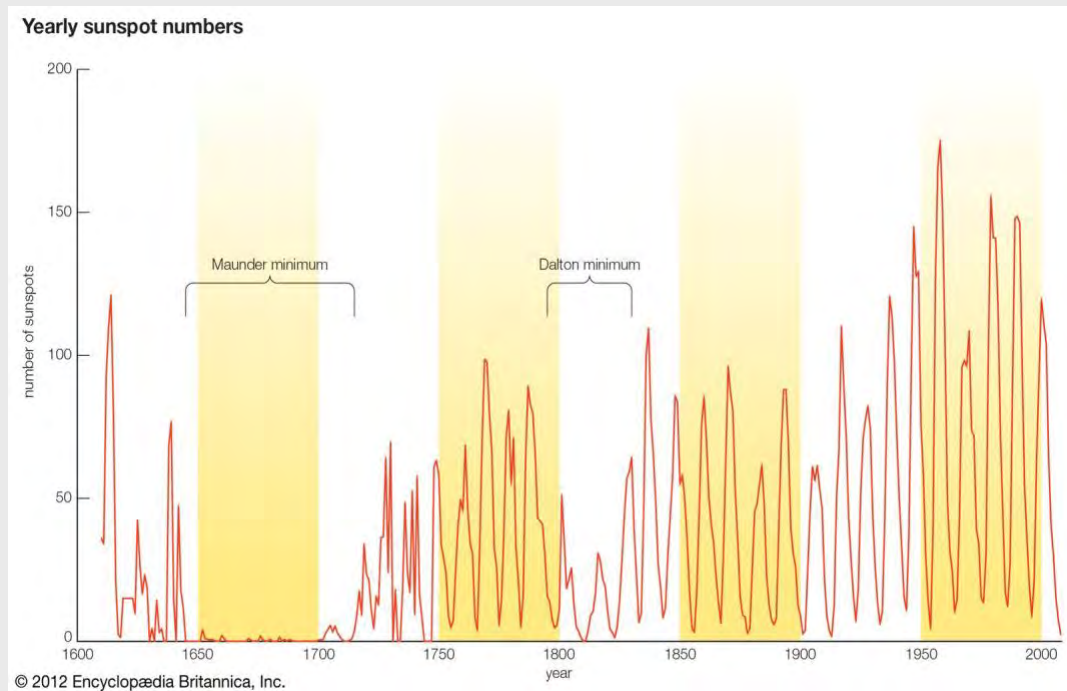


Figure 21: Yearly sunspot numbers (Source: Encyclopedia Britannica)³⁵

Figure 21 also shows a strengthening in sunspot numbers through to the end of the 20th century. This raises a question of whether solar activity is a primary driver of our Modern Warm Period rather than CO₂ emissions.

The IPCC's position is that the Sun's temperature is nearly constant and that the Total Solar Irradiance (TSI) varies by too small an amount to have any significant effect on current global warming.

Dr. Henrik Svensmark, a Danish physicist and director of the Center for Sun-Climate Research at the Danish Space Research Institute, has a different view of the role of the Sun in global warming.

In Svensmark's theory, Earth's temperature is controlled to a considerable degree by the amount of cloud cover in the Earth's atmosphere at any given time. A large amount of cloud cover reflects more incoming radiation from the Sun back into space, reducing the temperature on Earth; a small amount of cloud cover allows more of the Sun's radiation to reach the Earth's surface, so Earth's temperature rises.

The amount of cloud cover is determined by the cosmic ray flux penetrating the upper atmosphere, causing cloud condensation nuclei to form, thereby causing an increase in cloud cover. The sun influences the cosmic ray flux reaching the upper atmosphere by the strength of the solar wind being emitted by the sun. When the solar wind is strong it shields the earth and reduces the cosmic ray flux reaching the earth, thereby reducing the amount of cloud cover being formed, causing heating of the earth, and vice versa.

The solar wind strengthens as the number of sunspots increases and weakens as the number of sunspots drops off.

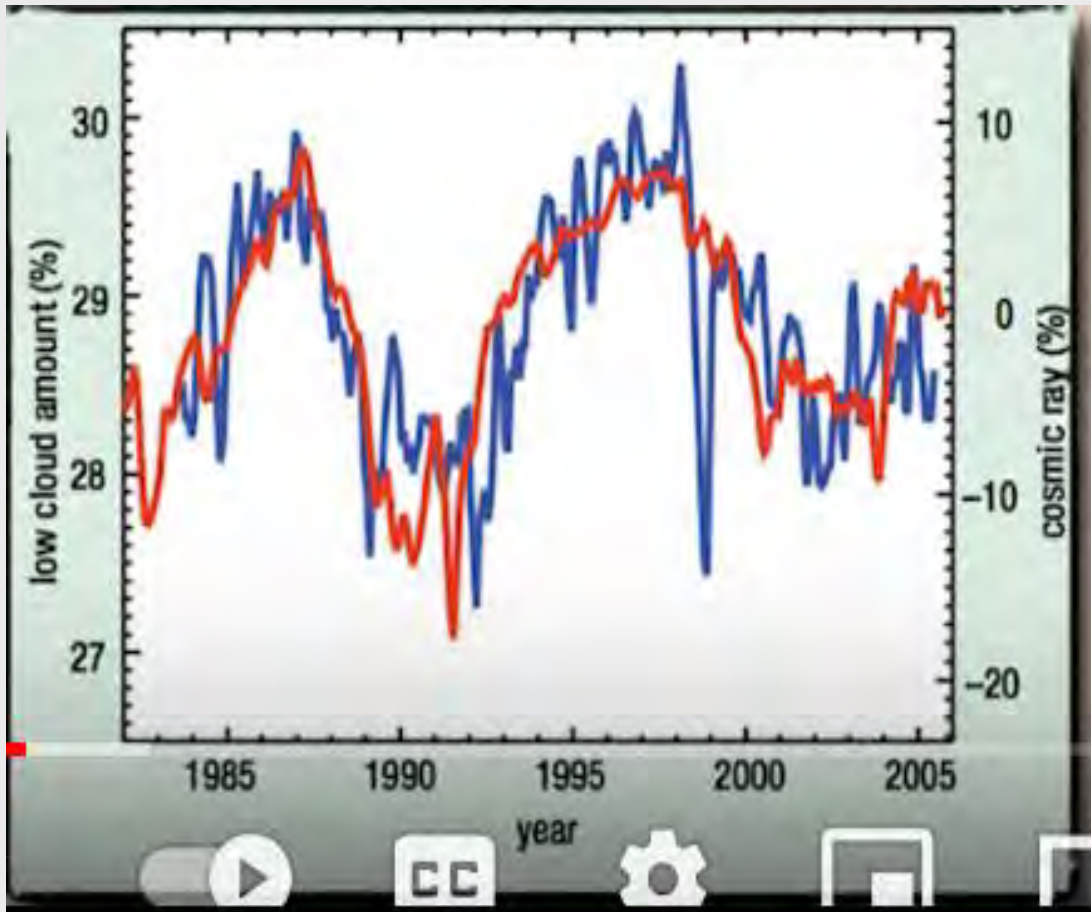


Figure 22: Low cloud cover association with cosmic ray flux into the upper atmosphere over one full solar cycle³⁶

In Svensmark's theory most of the temperature changes that have occurred in the Holocene, i.e., during the past 12,000 years since the end of the last ice age, have been due to the linked cosmic ray/solar wind/cloud-cover phenomena. CO₂ emissions have been only a minor factor in causing climate warming, including the recent climate warming of about 1.1°C since the end of the mini-ice age about 1850.

The IPCC's theory and Svensmark's theory are in stark contrast. The IPCC sees recent warming as primarily a man-made phenomenon due to increasing CO₂ emissions. Svensmark sees recent warming as being largely a natural phenomenon, with CO₂ playing a minor role. This means that the two theories have starkly different economic ramifications, political ramifications, and policy requirements.

Figure 22 illustrates the close association between the cosmic ray flux entering the upper atmosphere and the creation of low-level cloud in the atmosphere over one full 22-year solar cycle.

Svensmark's work has attracted other researchers such as Nir Shaviv, an Israeli astrophysicist who is also interested in cosmic ray interactions in the upper atmosphere. This is fundamental research work into determining how the atmosphere actually behaves.

A good way to get a sense of the scope of Svensmark's work is to view Shaviv's video at <https://www.youtube.com/watch?v=p9gjU1T4XL4>. The video has an interesting introduction by Dr. Benny Peiser of the Global Warming Policy Foundation on the significance of Svensmark's and Shaviv's work.

Physicist Steven Koonin, in his recent book *Unsettled: What Climate Science Tells Us, What It Doesn't, and Why It Matters*, writes:

While modelers base their sub-grid assumptions upon both fundamental physical laws and observations of weather phenomena, there is still considerable judgment involved. And since different modelers will make different assumptions, results can vary widely among models. This is not at all an unimportant detail, *since ordinary fluctuations in the height and coverage of clouds can have as much of an impact on flows of sunlight and heat as do human influences. In fact, the greatest uncertainty in climate modeling stems from the treatment of clouds.*³⁷ [emphasis added]

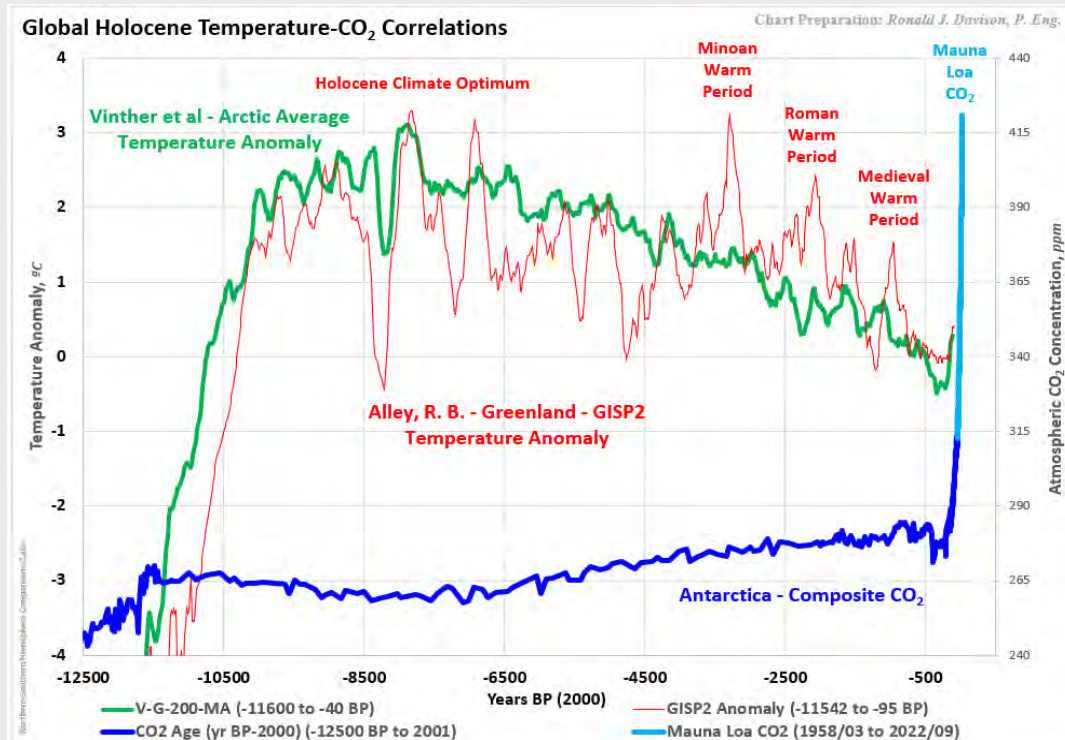


Figure 23: A View of the Holocene Interglacial Based on Greenland and Canadian Archipelago Ice Core Data³⁸

In Figure 23, the red line represents temperature changes as measured by a single Greenland ice-core borehole, a form of proxy data that allows us to assess past temperatures. The Minoan Warm Period, the Roman Warm Period, and the Medieval Warm Period, are clearly shown in the red line and were times when historical records confirm the good production of crops. The green line shows the overall temperature trend on the Greenland ice cap and the Canadian Archipelago.

The IPCC and its supporters have made many statements about the supposedly unprecedented climate changes the Earth is currently experiencing. If we look back to the Holocene Climate Optimum, however, the proxy climate data tells a different story.

In the following quotations from different authors, different dates are given for the timing of the Holocene Maximum, which was warmer than the Minoan, Roman or Medieval warmings. This is probably due to the different conditions at different locations as the surface of the Earth in the northern latitudes recovered from the Last Ice Age maximum of 20,000 years ago, as well as the different proxy data being examined. In all cases below, emphasis has been added.

“During the warmest part of the Holocene about 6,000 years ago ... *summer temperatures were as much as 4⁰C above present*. Glaciers disappeared from the Rocky Mountains and other high mountains. They began to reform about 3,000 years ago during a cool episode known as the Neoglacial and further expanded during the Little Ice Age of the past few hundred years.”

39

“It is now recognized that swings in climate after the Neoglacial occur on a roughly 1,000-year periodicity as part of what is known as the millennial-scale oscillation. A prominent warm phase occurred 2,000 years ago during the Roman Empire (the Roman Warm Period). The Dark Ages Cold Period of approximately 100 to 800 CE was followed in turn by the Medieval Warm Period, which refers to a few hundred years that peaked around 1000 CE. During this warm period, glaciers retreated, but cooler conditions returned during the Little Ice Age of 1350 to 1850 CE. Mountain glaciers grew worldwide such that in the mid-nineteenth century they were larger than during anytime in the past 10,000 years.” 39

“In the far northwest of the Northwest Territories, the northern limit of forests in the early Holocene is known to have been some distance north of its present position. During the warm period, which probably lasted from about 10,000-6,000 BP (Before Present), much of what is now tundra was forested. An example is the Tuktoyaktuk Peninsula: about 10,000 BP it was invaded by spruce and the large quantities of pollen in lake sediment show that the vegetation must have been a true forest of spruce, not merely scattered trees. Cattails and sweet gale evidently grew in the wetlands in the forest; *both were beyond their modern northern limit, which for cattails is several hundred kilometers to the south*. When the warm period ended, the forest disappeared, to be replaced by tundra, which still remains.”⁵ 40

“Other tree species besides spruce grew north of their present limits; these northern advances happened right across the continent, one after another as each region in turn experienced its warm spell.”⁶ 40

“About 8,000 years ago, the sea level was about 2 metres (6 feet) higher than today.” 41

This data from different sources appears to be internally consistent. The higher temperatures at the Holocene Maximum melted the last remnants of the ice sheets and all but the highest mountain glaciers. This caused the tree line to move a considerable distance northward, while sea levels were significantly higher than today.

All these changes began to reverse when the period of Neoglaciatio**n** began about 3,000 years ago. This illustrates the power of natural forces to reshape the surface of the planet and the biosphere over time. Man had no role in these events. In the past few thousand years, as the global temperature began to drop, CO₂ was slowly trending higher.

Svensmark's claim is that the oscillations in the red temperature curve in Figure 23 were driven largely by the activity of the sun. But what about the downtrend in temperature with the start of the new Neoglacial? This was likely due to another set of natural forces that operate between the Sun and the Earth called the Milankovitch Cycles.

The Milankovitch Cycles

If the summer's Sun cannot melt the snow from the preceding winter, the snow accumulates. If this continues year after year, then glaciers and eventually ice sheets will begin to grow and the Earth may enter another ice age.

The key to what will happen depends a lot on the Milankovitch Cycles and on how much solar radiation reaches the Arctic Ocean and the surrounding land masses each summer.

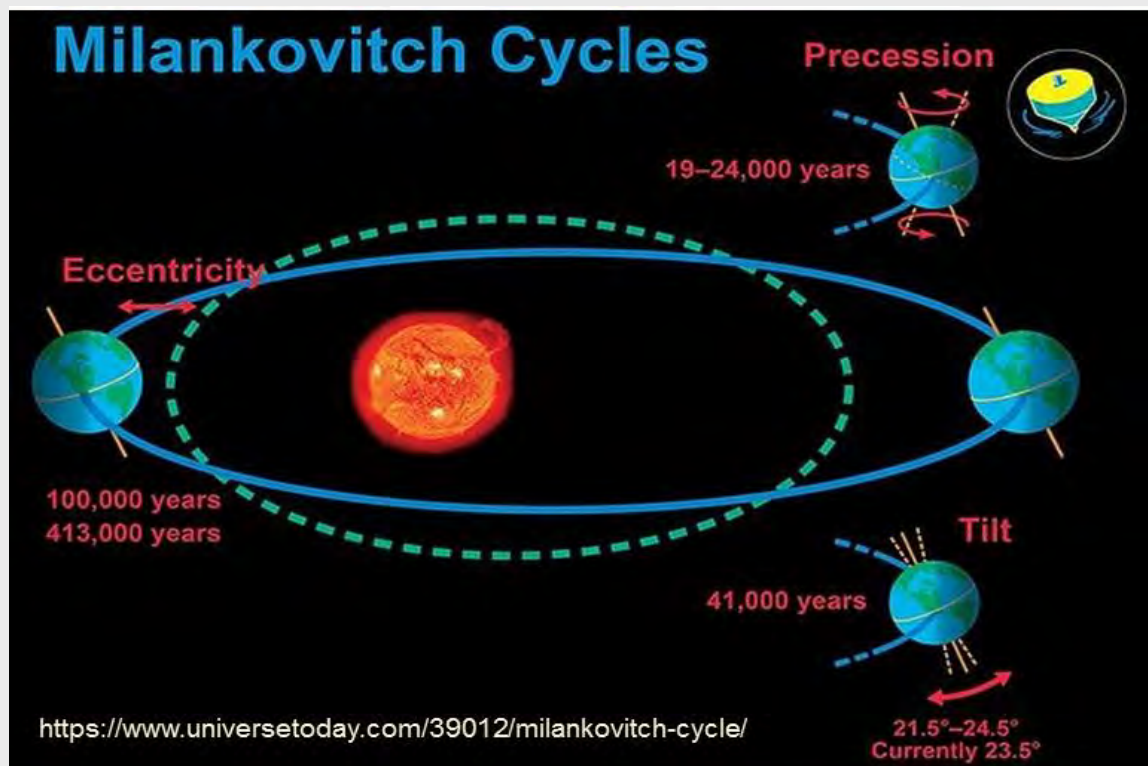


Figure 24: The Milankovitch Cycles (Source: CO₂ Coalition)⁴²

The Earth has an elliptical orbit around the sun, as shown in Figure 24, with a 100,000-year cycle during which it becomes more elliptical and less elliptical in turn. The Earth is closest to the Sun when its orbit is in its most elliptical state since the Sun always acts as one of the primary focuses of the ellipse. The closer the Earth is to the Sun, the more solar radiation the Earth receives.

In addition, the Earth's axis changes its tilt between 21.5° and 24.5° over a 41,000-year cycle. The closer the tilt of the Earth's axis is to 24.5° the greater the amount of solar radiation received in the Arctic.

The Earth's axis also has a wobble effect much like a spinning top that is called precession, with a cycle ranging from 19,000-24,000 years. The greatest solar radiation in the Arctic will occur when the Earth's axis is pointing directly toward the sun in the middle of summer.

When all three Milankovitch cycles are in strong warming phases at the same time the probability increases of enough solar radiation being absorbed in the Arctic to melt the snow from the previous winter. This situation began to develop about 20,000 years ago and was at its peak about 9,000 years ago.⁴³

The Earth's axis 12,000 years ago in December was pointing directly toward the Sun, the complete opposite of what we experience today. The tilt of the Earth's axis reached its maximum warming value for this cycle about 5,000 years ago. Both of these parameters are now in decline, and this decline is the likely explanation for the Neoglacial period that got under way 3,000 years ago.

The Earth's eccentricity remains in a warming orientation for now, but tilt and precession are dominating and the cooling trend of the combined action of the three Milankovitch Cycles will continue downward for about the next 14,000 years⁴³ before this negative forcing will have its first reversal.

Figure 23 shows the resulting interplay between the positive forcing of an active Sun and the current negative forcing of the Milankovitch Cycles in the past few thousand years. It remains to be seen how this will play out in the next few hundred years.

The dip in CO₂ levels in the early part of the Holocene, shown in Figure 23, may have been due in part to the rate of uptake of CO₂ in the reforestation of the northern latitudes exceeding for several thousand years the rate of outgassing of CO₂ from the oceans, after which the northern latitudes relapsed into their present tundra state.

So far, we have seen some of the manifestations of the Little Ice Age. In the next section we look at what can happen in a regular Ice Age.

Deep Geological Time

Our current Ice Age with its Holocene Interglacial is shown on the right side of Figure 25. The Interglacials in recent Ice Ages have been brief, lasting 10,000-15,000 years. We are now about 11,000 years into the current Holocene Interglacial.⁴⁴

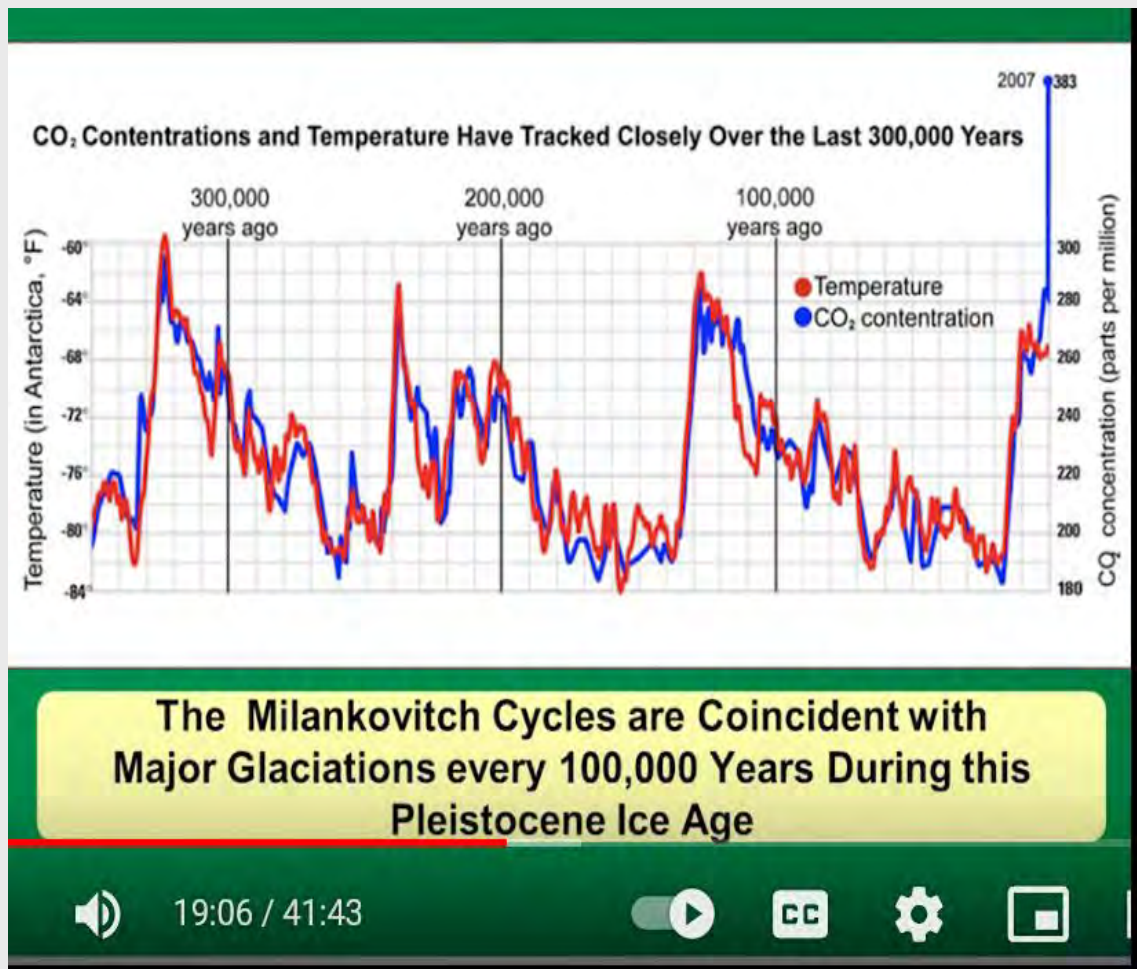


Figure 25: The four most recent ice ages (Source: Dr. Patrick Moore)⁴⁴

The CO₂ curve shown in blue has lagged the temperature curve shown in red by about 800 years. It is temperature that is driving this process, not CO₂. Because of their high heat capacity, the oceans warm slowly, outgassing CO₂ as they do, then they cool slowly, absorbing CO₂ as the temperature goes down.

The temperature in the previous Interglacial, the Eemian, at its maximum 125,000 years ago, was higher than the temperature in our present Holocene Interglacial. In the Eemian Interglacial, the Milankovitch Cycles had a stronger in-phase relationship with one another than has happened in the Holocene.⁴³

The peak sea level in the Eemian was probably 4 to 6 meters higher than today, although a more recent estimate suggests it might have been up to 10 meters higher,⁴⁵ indicating more melting of glaciers and more thermal expansion of the oceans.

Polar Bear DNA has been traced back to beyond 500,000 years ago.⁴⁶ Polar Bears survived the Eemian Interglacial. Polar Bears do not seem to be at any imminent risk of extinction, despite computer programs predicting otherwise. In fact, recent field data has shown that their population is expanding.⁴⁷

Figure 26 shows the depth of the ice sheet 20,000 years ago, superimposed on the existing skylines of Toronto, Chicago, Boston and Montreal, and really brings home the sheer magnitude of what an Ice Age can actually be like.

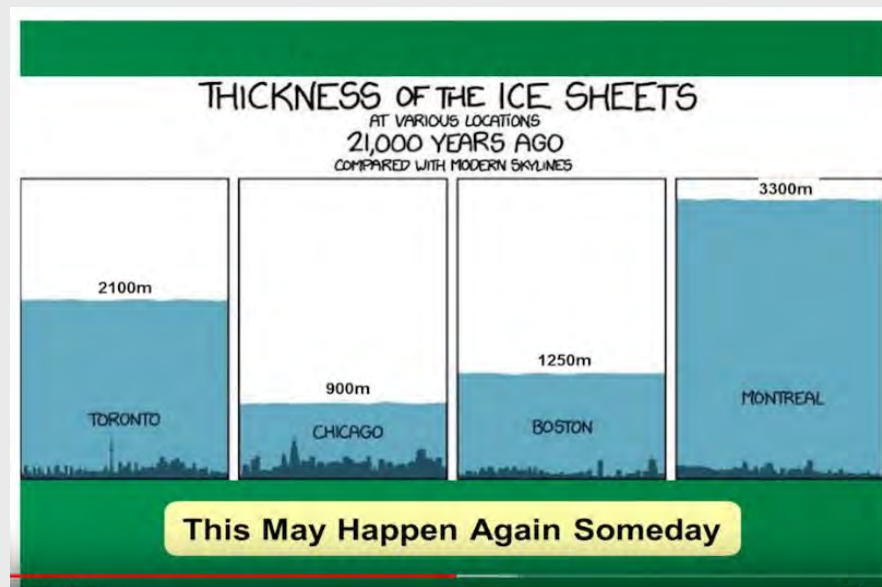


Figure 26: The difficulty of life in an Ice Age: many major Canadian and U.S. cities buried under ice (Source: Patrick Moore)⁴⁸

For humans, a similar ice sheet today would be a true climate apocalypse that would cause immense dislocation, suffering, conflict, starvation, and death. Most of the northern latitudes would be uninhabitable. The suffering experienced in the Little Ice Age was a minor inconvenience compared to what would happen in a real Ice Age.

In the most recent Ice Age, the Laurentide ice sheet covered Canada from Alberta to the Atlantic. The Cordilleran ice sheet, formed from glaciers flowing out of the Rockies, filled the Strait of Georgia, Puget Sound, and the Strait of Juan de Fuca. Glaciers and ice sheets also grew and covered large areas in Europe, Greenland, Asia, and the Antarctic. The total fall in sea level was about 150 metres (almost 500 feet).⁴⁹

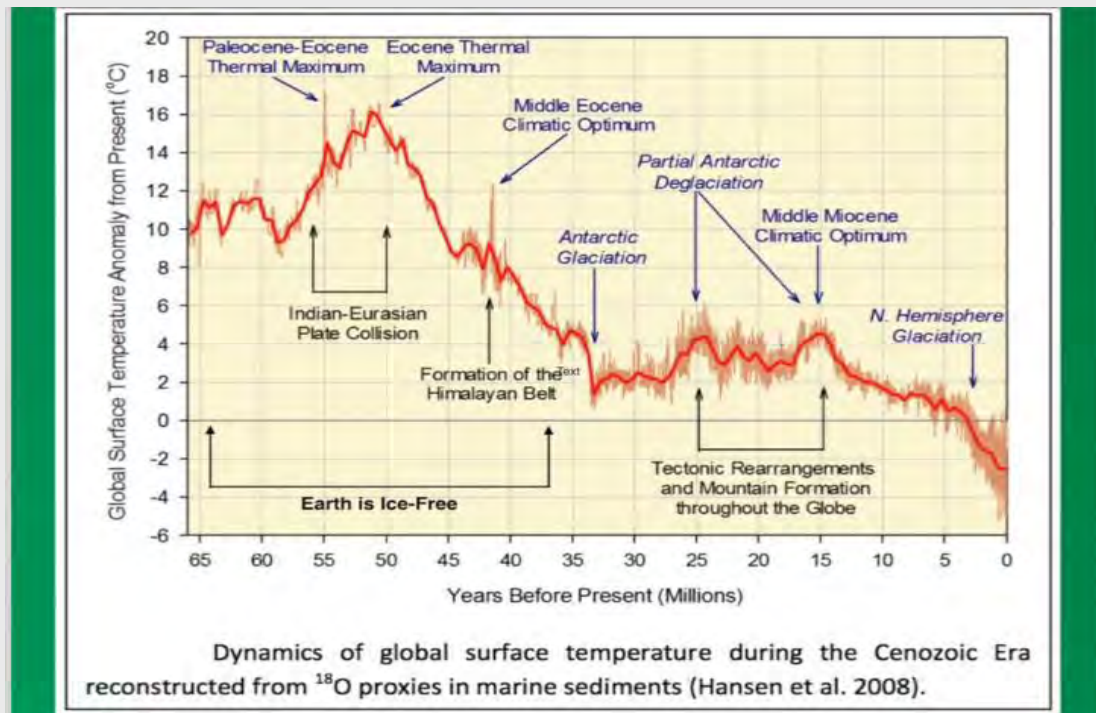


Figure 27: The sequence of events leading to the most recent Ice Age.
(Source: Dr. Patrick Moore)⁵⁰

Figure 27 shows some of the events leading into the last Ice Age. About 5 million years ago the rise of the Isthmus of Panama blocked the flow of water between the Pacific and the Atlantic oceans, causing major changes in the flow and direction of ocean currents. About 3 million years ago, uplift of the Coastal Mountains in Alaska blocked off the flow of warm Pacific air into Northern Canada, creating a much colder climate.⁵¹

Glaciers began to advance and retreat in the northern latitudes. Since 2.5 million years ago, the number of glacial and interglacial episodes exceeds 50⁵². Before one million years ago, the ice ages were comparatively short-lived with a 41,000-year periodicity, corresponding to the Milankovitch tilt-cycle periodicity.

In the last million years, the Milankovitch Eccentricity period of 100,000 years has become dominant, producing a much cooler climate and larger continental scale ice sheets. "...the Earth is now in one of the coldest periods in its history. *No geological period has been as cold as our current geologic period, the Quaternary, for at least 250 million years.*"⁵³ [emphasis added]

Why the period of the ice ages has changed is not known at this time. How long these ice-age cycles will continue is unknown as well. The current situation was created by the tectonic movement of continental plates and episodes of mountain building over hundreds of millions of years. We may be locked into a continuing cycle of ice ages until some major new shift occurs in the configuration of the continents or in new episodes of mountain building that significantly change airflow patterns in the atmosphere and the behavior of ocean currents.

It is a sobering thought. Can civilization survive more Ice Age phases like this past one?

Decrease of CO₂ over geological time

As the temperature fell over the past 140 million years (shown in Figure 28, below), the CO₂ solubility pump and the biological pump continued to remove CO₂ from the atmosphere and absorb it into the oceans. As the CO₂ Coalition notes:

During each of the last four ice ages, CO₂ concentration fell below 190 ppm. At the end of the last ice age, it fell to 182 ppm, thought to be the lowest in the Earth's history. Why is this alarming? Because below 150 ppm, most terrestrial plant life cannot exist.⁵⁵

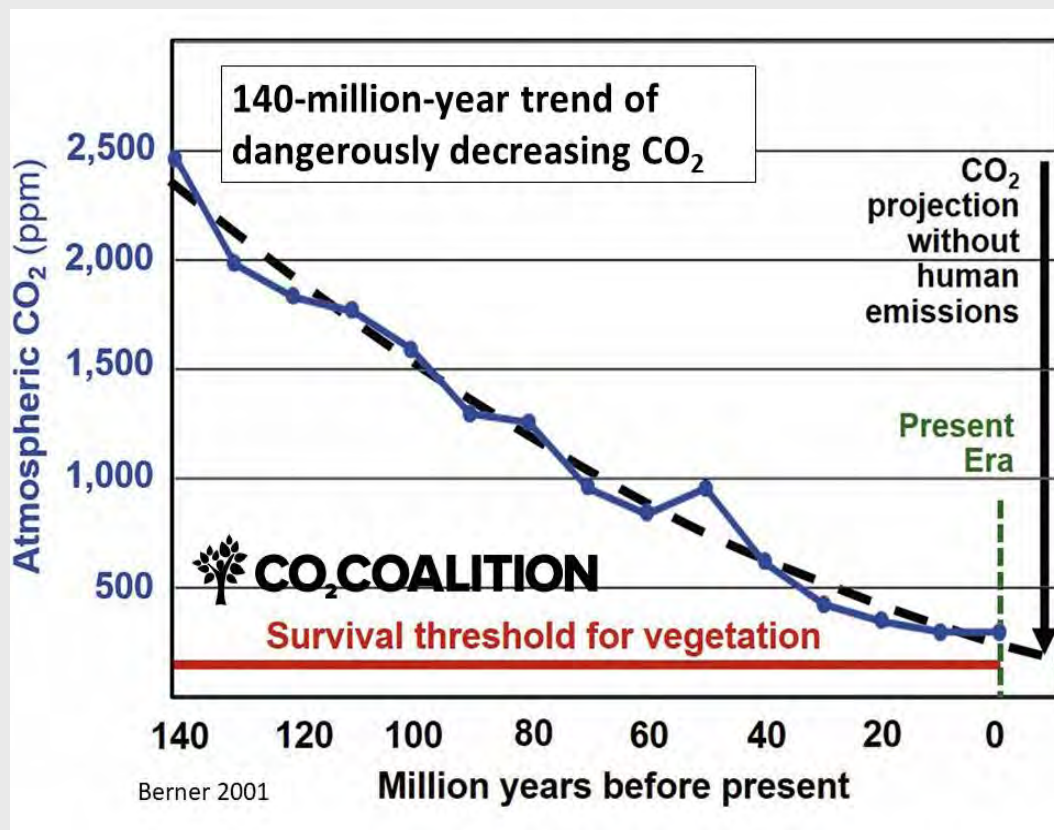


Figure 28: Depletion of CO₂ in the atmosphere in the past 140 million years. (Source: CO₂ Coalition)⁵⁴

In recent ice ages, ice cores from the Antarctic have shown a large buildup of dust. This dust is thought to have originated from the death of vegetation in the high plains of Asia and North America due to starvation from lack of CO₂ at higher elevations. The dust changed the albedo of the glaciers and ice sheets, reducing the reflection of energy from the Earth, enabling more solar radiation to be absorbed in the Arctic, and giving a boost to the Milankovitch Cycle effect if it is moving into a warming phase.

This would be a positive feedback to the warming process. As more land or water surface became exposed in the Arctic, the more efficient the heat absorption and melting process would become. One possibility that might confront future generations if we get into future ice age advances that appear to be as severe, or more severe, than the present one is that our descendants may try to substantially *increase* CO₂ emissions into the atmosphere in an effort to keep photosynthesis going in the equatorial regions at least. They would be attempting to create a refuge of last resort, buying time to maintain life on the planet until the next Interglacial arrives.

The Demonization of CO₂

The U.S. Environmental Protection Agency (EPA) has declared CO₂ and the other minor greenhouse gases to be pollutants. It is trying to regulate emission of them out of existence. Most other Western countries are trying to do the same.

On the face of it, this seems like an odd goal for the EPA to pursue. CO₂ is essential for photosynthesis and consequently for all life on the planet (see Figure 29).



Figure 29: Dr. Craig Idso shows the effect of more CO₂ on plants. (Source: CO₂ Science)

Today's low CO₂ concentration is starving trees and plants of the food they need to achieve their full growth potential via photosynthesis. Additional benefits of increased CO₂ include:

- Increased photosynthesis ("CO₂ fertilization").
- Plants grow faster, and with less stress and less water.
- Forests are growing faster.
- Stimulates growth of beneficial bacteria in both soil and water.
- More plant growth means less erosion of topsoil.
- Bigger crop yields, and more and bigger flowers.
- Fosters glomalin, a beneficial protein created by root fungi.
- Less water loss, less irrigation, and more soil moisture.

- Increase in natural repellents to fight insect predators.⁵⁶

Commercial greenhouse growers recognize the benefits of more CO₂. They will often raise CO₂ levels in greenhouses up to 1,200 parts per million (ppm) to stimulate faster growth and stronger plants.

With the Earth's population nearing eight billion people, it is essential that crop yields continue to expand to provide people with adequate food supplies. Figures 29 and 30 show that CO₂ acts as a fertilizer and not, as the EPA claims, a pollutant.

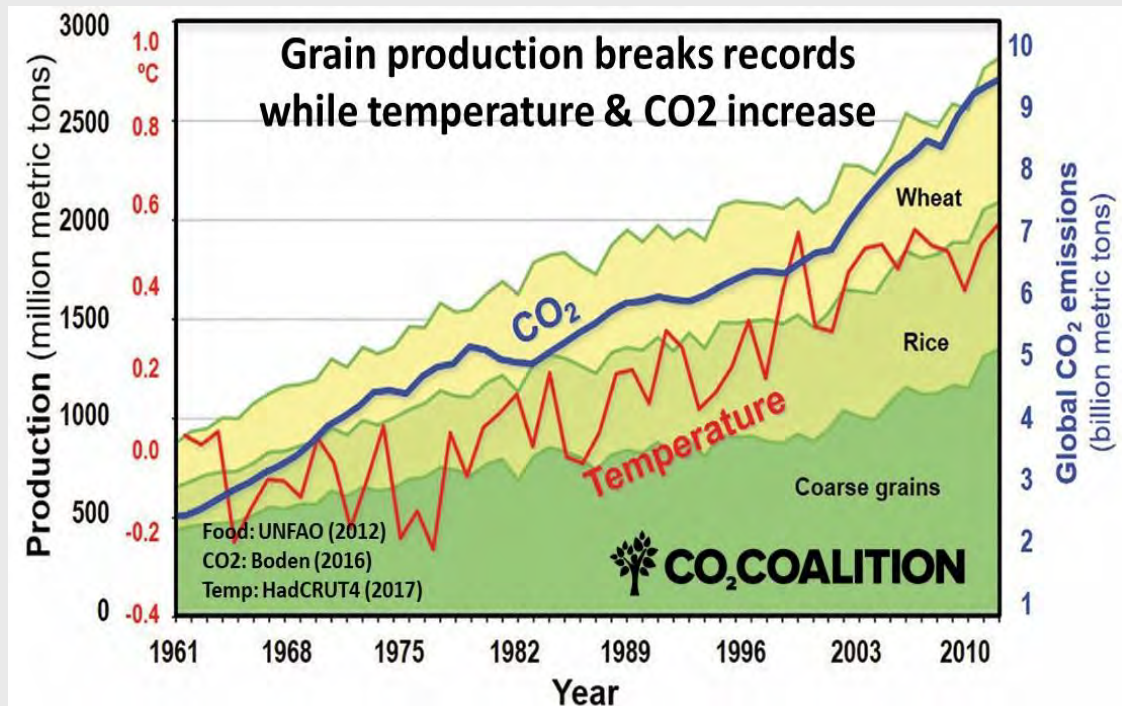


Figure 30: Increased crop yields due in part to more CO₂ and higher temperatures. (Source: CO₂ Coalition)⁵⁷

In addition to global-warming concerns over CO₂ levels rising much above our current level of 420 ppm, many studies generated by the IPCC suggest other dire consequences, such as acidification of the oceans, extinction of corals as well as extinction of many other species on both land and water. Based on Figure 31, below, there is little reason to believe that these predicted extinctions will ever occur.

The average CO₂ level over the entire 600-million-year record shown is above 2,600 ppm, yet both animals and plants flourished most of the time at most of these higher levels. One particularly interesting data segment in the CO₂ record is the Cambrian period between 500-550 million years ago. During this time there was an explosion of new life forms that

had never existed on the Earth before. CO₂ levels were in the 7,000-ppm range, yet this proliferation of new life forms was all taking place in the oceans.

If new life in the Cambrian could adapt to these much higher CO₂ levels, there is little reason for us to panic over our present level of 420 ppm or even higher.

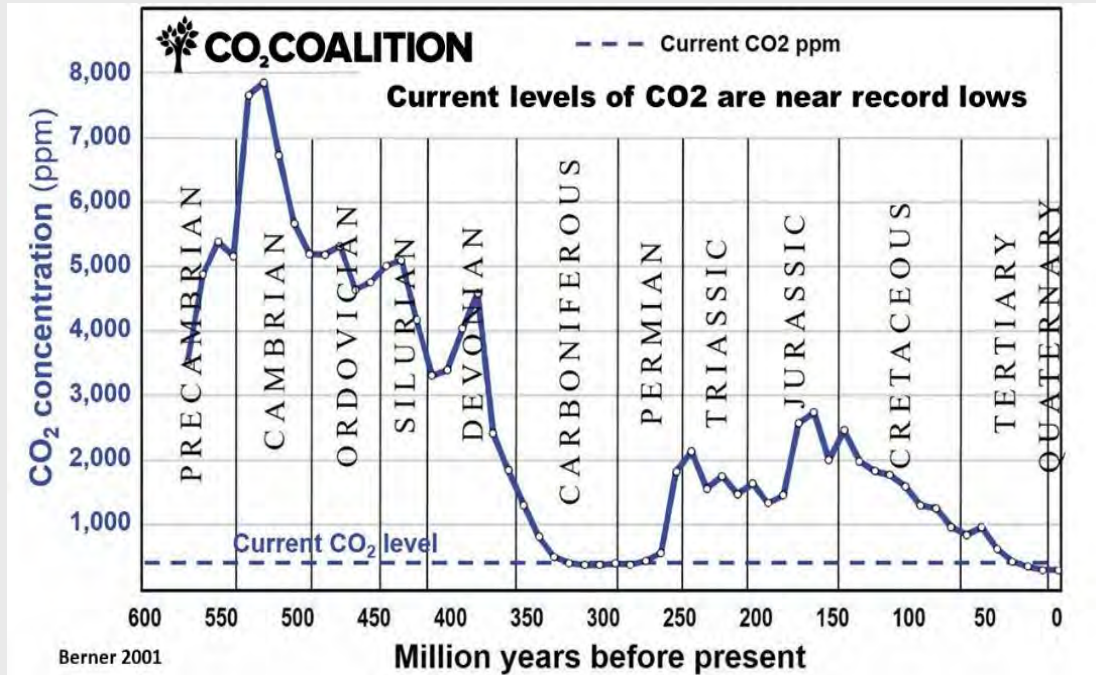


Figure 31: CO₂ levels in the past 600 million years⁵⁸

In fact, our higher CO₂ levels are currently *greening* the planet. The caption for Figure 32 (next page) is difficult to read but it states:

From a quarter to a half of Earth's vegetated lands have shown significant greening over the last 35 years, largely due to rising levels of atmospheric carbon dioxide, according to a new study published in the journal *Nature Climate Change* on April 25, 2016.

An international team of 32 authors from 24 institutions in eight countries led the effort, which involved using satellite data from NASA's Moderate Resolution Imaging Spectrometer and the National Oceanic and Atmospheric Administration's Advanced Very High Resolution Radiometer instruments to help determine the leaf-area index over the planet's vegetated region. *The greening represents an increase in plants and trees equivalent to two times the continental United States.*⁵⁹ [emphasis added]

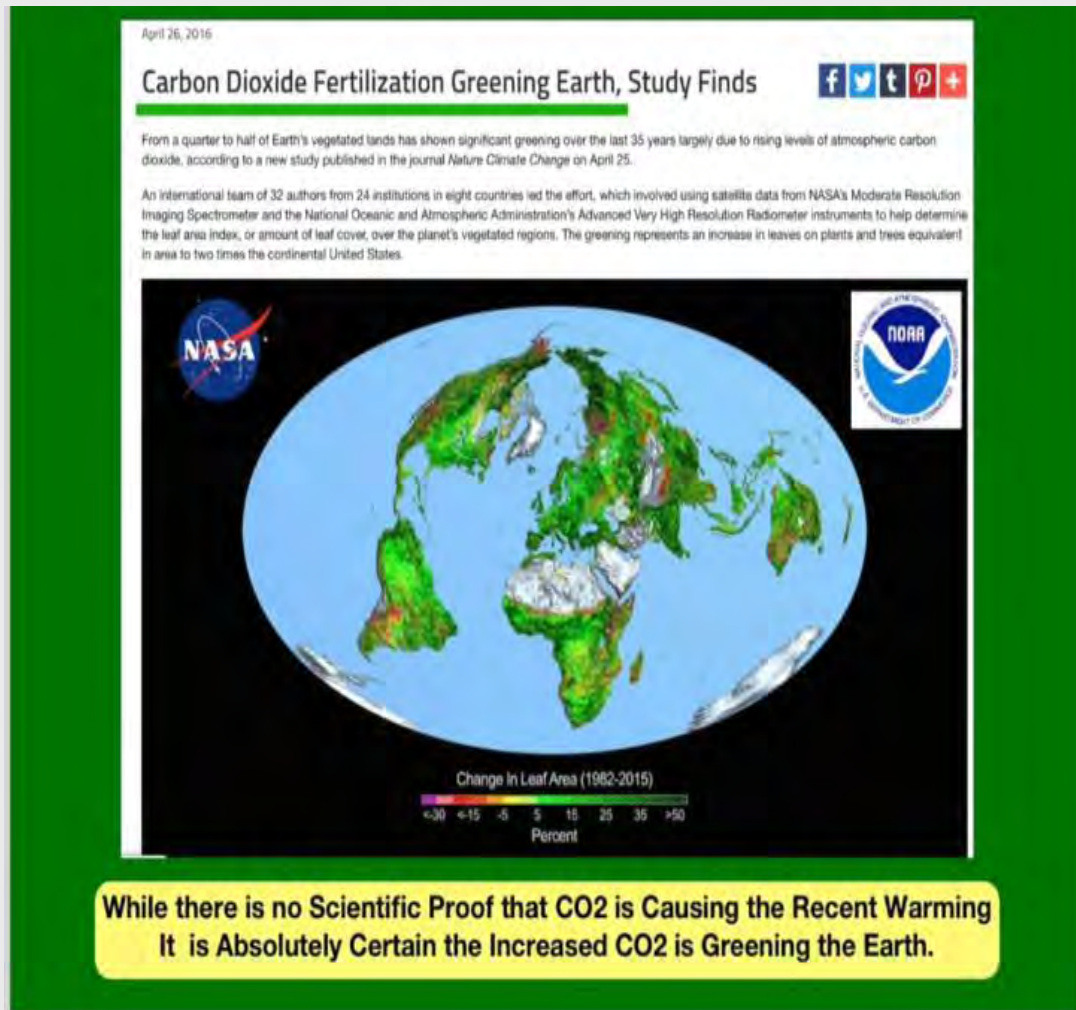


Figure 32: Carbon dioxide fertilization greening the Earth. (Source: Patrick Moore)

In other words, as CO₂ has risen, so has the amount of vegetation. The record of CO₂ values shown in Figures 28 to 32 refute many of the gloomy claims that have been made in the IPCC-sponsored studies.

Follow-up on Past Pollution Problems and Past Studies

B iologist Paul Ehrlich's book *The Population Bomb*, which forecast in 1968 that hundreds of millions of people would die by the end of the 1970s, was wrong. It didn't happen. No mass starvations have occurred due to crop failures or insufficient production in the intervening period.

Where local famines have occurred, it was usually due to governments adopting bad policies like The Great Leap Forward in China, or engaging in the wars that have bedeviled Ethiopia, Somalia, and Yemen in recent years, or Sri Lanka banning chemical fertilizers in 2021.

Ehrlich failed to realize that the jump in food productivity from the Green Revolution and the use of chemical fertilizers more than outstripped population growth in developing countries.

The *Limits to Growth* computer study predicted in 1971 that by the 1990s and the 2000s the world would have exhausted the supply of most industrial minerals, oil, and gas, and that food prices would be rising rapidly as rising population overwhelmed the output from the land suitable for agriculture.

By 2010, however, it was clear beyond any doubt that all the predictions produced by the experts in the *Limits to Growth* study were wrong. By 2010, industrial minerals were plentiful, oil and gas reserves were climbing rapidly due to fracking, and more people had better access to food at affordable prices than ever before in the history of humanity.

These are eloquent examples of the failure of the Post-Normal Science approach in which the initial assumptions and consensus of the experts were wrong. They had no idea how to adequately model the feedback of people who, when faced with higher prices or material shortages, found greater efficiencies, alternative sources of supply, or alternative materials or products to get what they wanted. This is a point worth remembering when we're told the "science is settled" Are the experts talking about traditional, experiment-based science, or Post-Normal Science?

The other environmental problems of the 1960s—Love Canal, Lake Erie, polluted rivers, polluted atmosphere—were all cleaned up, or substantially improved, in an orderly, methodical way over time under the provisions of the Clean Air Act and the Clean Water Act.

Environmentalism and Alarmism

Overpopulation, food security, energy security, and access to raw materials are four key issues that can create deep existential fears in humans and in societies, and cause humans and societies to take precipitous actions, sometimes for the better, sometimes for the worse.

When Maurice Strong empowered Non-Governmental Organizations at the Stockholm Conference in 1972, he opened a new path for NGOs to grow as leading influencers in shaping public opinion and sentiment in the Western world on global-warming issues. Major environmental organizations, with annual budgets of hundreds of millions of dollars, have become experts in spreading their messages of alarm that CO₂ and fossil fuels are destroying the planet.

The constant drumbeat of the environmentalists' messages of doom have resonated with the public, from children to elites.

A young generation is growing up in fear that the planet is doomed. Citizens are prepared to resort to civil disobedience, including defacing works of art to protest the use of fossil fuels.

It has become an article of faith among many segments of the population in Western societies that CO₂ and fossil fuels are a great threat to mankind and the planet.

Governments are trying to regulate fossil fuels out of existence. Courts and police are loath to issue or enforce injunctions against protestors blocking transportation routes or construction projects. It has become an article of faith among many segments of the population in Western societies that CO₂ and fossil fuels are a great threat to mankind and the planet.

The NGOs may be well pleased with their handiwork, but Western societies are beginning to pay a high price for the new mindset that NGOs have successfully embedded in Western societies.

The fixation on CO₂ as the primary evil to be eliminated has led the EU and the U.K., for example, to rapidly wind down their use of fossil fuels and to replace them with solar cells and wind turbines. This “greening” of energy has played a large part in creating the current chaos and war in Europe and is causing an explosive rise in the price of natural gas and Liquid Natural Gas.

Two prominent environmentalists, Michael Moore and Jeff Gibbs, created a powerful video entitled *Planet of the Humans*⁶⁰ (available at <https://www.youtube.com/watch?v=Zk11vI-7czE>). It has graphic scenes of destruction,

waste, and hypocrisy in the pursuit of green-energy goals. Many who consider themselves serious environmentalists should be appalled if they view this video and see what is being done in the name of environmentalism.

General Observations on Human Perceptions

Human life spans of about 80 years make it difficult for most people to realize that climate change commonly occurs over hundreds of years. Figure 19 illustrates how it took several hundred years for temperatures to rise to the Medieval High, and then several hundred years more for temperatures to fall to the depths of the Little Ice Age, with numerous minor bumps and dips along the way.

Our Modern Warm Period is generally taken as starting about 1850, based on rising sea levels, but the actual low of the Little Ice Age occurred about 1700, which means we have been in a warming trend for about 300 years.

Based on what we know about the Medieval High and the Roman High, this trend may continue for another 200 years or so, with bumps and dips along the way, before we reach the final peak of the Modern Warm Period. This means that inevitably we will continue to set new temperature “records” along the way. This period of peaks and dips will be driven primarily by the interplay between the Sun’s activity and the Milankovitch Cycles, with only a very minor contribution at most from rising CO₂.

We have limited ability to forecast with any precision the details of how all this will unfold, or where the impacts will be greatest. Therefore, we should focus on deploying structural, regulatory, and institutional measures to minimize adverse impacts to life and property as the need arises in particular localities.

Another human trait is that we tend to quickly forget about major weather events in the past. Few people in California are aware that the flood of record there occurred in December 1861. It was preceded by heavy snowfalls in the Sierra Nevada, followed by an atmospheric river of warm wet storms sweeping in from the Pacific over a period of 43 days. The Central Valley became a lake 300 miles long and 20 miles wide. Thousands of people died. The flood took months to recede. The costs were devastating and the state went bankrupt.

Because we tend to quickly forget about major weather events in the past, current weather events often seem ‘unprecedented’.

Subsequent investigations have shown that similar floods have occurred every one or two centuries over the past two millennia, interspersed with droughts.⁶¹ These floods were all due to natural forces, not CO₂, and alternating floods and droughts will likely recur whether we curb CO₂ or not.

Proponents of green energy seem to lack any appreciation of three key problems with their preferred energy sources. First, they don't understand that doubling, tripling, or quadrupling the size of their installed solar and wind-turbine capacity to eliminate fossil fuels means nothing if the Sun does not shine and the wind does not blow.

Second, there is no feasible way at this time to store surplus green energy to use when no green energy, or insufficient green energy, is available. Green energy societies can, therefore, either shut down their cities and countries for hours or days at a time when no

We have no way at this time to store surplus green energy to use when green energy (wind, solar) is not available or insufficient.

electricity is available, or they can maintain major gas or coal backup systems ready to kick in whenever green energy is not available.

Maintaining two separate power-generating systems, with one to act only as a backup for the other, is a major cost to any society that chooses to do this, and it makes domestic manufacturing

capability uncompetitive against countries using mainly fossil-fuel energy.

Third, green-energy proponents also fail to appreciate just how destabilizing intermittent, volatile green energy is to electrical grids. Trying to continually adjust an electrical grid for rapidly changing green-energy surges and shortages can be a very difficult and costly task as the fraction of green-energy generating capacity within a system increases. This is another real cost that must be borne by societies heavily dependent on green energy sources.

Materials Problems with Green Energy

The following quotation is from the Executive Summary of the report, “Mines, Minerals, and ‘Green’ Energy: A Reality Check,” by Mark Mills, a senior fellow at the Manhattan Institute, July 2020:

As policymakers have shifted focus from pandemic challenges to economic recovery, infrastructure plans are once more being actively discussed, including those relating to energy. Green energy advocates are doubling down on pressure to continue, or even increase, the use of wind, solar power, and electric cars. Left out of the discussion is any serious consideration of the broad environmental and supply-chain implications of renewable energy.

As I [Mills] explored in a previous paper, *The New Energy Economy: An Exercise in Magical Thinking*, many enthusiasts believe things that are not possible when it comes to the physics of fueling society, not least the magical belief that “clean-tech” energy can echo the velocity of the progress of digital technologies. It cannot.

This paper turns to a different reality: all energy-producing machinery must be fabricated from materials extracted from the Earth. No energy system, in short, is actually “renewable”, since all machines require the continual mining and processing of millions of tons of primary materials and the disposal of hardware that inevitably wears out. *Compared with hydrocarbons, green machines entail, on average, a ten-fold increase in the quantities extracted and processed to produce the same amount of energy.* [emphasis added]

Compared with hydrocarbons, green machines entail, on average, a ten-fold increase in the quantities extracted and processed to produce the same amount of energy.

This means that any significant expansion of today’s modest level of green energy—currently less than 4% of the country’s total consumption (versus 56% from oil and gas)—*will create an unprecedented increase in global mining for needed minerals, radically exacerbate existing environmental and labor challenges in emerging markets (where many mines are located), and dramatically increase U.S. imports and the vulnerability of America’s energy supply chain.* [emphasis added]

As recently as 1990, the U.S. was the world's number-one producer of minerals. Today, it is in seventh place. Even though the nation has vast mineral reserves worth trillions of dollars, America is now 100% dependent on imports for some 17 key minerals, and, for another 29, over half of domestic needs are imported.

This is an excellent summary of some of the difficulties of trying to replace high-density, efficient, reliable fossil fuels with intermittent, unreliable, inefficient low-density green energy. It is an inherently disruptive, costly undertaking that will have heavy negative impacts on the environment.

Mills' analysis and concerns have been echoed by many other informed commentators on this issue, including Robert Lyman⁶² and Francis Menton.⁶³

Since the inception of the IPCC in 1988, the IPCC and the supporters of green energy have studiously avoided making any serious examination of the environmental and economic costs of green energy.

Economic Issues

The IPCC initiative was presented as being a noble cause to safeguard life and the planet. Framing of the problem in this way was a convenient way to structure the IPCC organization. It avoided any serious questioning of the eventual costs and economics of the initiative. This approach suited the three principal partners in the IPCC coalition: the National Governments, the UN Bureaucracy, and the NGOs.

Unfortunately, at this early fork in the road, the wrong fork was taken. Over time, it has led to the suppression of information, lack of transparency and open debate, and to Western Governments adopting green energy policies and goals that were never clearly thought through as to their practicality, effectiveness, economic costs, environmental impacts, and social impacts.

On January 17, 1961, President Eisenhower gave his Farewell Address to the Nation. The speech is remembered primarily for his warning about the potential power of the military-industrial complex, and that its power is not abused.

But his speech gave another, less noticed warning, about potential risks from a scientific-technological elite in the future. He said as follows:

Akin to, and largely responsible for the sweeping changes in our industrial-military posture, has been the technological revolution during recent decades.

In this revolution, research has become central; it also becomes more formalized, complex, and costly. A steadily increasing share is conducted for, by, or at the direction of, the Federal government.

Today, the solitary inventor, tinkering in his shop, has been overshadowed by task forces of scientists in laboratories and testing fields. In the same fashion, the free university, historically the fountainhead of free ideas and scientific discovery, has experienced a revolution in the conduct of research. Partly because of the huge costs involved, a government contract becomes virtually a substitute for intellectual curiosity. For every old blackboard there are now hundreds of new electronic computers.

The prospect of domination of the nation's scholars by federal employment, project allocations, and the power of money is ever present and is gravely to be regarded.

Yet, in holding scientific research and discovery in respect, as we should, we must also be alert to the equal and opposite danger that public policy could itself become the captive of a scientific-technological elite.

It is the task of statesmanship to mold, to balance, and to integrate these and other forces, new and old, within the principles of our democratic system - ever aiming toward the supreme goals of our free society.

Unfortunately, President Eisenhower's twin fears both seem to have been realized on global warming issues, in which Governments have influenced the direction of research through their power of the purse, and the scientific-technological elite as represented by the universities and consultants have provided Governments, the IPCC, and the UN with the sort of answers they were seeking – even if the answers were not based on good science.

Neither side has been entirely honest about their actions or their role in how this initiative has played out. Each side has received something they wanted from the other. What is lacking, however, is any real sense that anyone is in charge of looking after the broad public

In countries like Canada and the UK, where all major political parties have sworn fealty to the net zero CO2 goal by 2050, elections have become a contest between parties vying to outbid one another to secure the environmental vote.

interest in the spending of the money or in evaluating the trustworthiness of the scientific analysis being provided.

But it is somewhat more complicated than that in two major respects.

At the beginning, when the IPCC was being formed, Government Leaders, like Margaret Thatcher, were pretty confident that Western Governments between them could control the

general direction of the IPCC and of the degree to which NGOs could influence the outcomes because of governments' control of funding.

But NGOs by this time were becoming increasingly effective in mobilizing their supporters to demonstrate and to vote in favor of environmental issues. Over the course of the next few years, politicians began to actively cater to the NGOs concerns in order to have the NGOs either endorse them, or at least not oppose them, in elections. In countries like Canada and the UK, where all major political parties have sworn fealty to the net zero CO₂ goal by 2050, elections have become a contest between parties vying to outbid one another to secure the environmental vote.

Instead of functioning as Gatekeepers on behalf of the general public, politicians have largely become enablers for the NGOs, funding their favored projects with public money while burdening unfavored projects with burdensome regulations and outright bans.

A further enabler of this developing anarchy has been the media. In the past, the media was seen as having an important oversight role on behalf of the public, calling out politicians or political parties or organizations who were seen to be violating the public trust.

The Media today, with few exceptions, seems to be content to amplify the alarms supplied to them by the IPCC and its supporting NGOs, and to label as deniers any people who try to question the IPCC's findings. The media have also become enablers for the NGOs.

This is not a healthy situation in a democracy. The normal internal controls have broken down. The outcome is the chaos we see in Europe today.

This lack of proper oversight by media and governments is having a widespread debilitating effect on Western societies.

It is evident that the societies leading the efforts to adopt green energy quickly are incurring significantly higher costs and are becoming highly taxed, highly subsidized, and highly indebted.

The internal fights that develop within these societies are over what groups will get how big a subsidy to placate them or prevent them moving to lower cost jurisdictions. The focus on acquiring subsidies largely eliminates the traditional role of economic evaluation, i.e., free markets, in determining what are the desirable choices for the long term economic health of societies.

Societies leading the efforts to adopt green energy quickly are incurring significantly higher costs and are becoming highly taxed, highly subsidized, and highly indebted.

The overall effect of these policies is a hemorrhaging of jobs, wealth, and technology out of high cost green energy societies. A lot of damage has already been done to these leading green energy jurisdictions, and more is likely to follow.

A further complication is that the large expenditures to date on developing green energy policies makes it difficult to break free of these destructive policies. Most senior politicians and leaders of institutions in the West over the years have promoted and funded green energy policies. For them to change direction now would be an admission that the policies that they had promoted in the past were wrong.

To stop funding for green energy projects now would also alienate a growing body of people, investors, organizations and institutions whose livelihoods have become dependent on the continuation of green subsidies and the funding of green energy research projects.

It is now clear that green funding is also creating growing inequality within Western Societies where the upper wealthier strata of society is doing reasonably well under green energy funding measures and investing opportunities, whereas the lower strata of society is bearing the burden of loss of jobs, high energy costs, high food costs, and high inflation costs on most of their necessities.

If Western political systems cannot on their own quickly bring about fundamental policy changes in direction, they may find that matters get to the point where demonstrations, or riots in the streets, force drastic changes to eventually be made, or to indebted governments reaching their borrowing limits and going bankrupt as Sri Lanka has just done. People in northern latitudes must have reliable access to affordable energy in winter and all people must have access to affordable food all year round.

It has been a remarkable lapse of political leadership in the West that in 2023 we even find ourselves having to discuss these issues.

China currently controls about 70% of global solar panel production, 50% of wind turbines, and 90% of lithium ion capacity.⁶⁴ China is currently increasing its energy capacity substantially. It is using new coal plants to do this. It has cut back its subsidies to its own solar and wind turbine providers. Clearly, they see wind and solar as being more expensive and unreliable than coal.

China is willing to sell its solar and wind turbine technology and products to the West if the West continues to follow its present path of eliminating fossil fuels. This is already resulting in China's energy sector becoming heavily invested in efficient coal plants and the West's energy sector becoming heavily invested in inefficient unreliable solar panels and wind turbines. This will give China a big comparative cost advantage in manufacturing industries for decades into the future.

Do we really want to continue down this path?

Further, China has embarked on a robust research program to create new designs for more efficient, safer nuclear reactors that would be available for replacing their current fleet of coal plants in 30 to 40 years' time. The West badly needs to do the same if it wishes to retain any independent industrial manufacturing capacity in the future.

Major Western environmental organizations have been successful in limiting the supply of Western capital for developing fossil fuels in developing countries, especially in Africa. This perpetuates poverty in the developing world. It is also counterproductive.

It is clear that the wealthier a country becomes the more it will have the resources and the desire to improve its environmental practices. In other words, wealth is not a bar to good environmental stewardship but its pre-condition.

Conclusion

Virtuous passionate minorities can become dominant forces shaping beliefs and actions in societies, especially in democratic societies, even to the point of creating hysterias, such as the global warming hysteria that we are currently living in, where some believe we have only 12 years left to drastically change societies or face extinction.

This belief has no basis in fact. The evidence presented in this essay shows that the current Modern Warming Trend is proceeding in an orderly way consistent with previous warming periods like the Medieval Warm Period, and the Roman Warm Period.

The assumptions by Bert Bolin and Jule Charney, and the IPCC's consensus of experts, on how CO₂ might behave in the atmosphere have not been borne out by observations. With the data that is available today, it is deplorable that the IPCC's Executive Panel and the UN Secretary General are still issuing Code Red type of alarms and urging the West to continue with its current misallocation of its financial and intellectual resources, pursuing green energy policies that are based on seriously flawed computer models and assumptions.

These policies are wreaking havoc wherever they are being pursued aggressively, impoverishing nations and hitting their most vulnerable citizens hardest.

The reality is that earth has been in an Ice Age phase for about 2.5 million years with recurrent advances and retreats of glaciers and ice sheets. In the past one million years, the pattern has been for cooling phases of about 100,000 years to be followed by brief Interglacial warm periods of about 10,000 to 15,000 years. We are now at about the 11,000 year mark into our present Holocene Interglacial.

Given the current climate trap which the Earth is caught in, there is a good possibility that our current Holocene Interglacial will end with the earth slipping back into another deep temperature drop over the following 100,000 years to retest the 150 ppm threshold of CO₂ for the survival of photosynthesis and life on the planet.

Given that CO₂ levels have averaged over 2,600 ppm over the past 550 million years, there seems little reason for us to panic today over our present CO₂ level of 420 ppm, especially since we now know that CO₂'s ability to add to the greenhouse gas effect becomes severely limited as its concentration increases. Further rises in CO₂ and the other greenhouse gases methane and nitrous oxide should have negligible effects on future global warming. Natural forces and land use changes by the actions of man and by CO₂'s greening of the earth will remain the dominant drivers of future climate change.

The rising level of CO₂ acts like a natural fertilizer and along with the help of manufactured fertilizers, it is helping to produce record yields of cereal crops as well as a significant greening of the planet.

This rise in food production has been crucial for feeding the world's growing population and improving the access of hundreds of millions of people in the developing world to a better and a more reliable food supply that is underpinning the significant rise that is underway in their standard of living.

The biggest threat to the general improvement for human life on the planet is misguided actions from governments implementing their green energy policies, trying to curb a non-existent problem from rising CO₂ emissions

The biggest threat to this general improvement for human life on the planet is misguided actions from governments implementing their green-energy policies, trying to curb a non-existent problem from rising CO₂ emissions.

Sri Lanka's Government has led the way in wrecking that country's food supply and its economy, but Western governments are close on its heels.

Holland and Canada are now trying to force their farmers to reduce crop production by using less chemical fertilizer, which will in turn reduce the farmers' ability to feed cattle or to export food to other countries. The end result of these measures will be to reduce the amount of food available in the world to feed its population. The cost of food will rise. The poorer people in the developing countries will bear the brunt of these measures, while these actions will reduce the effect of greenhouse gas emissions by a negligible amount.

So far, the rush of the EU and the UK to embrace green energy has emboldened Russia's President Putin to invade the Ukraine, has left Europe without access to the fossil fuels they need to keep warm in winter and to supply their industries with affordable energy and feedstock, and has impaired the traditional supply of grains from the Ukraine and Russia to Middle East countries, leaving these countries struggling to find adequate food supplies for their populations.

Western Political Leaders are largely responsible for creating the current mess that we are in by creating the IPCC structure with its focus on achieving political goals rather than scientific goals. This has led to narrowly focused IPCC studies, concentrating on man-made global warming, using Post-Normal Science procedures. These studies lacked the openness, rigor, objectivity and discipline that would have resulted if the traditional norms of the scientific method had been used instead. The IPCC studies have also lacked realistic and detailed evaluations of the economic costs, environmental impacts, social impacts, and societal impacts of their proposed green energy policies.

In the West, new political leaders, or current political leaders who acknowledge that fundamental mistakes have been made on energy issues in the past, will need to reverse existing energy policies and start the West on a process to bring order out of chaos. This new political leadership will need to oppose the false messaging of major Environmental NGOs about the state of the planet and start to wind down the current level of hysteria over global warming in Western societies.

This essay started with a note about population. It will end with another note about population. If Malthus were to see the planet today, he would be amazed that we are approaching a population of 8 billion people in the world, and with much of this population enjoying a high, or improving, standard of living. This has been possible in large part to the combination of access to cheap fossil fuels, of innovation leading to large increases in productivity, and from the fruits of the industrial revolution spreading out to countries around the world.

The broad and powerful drive for higher standards of living in the developing world reflects the fact that most people who are poor, don't want to stay poor. They see what industrialized countries have achieved in terms of quality of life. They want the same thing for themselves and their families, either by their own country rapidly improving its standard of living, or by they themselves seeking to emigrate to the West.

On population growth, experience in all developing countries shows that as the standard of living rises, and if birth control measures are readily available, and if more women enter the work force and universities, population growth begins to decline below replacement levels.

On the thorny issue of population growth, experience in all developing countries shows that as the standard of living rises, and if birth control measures are readily available, and if more women enter the work force and universities, population growth begins to decline below replacement levels.

This is a more humane way to bring population growth under control worldwide rather than by letting starvation of poorer populations be the default control mechanism as it was in Malthus' time.

This stabilization of the world's population, if it can be achieved in the next few decades, and then begin to drift downward, would also relieve many anxieties about sustainability issues in the future.

If this path is followed, it will require a lot of thinking and experimentation to determine how satisfactory standards of living can be maintained in societies that are both aging and experiencing population decline at the same time. It is a complex problem with many societal values to be considered. It is something that we have never attempted to do before

on a large scale, or with a mix of societies that are still trying to find ways to live peacefully together with one another today. This is where we should now be focusing our energies.

Politics and perceptions will play a major role in whether we can move into this proposed new stable world order in a relatively peaceful and effective way, or whether we have to go through more rounds of strife, bloodshed, and broken countries before we can take the next steps into a more rational world order.

If Putin's gambit fails and Russia aligns itself with the EU going forward, it could be a pivotal point for the world as it would strengthen democratic processes rather than autocratic ones. It will leave China as the odd man out if it tries to achieve its ends by force. It has been gratifying to see how many countries, and even younger Russian citizens, have condemned Putin for trying to carve a chunk out of a neighboring country by the arbitrary use of force.

If Putin fails, it will likely have a strong inhibitory effect on other autocrats thinking of doing the same thing. Even China will have to think twice about the possibility of it being cut off from access to markets around the world if it tries to take Taiwan by force.

To make all this happen, however, the world's population must continue to have access to cheap reliable fossil fuel energy for the present. A strong focus on natural gas in the immediate future and the phasing-in of some form of nuclear energy in coming decades would likely be the best way to go.

Green Energy with its low energy density, its unreliability, its severely destabilizing effects on electrical grids, and its high overall cost, will just wreck Western societies if we persist in trying to impose this retrograde quixotic energy technology on Western societies. The time is long overdue for us to have a serious rethink of where we should be heading, and how we are going to get there.

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Postscript

A comparatively small number of scientists, specialists, and concerned citizens in North America and Europe have repeatedly pointed out that the IPCC's work does not meet the standards of transparency and supporting data required for it to meet the norms of the scientific method.

Most of these people are now part of the elder generation, but they remain engaged in trying to see that public policy is founded on sound scientific principles. This is what their lives have been about, and they are concerned about the flaws they see in the IPCC's *Summary for Policymakers* reports and the flaws they see in the rationale for green energy.

It would be good if more younger researchers were represented in this group, but the overwhelming bias of the IPCC and Western Governments is to fund scientists and NGOs to advance the IPCC's goals, not to evaluate the IPCC for its flaws.

Among those whose work I am most familiar with are Steve McIntyre, Ross McKittrick, Timothy Ball, Ian Clark, John Christy, William Happer, Steven Koonin, Bjorn Lomborg, Donna Laframboise, Vivian Krause, Tony Heller, John Robson and Tom Gallagher. All have tried to inform politicians and the public of the shortcomings of the IPCC's modeling work as well as the many shortcomings in government agencies, universities, and the media for their questionable and sometimes deceptive statements on environmental matters and NGOs' claims.

For their efforts, skeptics have often been harshly criticized, efforts have been made to deny them a platform for their views and to prevent them getting peer reviewed approval for their papers, and the IPCC and its supporters have refused to debate with them in public. The responses by the IPCC and its supporters have often been completely opposite to the tenets of open science, of honesty, and of being willing to engage with other researchers to find valid answers to difficult questions.

A prominent environmentalist of long standing, James Lovelock, was initially a supporter of the suppression of CO₂, even being in his own words an alarmist on the matter. In later life, however, he changed his position, thinking that the threat from rising CO₂ was not as great as he had first thought, and that more use should be made of natural gas and nuclear power.

James Lovelock changed his mind on the threat posed by rising CO₂. It would be a welcome change if major Environmental NGOs could find a way to do the same.

As was mentioned in the essay earlier, two prominent environmentalists, Michael Moore and Jeff Gibbs, created a video called *Planet of the Humans*.⁶⁰ It is a powerful video, showing graphic scenes of destruction, waste, and hypocrisy. They deserve a lot of credit

for preparing a video critical of many aspects of the environmental movement which they still believe in.

Gibbs and some of the people he interviewed seem in despair due to the combination of overpopulation in the world and overconsumption in Western countries. The only solution they could seem to see was to reduce the world's population substantially, but they didn't say how this could be done.

The overpopulation issue was briefly addressed in the essay in terms of the relationship between rising living standards and falling reproduction rates. Increasing humanity's overall standard of living would seem to be the best option if the planet is to arrive at a stable and humane solution to this problem.

Another passionate proponent of a humanistic environmentalism all his life is Patrick Moore. Patrick was a cofounder of Greenpeace and he served in Leadership positions for 15 years. He found at the end of his tenure on the Greenpeace Board that he was the only member on it with a formal education in science.

When the Board wanted to mount a Greenpeace campaign against Chlorine as being "The Devil's Element" and calling for a global ban, Patrick objected, pointing out Chlorine's critical role in disinfecting water supplies, making them safe for human consumption, and the important role that Chlorine plays in many modern medicines. The Board refused to reconsider. Patrick chose to resign.

Patrick has continued to be a passionate supporter of Environmentalism, but a Humanistic Environmentalism based on science and logic, with man being a positive contributor to the health of the planet, not a destructive one.

Susan Crockford is a zoologist who has studied polar bears in the field for decades. She did not agree with the scientific consensus that polar bears are threatened by climate change based on computer modeling studies by a modeling group that would not release the details of their models.

She found in her work that polar bear populations were actually increasing, and the bears were often thriving. She said so in public, including in presentations to schoolteachers and their young students who thought that polar bears were almost extinct.

A complaint got back to the University of Victoria about her non-consensus climate views. UVic cancelled her Adjunct Assistant Professor status, giving no details of the complaint against her or the process by which the university cancelled her. About the last thing that universities seem interested in these days is freedom of speech, freedom of thought, or opinions based on real data.

Crockford then became suspicious about a Netflix documentary prepared by the World Wildlife Federation and veteran documentary presenter David Attenborough, claiming that walrus falling off cliffs in the Arctic was due to climate-change effects on the ice. This didn't jibe with Crockford's knowledge of walrus behavior. She documented past cases of polar bears hunting walruses, causing the walruses to panic and fall off the cliffs, before climate change was an issue. Her book *Fallen Icon* documents the deception in the Netflix documentary.

Crockford is another example of someone who cares about the environment and about the truth, even when it has cost her a lot of time and effort to try to bring this evidence to the attention of the public and despite having to go up against well-funded organizations like the WWF and Netflix, and prominent personalities like David Attenborough.

One last environmentalist that I would like to highlight is Michael Shellenberger,⁶⁵ the author of *Apocalypse Never*. Michael became an environmentalist when he was a teenager in California, fighting to save the Redwoods. As a young man, he travelled to Brazil, Nicaragua, Congo, and Indonesia where he lived with poor people. He saw the hardships of life at the poverty level, and how often even access to a tractor or fertilizer could have significantly improved the quality of their lives. He could see clearly why people in the country were attracted to the cities because of the better opportunities available there.

He saw the pressing need for poor countries to get access to cheap, energy dense fossil fuels to improve the lives of their citizens. He could also see the long run advantages of going to nuclear energy to meet much of the energy needs of the world's population in the future.

Shellenberger is a good example of someone who cares about the environment, has observed what life is like in poor countries, and who is using his mind to think of ways to help both poor people and the environment. We need more Shellenberger's in this world.

It is clear from the lives of the six Environmentalists that I have highlighted here and the interviews with many ordinary citizens shown in *Planet of the Humans*, that many people want good environmental practices widely followed on the planet.

One question remains: can Western governments and the big institutional environmental NGOs give up their present focus on demonizing CO₂ and fossil fuels, and switch instead to promoting effective measures that will actually make the world a better and safer place for people as well as for the environment? The future well-being of much of the world rests on the answer to this question.

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