Journal of Sustainable Development; Vol. 15, No. 5; 2022
ISSN 1913-9063 E-ISSN 1913-9071
Published by Canadian Center of Science and Education

# While the Climate Always Has and Always Will Change, There Is no Climate Crisis

Wallace Manheimer[1]

[1] Retired from The US Naval Research Laboray, USA

Correspondence: Wallace Manheimer, Retired from The US Naval Research Laboray, USA. E-mail: wallymanheimer@yahoo.com. Orcid number: 0000-0001-6334-2591

Received: July 31, 2022 Accepted: September 6, 2022 Online Published: September 8, 2022

doi:10.5539/jsd.v15n5p116 URL: https://doi.org/10.5539/jsd.v15n5p116

**Abstract**

The emphasis on a false climate crisis is becoming a tragedy for modern civilization, which depends on relible, economic, and environmentally viable energy. The windmills, solar panels and backup batteries have *none* if these qualities. This falsehood is pushed by a powerful lobby which Bjorn Lomborg has called a climate industrial complex, comprising some scientists, most media, industrialists, and legislators. It has somehow managed to convince many that $CO_2$ in the atmosphere, a gas necessary for life on earth, one which we exhale with every breath, is an environmental poison. Multiple scientific theories and measurements show that there is no climate crisis. Radiation forcing calculations by both skeptics and believers show that the carbon dioxide radiation forcicng is about 0.3% of the incident radiation, far less than other effects on climate. Over the period of human civilization, the temperature has oscillated between quite a few warm and cold periods, with many of the warm periods being warmer than today. During geological times, it and the carbon dioxide level have been all over the place with no correlation between them.

## 1. Introduction

Modern civilization needs energy. Before fossil fuel became widely used, this energy was provided by people and animals. Because this constituted so little energy, civilization was a thin veneer atop a vast mountain of human squalor and misery, a veneer maintained by such institutions as slavery, colonialism and tyranny. Fossil fuel has extended the benefits of modern civilization to billions, but its job, in this respect is not yet complete, there are still billions on earth who derive very little benefit from this power source, and billions more who derive only minimal benefits. To spread the benefits of modern civilization to the entire human family would require much more energy, as well as newer sources of energy.

Thirty years ago, one could envision the spread of fossil fuel, to be gradually replaced by nuclear energy, to be fueled at first by mined uranium, and then by breeding fissile material, either by nuclear fission or nuclear fusion; and possibly even by fusion itself. This author has published 2 papers very recently on this very topic, one in this journal (Manheimer 2022 a), and one in the American Nuclear Society's journal Fusion Science and Technology, special issue on "Wide-range and exotic applications of fusion technology" (Manheimer 2022 b).

However thirty years ago, a gigantic monkey wrench was thrown into this plan. This is the fear that the continued burning of fossil fuel would put too much $CO_2$ into the earth's atmosphere and cause possibly catastrophic climate change in a short time, a decade or two. Based on this fear, the the western world is in the process of switching its power source to wind and solar, with battery backups for times when there is no wind or solar. This author published in this journal a long analysis of wind and solar power, as well as battery backups. It, and many references therein, as well as many other sources, have concluded that wind and solar are not viable power sources. The bitter experience of those countries (England and Germany) and regions (Texas and California) that have implemented them on a large scale have shown it to be unreliable, very expensive, and environmentally disastrous, both locally and in the areas where they mine the material for it, and in the areas where they dispose of its trash (Manheimer 2022 a).

Accordingly this author has investigated the motivating factor for the wind and solar transition, namely the fear of $CO_2$ induced of climate change. In a single sentence this fear is vastly overblown. There is certainly no scientific basis for expecting a climate crisis from too much $CO_2$ in the atmosphere in the next century or so. Hence there is no reason why civilization cannot advance using both fossil fuel power and nuclear power, gradually shifting to

more and more nuclear power.

With very little evidence to back them up, many sources have asserted that regarding climate change, 'the science is settled'; there is no need for its believers to debate those skeptical of it. For instance in his Dec 30, 2018 show Meet the Press, devoted to climate change, the moderator Chuck Todd said:

> "We're not going to debate climate change, the existence of it. The Earth is getting hotter. And human activity is a major cause, period. We're not going to give time to climate deniers. The science is settled, even if political opinion is not."

Of course Chuck Todd is not a scientists, but presumably has spoken to some. But has he ever spoken to Richard Lindzen, Roy Spencer, Will Happer, Patrick Moore, Judith Curry…….? These are scientists with impeccable reputations and expertise who would give him a very different viewpoint.

Unlike Chuck Todd, this paper will not decribe the combatants with the pejorative terms 'deniers' or 'alarmists'; but will use the more neutral terms 'skeptics' and 'believers'.

This paper will present counter arguments to those of the believers. There is a tremendous amount of data backing this up. Of course climate science' is a vast field, involving physics, chemistry, biology, earth science, astronomy, agriculture, manufacturing…… No one person can possible master all of it. In fact this author would dispute that anyone can call himself a 'climate scientist'. Accordingly this paper can hardly do a complete job. However it does give a glimpse of the vast amount of data and theory disputing that we are in anything like a climate crisis.

To begin, one of this era's leading physicists, Steven Koonin (Koonin 2021) has recently published a book entitled *Unsettled*, giving it that name presumably to mock the claims of believers that 'the science is settled'. In it he gives many reasons for uncertainty and doubt of an impending 'climate crisis'. Also two of the world's leading environmentalists, Patrick Moore (Moore) and Michael Shellenberger (Shellenberger) have also written books recently disputing that the added $CO_2$ in the atmosphere is causing a climate crisis. Of course there is the classic by H.H. Lamb (Lamb), often regarded as the father of climate science. The effect of $CO_2$ on climate does not even appear in his book (issued in 1995) until page 330, hardly a confirmation that he saw it as the main knob controlling the earth's temperature.

Perhaps one of the best statements used to cast doubt on the an approaching climate crisis is by Richard Lindzen, perhaps the world's leading authority on geological fluid motions:

> "What historians will definitely wonder about in future centuries is how deeply flawed logic, obscured by shrewd and unrelenting propaganda, actually enabled a coalition of powerful special interests to convince nearly everyone in the world that CO2 from human industry was a dangerous, planet-destroying toxin. It will be remembered as the greatest mass delusion in the history of the world- that CO2, the life of plants, was considered for a time to be a deadly poison."

Lindzen is definitely right about one thing, there is now certainly 'a coalition of powerful special interests to convince nearly everyone in the world that CO2 from human industry was a dangerous, planet-destroying toxin'. Bjorn Lomborg has described this coalition as 'The climate industrial complex' (Lomborg). He begins:

The tight relationship between the groups echoes the relationship among weapons makers, researchers and the U.S. military during the Cold War. President Dwight Eisenhower famously warned about the might of the "military-industrial complex," cautioning that "the potential for the disastrous rise of misplaced power exists and will persist." He worried that "there is a recurring temptation to feel that some spectacular and costly action could become the miraculous solution to all current difficulties."

This is certainly true of climate change. We are told that very expensive carbon regulations are the only way to respond to global warming, despite ample evidence that this approach does not pass a basic cost-benefit test. We must ask whether a "climate-industrial complex" is emerging, pressing taxpayers to fork over money to please those who stand to gain.

And concluding with:

The partnership among self-interested businesses, grandstanding politicians and alarmist campaigners truly is an unholy alliance. The climate-industrial complex does not promote discussion on how to overcome this challenge in a way that will be best for everybody. We should not be surprised or impressed that those who stand to make a profit are among the loudest calling for politicians to act.

This author is a scientist with over 50 years' experience. Accordingly, he has looked at the data as an experienced scientist, but not a 'climate scientist' and has concluded that Lindzen, Lomborg and many, many others are indeed correct. In fact, $CO_2$ is necessary for life on this planet. So far, the main effect of the added $CO_2$ in the atmosphere

has been to increase the greening of the earth ($CO_2$ coalition), as $CO_2$ is vital plant food. Without atmospheric $CO_2$, the earth would be a dead planet. Few believers seem cognizant of this undeniable fact. Can they answer a simple question: What do they think is the optimum level of atmospheric $CO_2$ and why? In fact, those believers in a fast-approaching climate crisis seem, in the opinion of this author, to be more like members of a religious cult, than like practicing, skeptical scientists.

Furthermore, as pointed out, modern civilization depends on energy. Right now, we have reasonable energy infrastructure, and the possibility of converting to much more nuclear power in coming decades. If we dismantle our existing power infrastructure, and convert to solar and wind, and solar and wind fail, as they will, it will be the end of modern civilization. It would be especially tragic when not only will this new infrastructure fail, but will cost trillions, trash large portions of the environment, and be entirely unnecessary. *The stakes are enormous.*

Section II describes the main tall poles of the climate industrial complex, if you will. Section III describes a few of the many predictions of climate crisis believers, predictions which time have proven erroneous. It also mentions many highly qualified scientists who do not accept the climate crisis dogma. Section IV discusses the radiation forcing of the atmospheric $CO_2$. Both the believers and skeptics show that the radiation forcing, by itself, is not nearly sufficient to cause a climate crisis for at least a century or two. Section V discusses evidence of climate change over the period of human civilization, the past 10,000 years. Section VI discusses the climate during geological times, and Section VII discusses a simple way for anyone, anywhere, any time to check out the predictions of a particular potential catastrophe, for instance increasing frequency and severity of tornados. Finally, Section VIII draws conclusions.

## 2. The Chicken Littles of the Climate Industrial Complex

One cannot listen to national and world leaders very long without learning false information that there is a climate crisis which we have very little time to solve. Here are some statements from the Glasgow Nov 2021 international conference on climate change. There are many, many more like this:

“Humanity has long since run down the clock on climate change. It’s one minute to midnight on that Doomsday clock and we need to act now.” Boris Johnson

“Our addiction to fossil fuels is pushing humanity to the brink. We face a stark choice: Either we stop it — or it stops us. It’s time to say: enough.” Antonio Guterres, secretary general of UN

“Quite literally it is the last-chance saloon. We must now translate fine words into still finer actions.” Prince Charles

“President Biden is committed to cutting greenhouse gas emissions 50-52 percent below 2005 levels in 2030, reaching a 100% carbon pollution-free power sector by 2035, and achieving a net-zero economy by no later than 2050.” White house statement November 2021

“The scientific community is telling us in no uncertain terms that we have less than 11 years left to transform our energy system away from fossil fuels to energy efficiency and sustainable energy, if we are going to leave this planet healthy and habitable for ourselves, our children, grandchildren, and future generations.” Bernie Sanders presidential campaign 2020 web site

This author, a practicing scientist with over 50 years’ experience, gets very nervous on hearing politicians say they are following ‘the scientific community’. This confers on us a unanimity which we don’t have, and an authority on us which we don’t want. To me it is basically a way for the politician to say ‘Do what I tell you’.

But should someone have missed these statements by politicians, all one has to do is turn to the New York Times, Washington Post, ABC, CBS, NBC, PBS, MSNBC, or CNN to learn the same thing.

What about scientific journals, do they permit deviations from the orthodoxy? Few skeptical articles are accepted for publication in the most standard journals. Most are published in blogs. Here is a quote from the editorial in Science Magazine, one of the most prestigious scientific journals, by the editor Marcia McNutt (McNutt):

But now with climate change, we face a slowly escalating but long-enduring global threat to food supplies, …to support a population of more than 7 billion people.

The time for debate has ended. Action is urgently needed…..to reduce their per-capita fossil fuel emissions even further...

But in case anyone still does not get the idea, Dr. McNutt went on to say that skeptics belong in one of the circles of Dante’s inferno. Figure 3, is her picture of this from her Science Magazine editorial.

Figure 1. “where [would]...Dante...place all of us who are borrowing against this Earth...?” Dr. McNutt’s picture of one of the circles of hell where the skeptics of human induced climate change ought to go

If somebody does manage to get over all the hurdles and publish a skeptical article on climate change in one of the major journals, does he or she have a chance of spreading his view on social media?

Here is Face Book’s statement November 2021:

We have a responsibility to tackle climate misinformation on our services, which is why we partner with more than 80 independent fact-checking organizations globally to review and rate content, including content about climate change. When they rate content as false, we reduce its distribution so fewer people see it and we show a warning label with more context. And we apply penalties to people who repeatedly share false information.

Here is twitter (this may be changing with Elon Musk possibly taking over the company):

Twitter is banning misleading advertisements that go against the scientific consensus of climate change, the company announced on Friday, which was Earth Day.

“We believe that climate denialism shouldn’t be monetized on Twitter, and that misrepresentative ads shouldn’t detract from important conversations about the climate crisis,” Twitter said in a blog post.

Here is Google (October 2021):

That’s why today, we’re announcing a new monetization policy for Google advertisers, publishers and YouTube creators that will prohibit ads for, and monetization of, content that contradicts well-established scientific consensus around the existence and causes of climate change. This includes content referring to climate change as a hoax or a scam, claims denying that long-term trends show the global climate is warming, and claims denying that greenhouse gas emissions or human activity contribute to climate change.

What about major scientific societies? Here is the American Physical Society:

Multiple lines of evidence strongly support the finding that anthropogenic greenhouse gases have become the dominant driver of global climate warming observed since the mid-twentieth century.

Here is the American Meteorological Society:

“Warming of the climate system now is unequivocal, according to many different kinds of evidence.” It goes on to say, “It is clear from extensive scientific evidence that the dominant cause of the rapid change in climate of the

past half century is human-induced increases in the amount of atmospheric greenhouse gases …"

Can all of these authoritative sources be wrong? It seems inconceivable, but they almost certainly are!

It is particularly disheartening to see these learned scientific societies make such definitive claims when so much contrary information is readily available. They do not even put error bars on their statements! Don't they realize that the radiative forcing from the excess $CO_2$ in the atmosphere is much less than 1% of the total radiation input, and there are other climate and meteorological effects that are much more dominant? Don't they recognize that for much the last 10,000 years, the earth has almost certainly been warmer than today? Don't they know that in those 10,000 years, there have been many oscillations between warm and cold periods, not so different from today's warm period? Don't they realize that in the warm periods, civilization flourished, in the cold period it suffered? Don't they realize that in its geological history, the earth's temperature and $CO_2$ varied widely with little correlation to each other? This information, by very well established sources such as NOAA, NASA, The National Hurricane Center, The IPCC ….. is very simple to get on the Google search engine, the very search engine of a company that specifically says it will not provide information on 'claims denying that long-term trends show the global climate is warming'.

### 3. Some Naked Emperors of the Climate Industrial Complex, and Others

To start, we consider two naked emperors. We can now compare their predictions of 30 years ago with today's reality. James Hansen, the leader of the Goddard institute at Columbia University, in1988 predicted great warming over the next few decades for a variety of $CO_2$ atmospheric inputs. The world's actual $CO_2$ input was greater than his maximum assumption. In Fig. (2) are shown his predictions of temperature rise from 1988 to 2030, and the actual measurements up to 2012 (Watts).

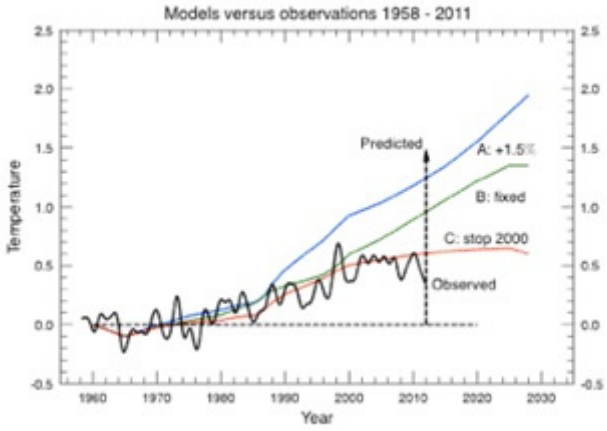



Figure 2. James Hansen's prediction of world temperature rise for various assumptions of $CO_2$ emission. His maximum case (case A) for $CO_2$ emission considerably underestimated the actual $CO_2$ input. The actual temperature rise is shown in black

Undoubtedly there are new simulations that now give perfect agreement from 1960 to 2020, but predict calamity in the next 10 or 20 years. But how many bites from the apple do the modelers get before they lose all credibility? After all it was John von Neuman who said "With 4 parameters, I can simulate an elephant; with 5, I can get him to wiggle his trunk". All these climate simulations have many more than 5 parameters (Vossen).

In fact a reasonable image of an elephant has been simulated with 4 parameters; it wiggled his trunk with 5 (Mayer). The image of the elephant wiggling his trunk is shown in Figure (3).

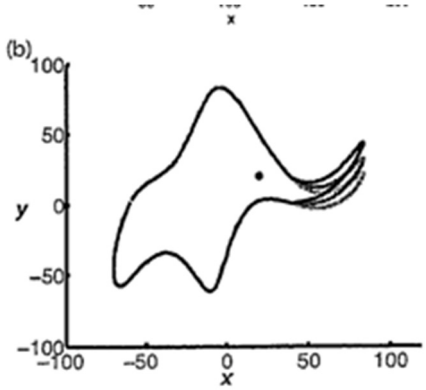
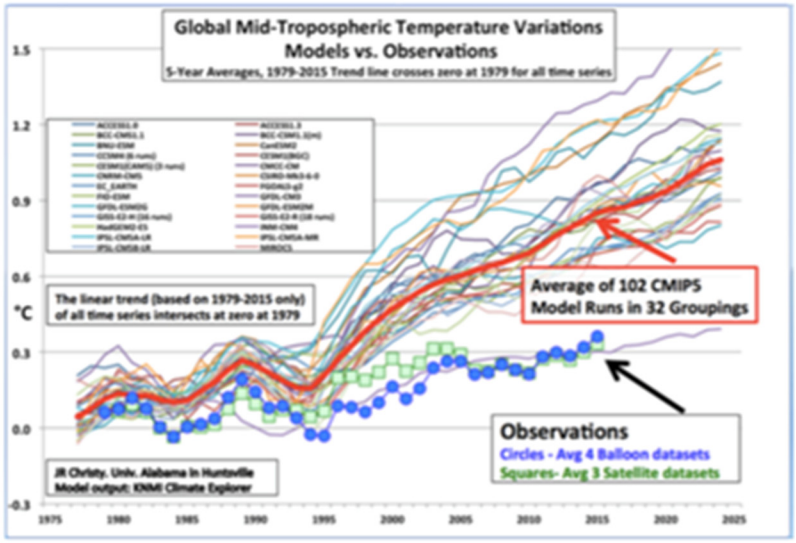



Figure 3. The simulated elephant wiggling his trunk

Hansen is hardly the only one who got the prediction of future temperature wrong. John Christy (Christy) presented testimony to congress showing a whole variety of numerical simulations of future heating as compared to reality. The simulations were way off. Figure (4) is from what he presented to congress.




Above: Global average mid-tropospheric temperature variations (5-year averages) for 32 models (lines) representing 102 individual simulations. Circles (balloons) and squares (satellites) depict the observations. The Russian model (INM-CM4) was the only model close to the observations.

Figure 4. From Christy's testimony to congress

Notice that all of the simulations predicted much greater temperature rise than was actually measured. Since all of the simulations overestimated the temperature, they are not making random errors; if they were, some would underestimate the temperature rise. One cannot escape the conclusion that a bias toward heating is built into all the numerical codes. In fact several people (Vossin, Koonin, Manheimer 2020) have pointed out the difficulties with these simulations. Yet on the basis of these simulations, which cannot even predict the present, the climate industrial complex is planning to spend trillions to take apart our existing energy infrastructure, and replace it with something that does not even work.

It does not always take 30 years to expose an incorrect prediction. In 2008 Hansen predicted that there would be no summer time Arctic ice after 5 or 10 years (Predictions). In Figure (5) are shown NOAA measurements of Arctic ice in March (the maximum) and September (the minimum) (Climate).

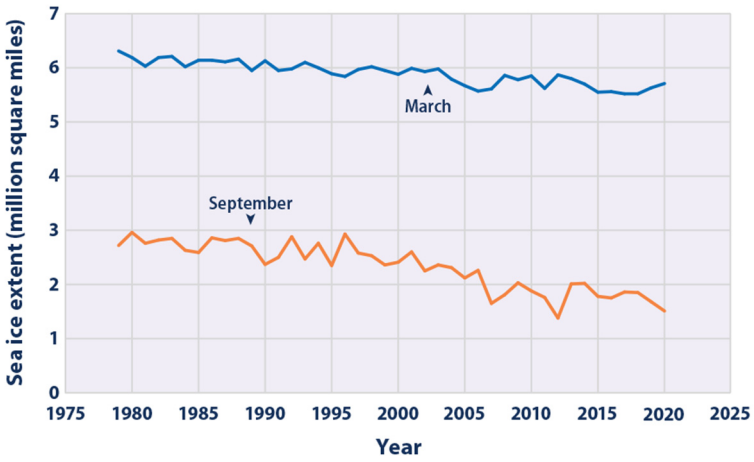



Figure 5. The actual measured extent of Arctic ice as a function of year from 1979 to 2020 in March (the maximum) and September (the minimum). Had Hansen made his prediction in 2007 instead of 2008, for 2018 instead of 2020, the actual summer ice would have increased!

Another well established scientist who missed on an important prediction is Professor Kerry Emanuel of MIT. He had recently been celebrated (BBVA) for his study that the warming of the ocean would make hurricanes more frequent and intense:

Besides unraveling the mechanisms of how hurricanes develop, Emanuel was the first to link them with the warming of sea surface waters driven by climate change. His models currently predict a 5% increase in hurricane intensity, i.e., wind speed, for each one degree rise in ocean temperatures.

However Figure (6) is a plot from NOAA of the ocean surface temperature over the last century and a half (Buchholz).

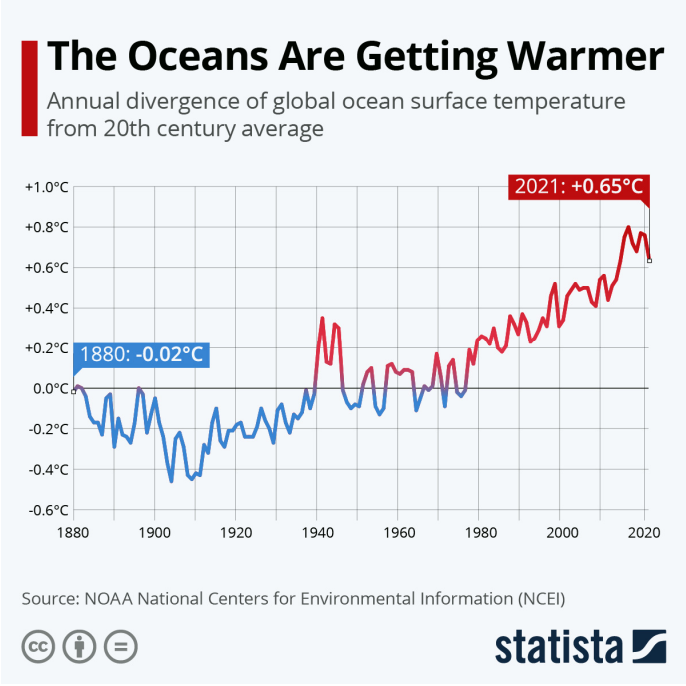



Figure 6. A plot of ocean surface temperature over the last 140 years from NOAA, showing that in the last 60 years the oceans have warmed by ~ 1°C. Professor Emanuel's prediction is the this should have given a significant increase in hurricane frequency and intensity

Figure (7) is a plot from NOAA (Spencer 2018) of the number of strong hurricanes striking the American East coast over this time period.

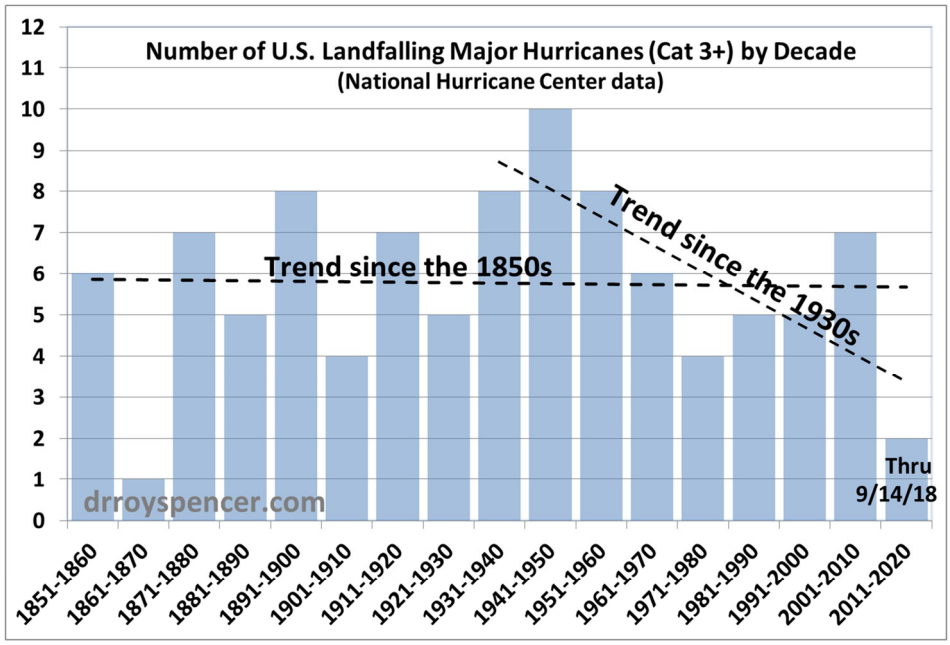



Figure 7. A NOAA plot of the number of intense hurricanes striking the US over the last 140 years

Clearly the number of strong hurricanes has been decreasing from the 1950's to the present, as the ocean has warmed, This is just exactly the opposite of what Professor Emanuel predicted.

Now we consider some emperors still wearing clothes. In 2006, 32,000 scientists, including 9000 Ph.D's signed a petition disputing the alarmist view of the climate (www.petitionproject.org). The petition was led by none other than Fred Seitz, at the time the president of the National Academy of Science (NAS). This year a new organization, Clintel (https://clintel.org/world-climate-declaration/) has formed and has put out a similar statement. Already over 1000 professional scientist from all over the world have signed on. This certainly contradicts the assertion that "the science is settled'. In fact, if, as publicized, 97% of scientists really believe the current dogma on climate change, we would have expected to see a petition supporting this view signed by ~970,000 scientists, ~300,000 with Ph.D's.

While the raw number scientists who signed these statements are certainly an important data point, this author is even more impressed by the quality of some of the leading skeptics. Some of these are Richard Lindzen (world's leading expert on geophysical fluid dynamics and the youngest person elected to NAS), William Happer (one of the world's world leading authorities on the interaction of radiation with atoms and molecules, and inventor of the sodium guide star, an earth based method of correcting for atmospheric turbulence in large telescopes, and leading member of NAS), Roy Spencer and John Christy (in charge of the NOAA/NASA/UAH space based temperature data collection. Christy has testified before congress), Patrick Moore (originator of Greenpeace, resigned when he thought it became too extreme, he recently wrote a book critical of the climate alarmism [Moore], and has testified several time before congress), Judith Curry (former chairwoman of the earth and atmospheric science department at Georgia Tech but resigned from her academic post when the academic atmosphere became too stultifying for her), Ivar Giaever (Nobel Prize winner in physics, resigned from the American Physical Society because of its stand on climate change), Steven Koonin (one of today's leading physicists, he also recently wrote a book; to mock the claim of the alarmists that 'the science is settled', he titled his book 'Unsettled'[Koonin] ), Patrick Michaels (Retired from the atmospheric department of the University of Virginia, and chief Virginia climatologist), Michael Shellenberger (leading environmentalist and originator of Environmental Progress, also wrote a book criticizing climate alarmism), Mark Mills (the leading energy expert of the Manhattan Institute). Then there a few more who are no longer with us. Foremost there is Fred Seitz (former head of the Rockefeller University and former president

of the National Academy of Science), Fred Singer, (retired professor University of Virginia, designed many of the space-based instruments used for environmental measurements), Freeman Dyson (long time scholar at Princeton Institute of Advanced Studies, probably the greatest physicist who has NOT won a Nobel Prize), and many, many others.

This author certainly has respect for both Kerry Emanuel and James Hansen. They played in the arena as best they could and certainly contributed a lot to their field of endeavor. I certainly do not point to their wrong predictions with any sense of superiority, having made several wrong predictions in my own corner of the scientific world. However unlike those of Emanuel and Hansen, nobody is wasting trillions on mine. Perhaps those making predictions should act with less hubris, and pay a bit more attention to Yogi Berra's timeless wisdom: "Predictions are tough, especially about the future".

## 4. A Brief Tour of $CO_2$ Induced Radiation Forcing in the Atmosphere

To continue we take a look at the physics of $CO_2$ in the atmosphere. If there is one $CO_2$ molecule and radiation coming up from the earth hits it at the right frequency, the molecule absorbs some radiation, gets into an excited state, nearly immediately decays and reradiates, and sends some of that radiation back to earth. If there are many $CO_2$ molecules, the temptation might be to simply add up the heating from each molecule, but that is incorrect. For one thing, no matter how many molecules there are, it can never reradiate in that frequency range more than a black body would at that temperature. In other word, the radiation at that frequency can saturate.

To calculate what is called a $CO_2$ driven radiative forcing, one needs a start date and a final date (or equivalently an initial $CO_2$ concentration and a final concentration). One then calculates the added radiation coming down to earth, in $W/m^2$ from this added concentration. In (IPCC) is shown the IPCC calculation from their Sixth Assessment report. Their Figure 2.10, reproduced as our Fig (8), gives their calculated radiative forcing from 1900 ($CO_2$ concentration of ~280 ppm) to 2020 (~420 ppm); a forcing of ~1.75$W/m^2$.

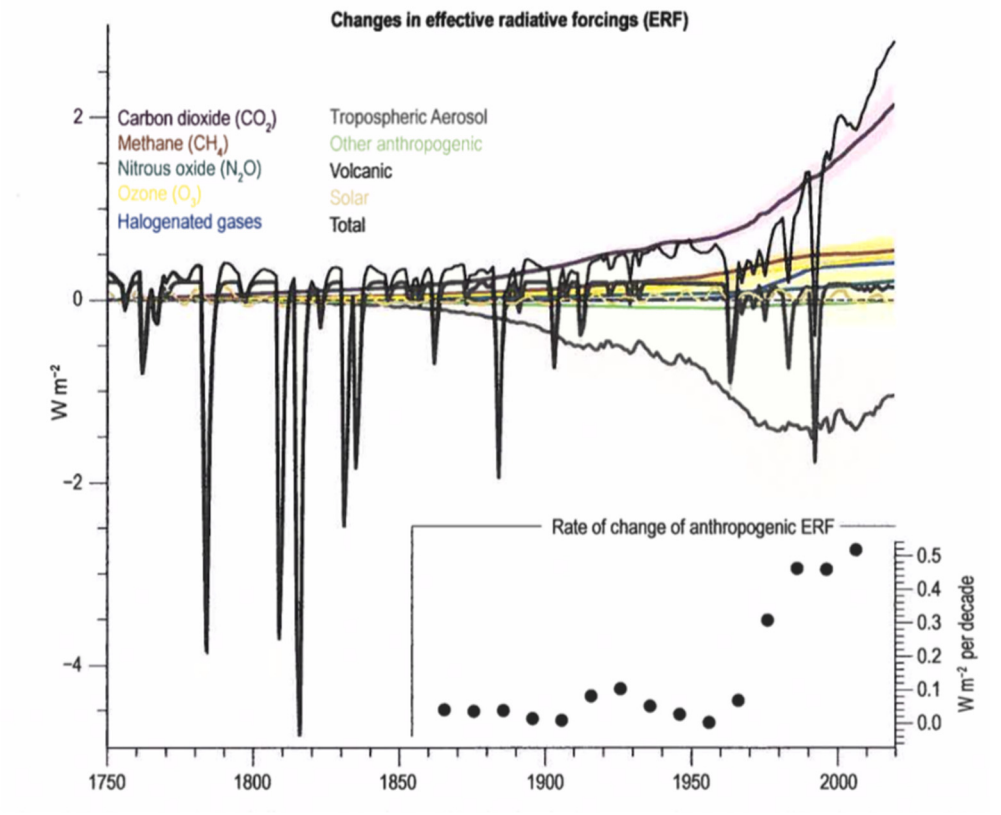



Figure 8. Calculated $CO_2$ and other greenhouse gas forcing as reported in the IPCC 6th assessment report (2021). Their $CO_2$ forcing from 1900 to 2020 is about 1.75 $W/m^2$

Recently, Wijngaarden and Happer (W&H) have made an extremely detailed calculation of the radiation transport considering the 5 most common greenhouse gas atmospheric impurities (Wijngaarden). Their main results are

shown as Fig. (9). The smooth blue curve is the black body radiation of the earth at 287 degrees Kelvin. This is what the earth would radiate back to space if the atmosphere had no effect. The greenhouse gases tend to make the actual curve lower than the black body curve, meaning that the earth is reabsorbing some of its radiation, heating the planet. The green curve is the radiation with all greenhouse gases except $CO_2$ present. The black curve is the radiation with 400 parts per million of $CO_2$, approximately today's concentration. The red curve is the radiation if the $CO_2$ concentration were doubled.

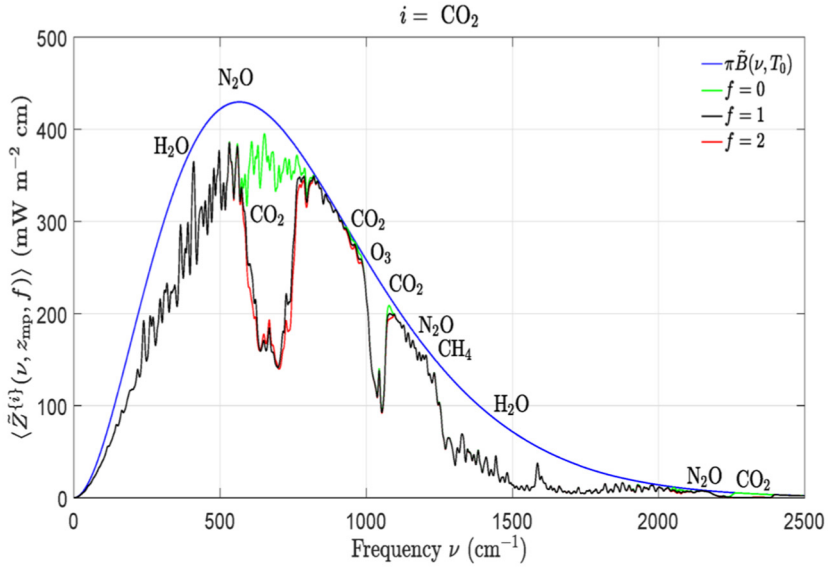



Figure 9. The Planck radiation curve (blue), with all greenhouse gases except $CO_2$ (green), with today's concentration of $CO_2$ (400 ppm, black) and with double today's concentration (800 ppm, red)

W&H find a radiative forcing of ~3 W/m$^2$. The W&H calculation and the IPCC calculations cover different time periods, or equivalently, different initial and final $CO_2$ calculations, so it is difficult to determine the extent to which they agree or disagree. For our purposes here, we will use the W&H calculation, as it is a more detailed one. Among other things W&H developed numerical algorithms allowing them to examine and analyze individually, hundreds of thousands of molecular rotational and vibrational states using only a PC. In any case, the scientists (IPCC and Wijngaarden) are basically on the same page, it is the politicians and media personnel that have wildly different interpretations. Depending on their assumptions, W&H calculate a temperature increase on the earth surface of 1-2$^o$C, depending on their assumptions. Since the radiative forcing of 3 W/m$^2$ is ~ 0.3% of the incident solar radiation, and a 1$^o$K temperature increase is ~ 0.3% of the Kelvin temperature of 300$^O$K, these estimates are reasonably consistent with one another. In fact, Figure 114 of (Lamb) gives his graph predicting that increasing $CO_2$ in the atmosphere from 400-800 parts per million would increase the earth temperature by ~1.5$^o$C, not far off of the W&H estimate.

If the world keeps using fossil fuel at 10 TW, as it does today, this adds about 2 ppm of $CO_2$ to the atmosphere per year. In other words it would take 200 years to double the $CO_2$ concentration and increase the temperature by a degree or two. However long before that, the world hopefully will make a transition to nuclear power, perhaps fueled by fusion breeding (Manheimer 2022 a). In no case is it 'one minute to midnight' (Boris Johnson), nor are we in the 'last chance saloon' (Prince Charles).

However truly the amazing thing is that the forcing as calculated by the IPCC scientists (the believers) and as calculated by W&H (the skeptics) are not that different. The scientists basically agree! In fact, had they calculated the forcing over the same time periods (i.e. same initial and final atmospheric $CO_2$ concentrations), who knows how close their calculations would have been, perhaps they would have gotten very nearly the same result. It is strictly a matter of different predictions from similar results. The IPCC bureaucrats predict that a forcing of 0.3% will cause a calamity. The skeptics predict that a forcing of 0.3% will cause something more like a 0.3% temperature rise on the Kelvin scale, namely 1 to 2$^o$C. To this author, the latter prediction seems much more reasonable.

In fact given the space based temperature measurements of the lower atmosphere over the past ~ 45 years, one can very, very roughly test the effect of the $CO_2$ forcing. Figure 10 is a measurent of this temperature (Spencer 2022) from 1979 ($CO_2$ concentration of ~ 335 ppm) to 2022 (~415ppm), or a increase of 80ppm.

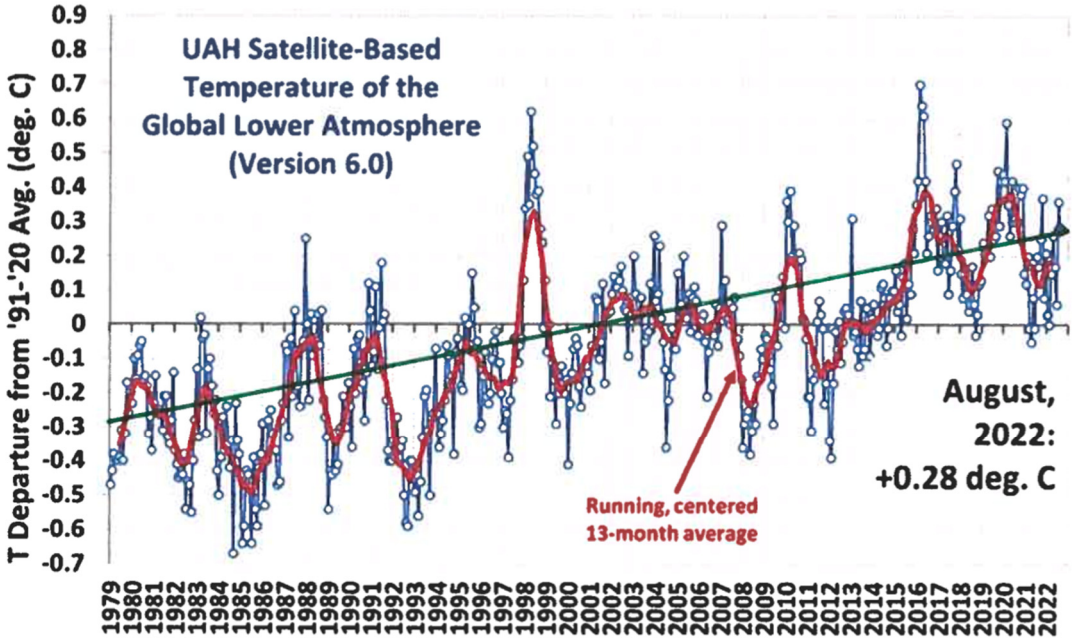



Figure 10. The space based temperature measurement of the lower atmopshere, along with a green line of a rough linear fit, drawn in by the author

Clearly in this period the temperature, averaged over many fluctuations, has increased by ~ 0.6°C, or ~0.2% of the temperature on the Kelvin scale. The IPCC estimated a forcing of 1.75W/m$^2$ with a 140 ppm increase, or ~ 1 W/m$^2$ with an 80 ppm increase, or about a 0.1% increase. W&H estimated their their 0.3% increase in forcing would increase the temperature by ~ 0.3-0.6%, not far off Lamb's estimate. This all seems to hang together.

Of course Figure 10 cannot be taken as confirmation of W&H's estimate of 1-2 degrees. The atmosphere is much too complicated to be described by simply the $CO_2$ content. For instance Figure 11 shows a NOAA (NOAA) graph of the temperature from 1880 to the present, based on many ground based measurement stations. Much of the time of these measurements was before the era of space based measurement, which this author believes is the most accurate. However in this era before space based measurement and before significant $CO_2$ accumulated in the atmosphere, there was still a great deal of variation in temperature. Notice that from 1920 to 1950, when $CO_2$ levels were quite low, there was nearly a 1°C increase in temperature, an increase greater than from 1979 according to Figure 10, where the temperature rise might have been due to $CO_2$. Also notice that from 1979 to the present, the ground based and space based measurements certainly do not follow one another exactly. There is a significant uncertainty even a comparison of one type of measurement to another.

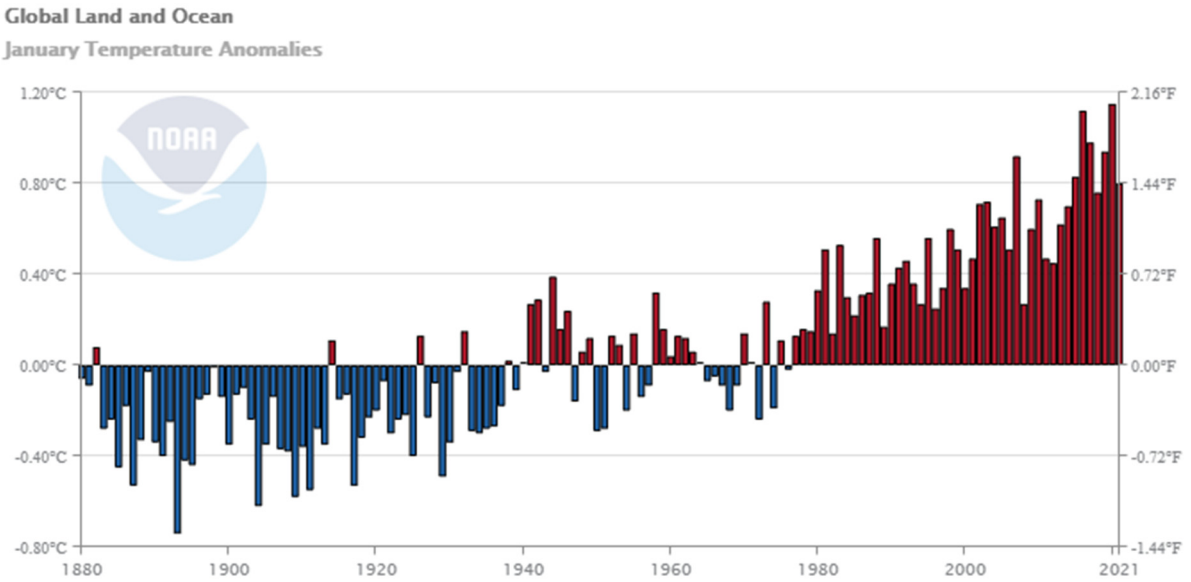



Figure 11. NOAA measurements of world temperture from 1880 to the present, based on ground station measurements from stations around the world

All of this, these theories, and the measurements certainly do not support the assertion of a rapidly approaching climate crisis.

**5. The Climate Change over the Period of Human Civilization**

Let us now consider the temperature record for about 10,000 years, the time of human civilization. When believers say that this or that is a record heat spell, or hurricane, or whatever, they are talking about one particular place, and only during the time official records were kept, perhaps a bit more than a century. However civilization goes way further back than that, and other measurements indicate oscillating hot and cold periods, with many hot periods warmer than today's. Skeptics tend to look over much longer periods of time.

One way of measuring this temperatures in previous eras is with the ratio of $^{18}O$ to $^{16}O$ in the Greenland ice cores. About 0.1% of oxygen on earth is the heavier isotope. Water containing the heavier and lighter oxygen isotopes evaporate at a slightly different rates, a difference dependent on temperature. Hence measuring the isotope ratio as a function of depth in the ice caps (i.e. as a function of year) gives a very good indication of temperature as a function of year. This is not a local Greenland measurement. The snow on Greenland is from ocean evaporation over a large part of the earth south and west of Greenland. It comes from water evaporated from the tropics and midlatitudes and carried by the prevailing westerly winds, and then carried up to the northern latitudes by general circulation. Hence it is an indication of the average temperature over a large patch of earth at those times.

Graphs of this ratio abound in a Google images search. Most are very choppy, but some also average over the rapid time oscillations (Easterbrook, McVetanovic) and normalize the isotope ratio to temperature. One of these is in Figure 12.

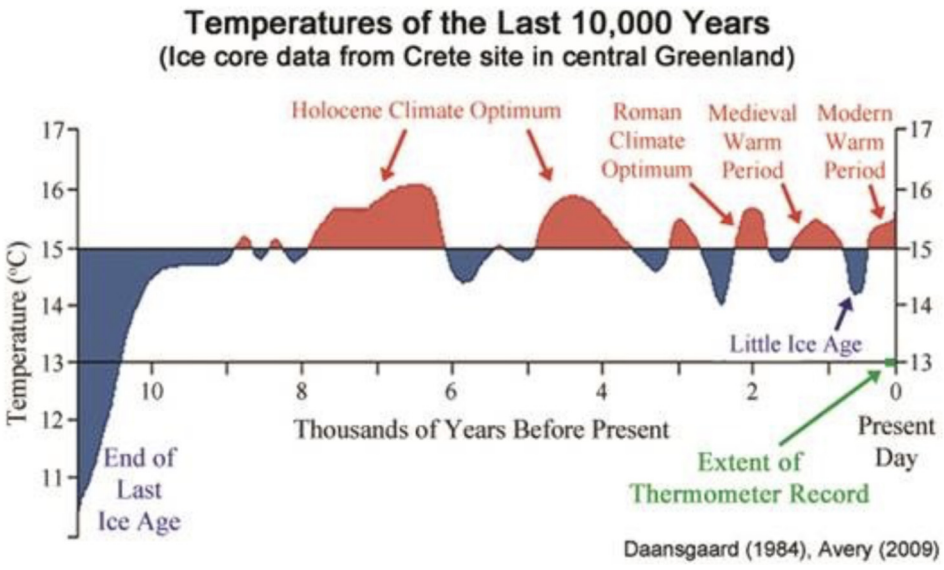



Figure 12. A smoothed plot of average temperature over the last 10,000 years as measured by the Greenland ice caps

Note that this graph was from a *Google* search; a search from the very organization that claimed that they are "announcing a new monetization policy (which)….prohibits ads for, and monetization of, content that contradicts well-established scientific consensus around the existence and causes of climate change. This includes content ….denying that long-term trends show the global climate is warming, and claims denying that greenhouse gas emissions or human activity contribute to climate change".

Google's Figure (12) certainly denies 'that that long-term trends show the global climate is warming'. On the contrary, it shows that for the period human civilization existed on earth, the climate bounced back and forth between warm and cold periods. It is no coincidence that civilization advanced in the warm periods and decayed in the cold periods.

As convincing as Figure 12 is, it is far from the only evidence that these earlier warm periods were warmer than today. Figure 13 is a plot of most of the northern hemisphere showing the northernmost limits of forest 4000 years ago, in the Holocene Climate Optimum, about the time of the biblical exodus; and today (Lamb). Remnants of these northern forests from 4000 years ago are still in place and can be examined today. Again, it is obviously not a local measurement. 4000 years ago these forests extended ~ 200 miles further north than they do today, indicating a considerably warmer climate then. Lamb has several similar examples, for instance remnants of forests at higher altitude on mountains, forests that cannot exist at these altitudes today.

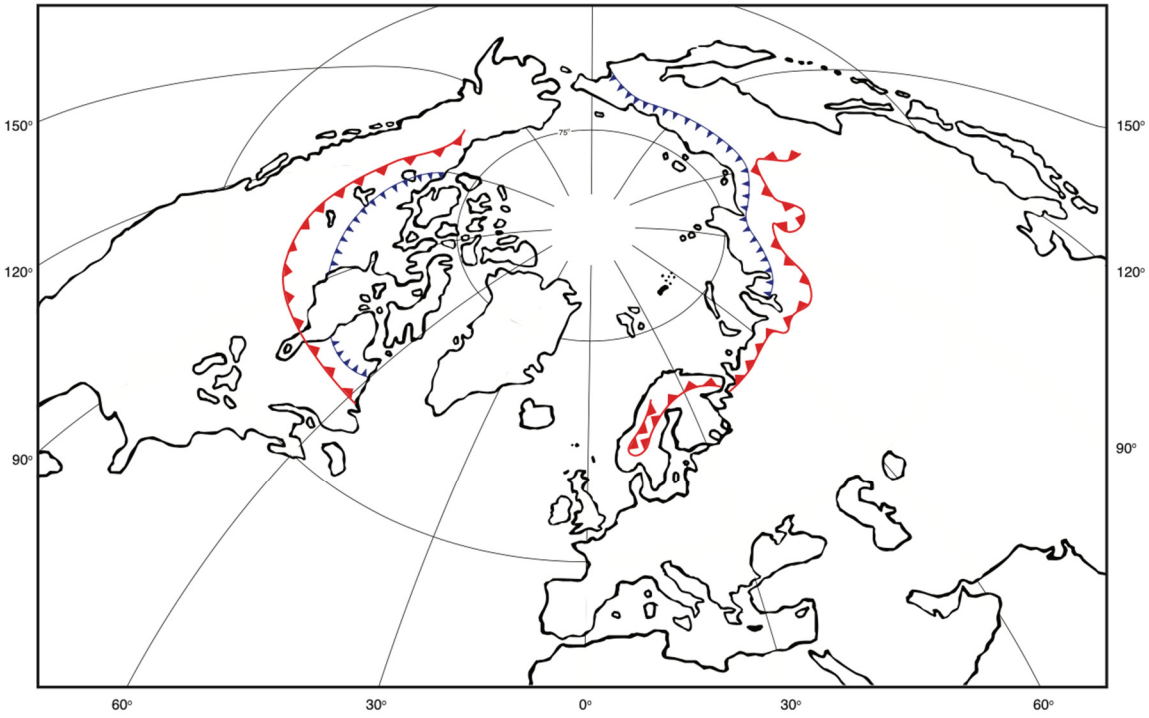



Figure 13. The smaller blue triangles are the limits of northernmost forest 4000 years ago during the Holocene climate optimum; and the larger red triangles, today. Clearly the Holocene climate was sufficiently warmer than today, so that the forests could exist ~ 200 miles further north. Redrawn from Figure 46 of (Lamb)

Another example is the well established fact that that in the Roman Climate Optimum, the Romans had vineyards all over England (Brown), extending up to Hadrian's wall. The map in Figure 14 shows places where Roman pruning hooks, used in vineyards, were excavated in England. Also it shows where the remnants of six Roman vineyards were found. Virtually all the literature on Roman wine in England point out that Britain then was considerably warmer than today. Grapes that survive now in say Quebec or Minnesota today are newer hybrid grapes, bred to thrive in cold climate (Perry).

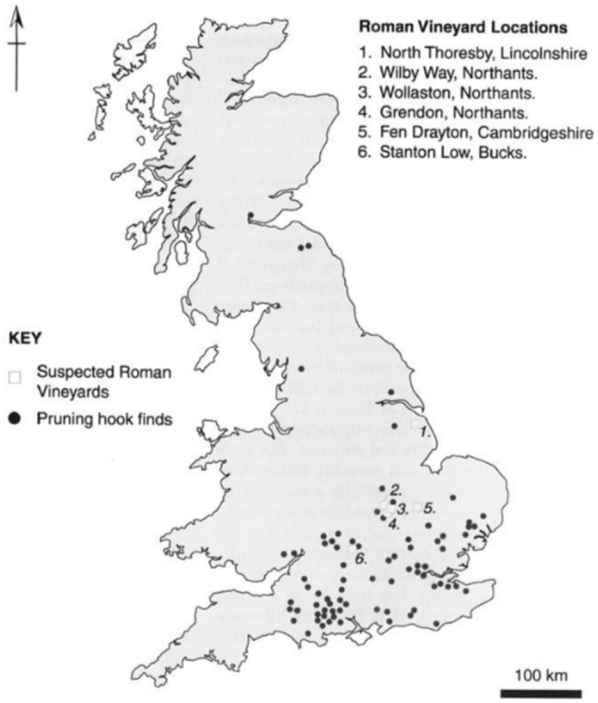



Figure 14. A map of England showing where the Roman's grew wine 2000 years ago, when England had a warmer climate than today

Finally, in the Midieval Warm Period, the Vikings settled Greenland and for hundreds of years, grew barley there, something not possible to do today. Modern explorers found some of this barley in Greenland firmly establishing that it was grown there ~ 1000 years ago (Viking). Figure 15 show recently excavated remnants of 1000 year old barley grain found in in Greenland in 2012. Certainly Greenland today is much too cold for cultivating barley.


Figure 15. Remnants 1000 year old of barley excavated in Greenland in 2012, planted at a time when Greenland was much warmer than today

In other words, there were much warmer periods than today during the course of human civilization, and these during periods civilization flourished; the in between cold periods were generally disastrous. How can learned scientific societies neglect these well established facts?

**6. Climate over a Geological Time Scale**

Finally we take a very brief look at the geological history of temperature and $CO_2$ on earth. Again, graphs abound on the internet, and the further back one goes, the more speculative they become. A typical example is the graph in Figure 16 (Davis). There are other similar plots in a simple internet search.

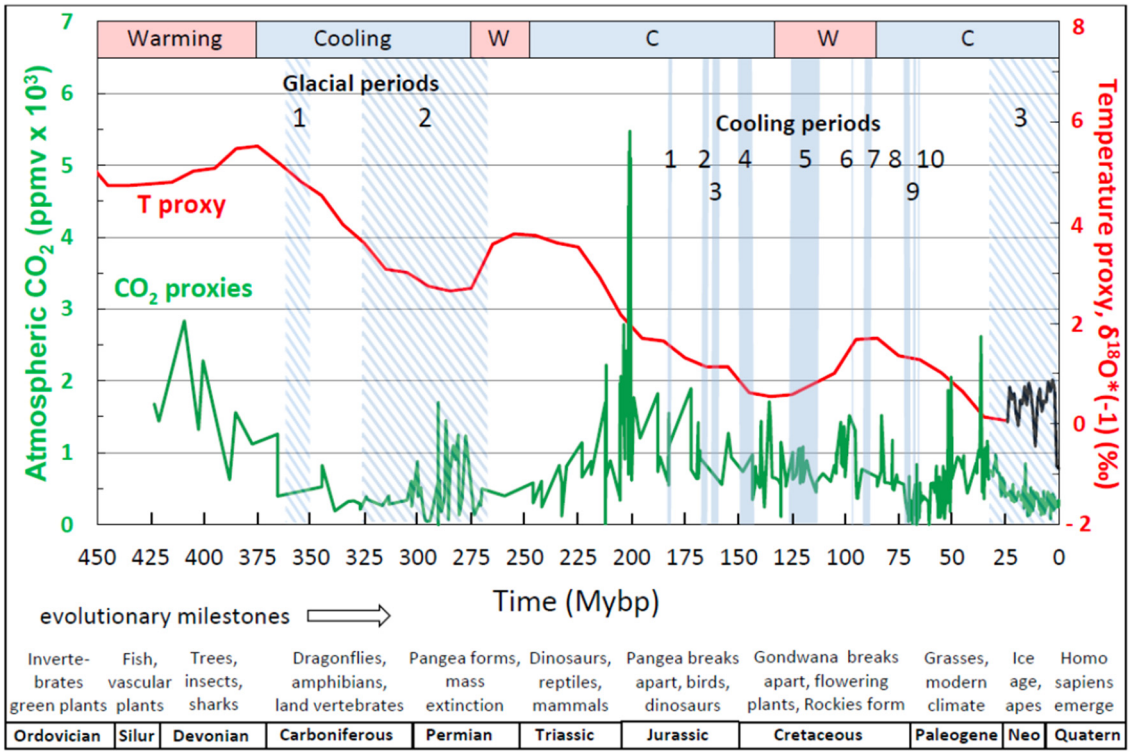



Figure 16. The geological history of $CO_2$ level and temperature proxy for the past 400 million years. $CO_2$ levels now are ~ 400ppm

Davis also showed a scatter plot of temperature versus atmospheric $CO_2$ level reproduced as Figure 17.

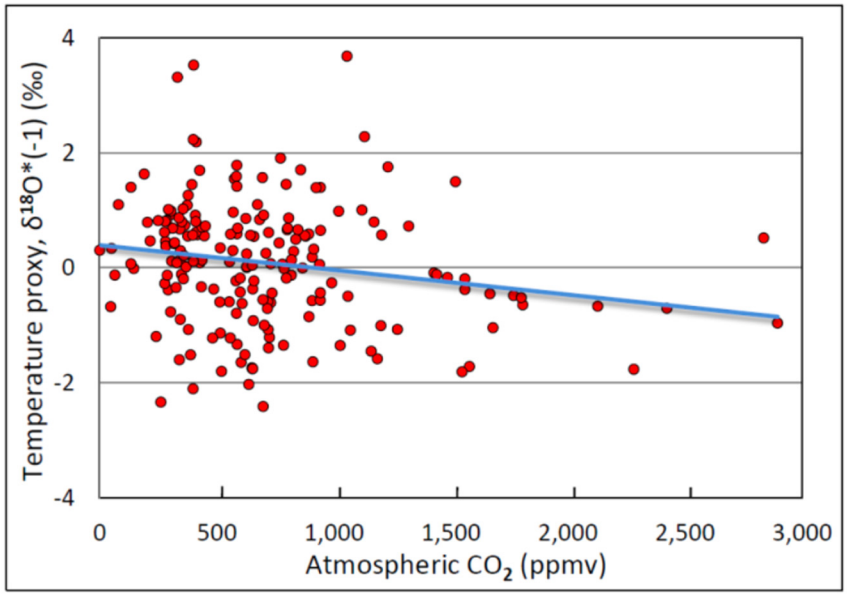



Figure 17. Scatter plot of the correlation of $CO_2$ level with temperature proxy from Davis. Clearly he finds that the temperature and $CO_2$ level are basically uncorrelated. In fact using a least square plot, he find a slight negative correlation

While one may think the geological history has little to do with today, there is one way in which it might be relevant. One of the main fears the climate change believers enunciate is that with the added $CO_2$, the polar caps in Greenland and Antarctica might melt, raising ocean levels by many meters. However the Antarctica polar cap was formed ~ 40 million years ago (Antarctic). Then the earth's temperature was ~8 degrees higher and the $CO_2$ was about double what is is today. The Greenland ice caps were formed ~ 3 million years ago (Chavez),when the earth's temperature was ~ a degree or two warmer than today and the $CO_2$ level was ~ 500ppm. This data does not prove that added $CO_2$ will not melt the ice caps today, but it certainly does not enhance the case it they will.

## 7. What an Internet Search Says about Climate Change

Scientific examination of geological fluid motion or radiation transport are not the only way to debunk the case that we are now at a time of extreme peril due to climate change. There is something any layman can do, anywhere, any time. After, let's say after a strong tornado, a politician (Manheimer 2017) or a media figure (Manheimer 2019) says that these strong tornados are a certain indication of a quickly approaching catastrophe due to climate change. Simply do a Google or Bing search. Almost invariably, it will show that the claim is wildly exaggerated. For example, let's take Dr. Mc Nutt's assertion of a coming world food crisis. Go to Google Images and type in 'graph of world food production' and out will pop many, many graphs, nearly all showing, in different ways, increasing food production. An example is in Figure 18. It shows *per capita* food production, so to get the actual increase in food production, one would have to multiply by the increase in population.

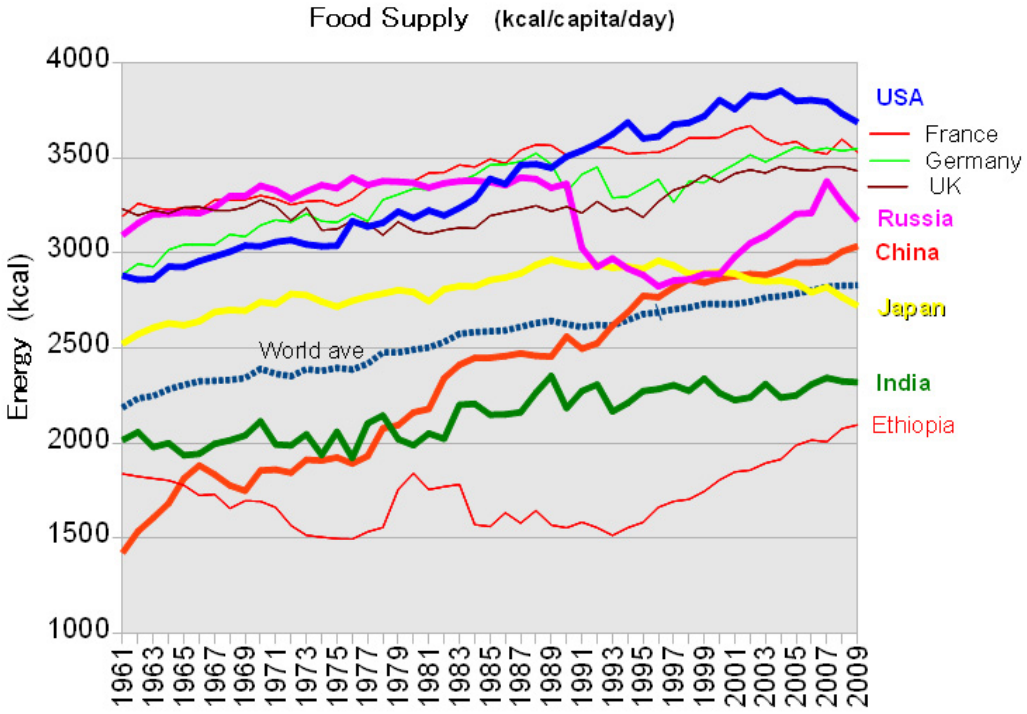



Figure 18. Per capita food production in kcal/(per-capita per day) from 1961 to 2009

Notice that there is a steadily increasing production, with no sign of any 'slowly escalating but long-enduring global threat to food supplies.'

This author's experience is that virtually all of your searches will debunk the claims of imminent catastrophe.

## 8. Conclusions

As a final indication of the lack of confidence that the threat of a climate crisis is real, there was a large international meeting to discuss the climate dilemma in Scotland in November 2021. World leaders, including President Biden and many European leaders attended. However, the leaders of Brazil, Russia, China and Turkey voted with their feet, and did not attend. The leader of India attended but announced that India would not be reducing its CO2 emission until 2070, an absolutely meaningless commitment. These are large, important, technically advanced

countries, containing ~ 40% of the world's population. Actually, the western democracies are not all that different. Typically, some bureaucrat orders that we have to stop or reduce the use of fossil fuel in this way and that. Occasionally the new rule is put to a vote, and the new rule is almost always rejected by the voters. As Yogi Berra put it "If people don't want to come to the ballpark, you can't stop 'em".

Unlike the claims of believers that there is nearly universal (i.e. 97%) agreement on the scientific basis for $CO_2$ levels being a crucial dial which controls the earth's temperature, this author finds that there is a vast literature, and vast amounts of data from extremely qualified scientists disputing this. If in fact 'the science is settled', it seems to be much more settled in the fact that there is no particular correlation between $CO_2$ level and the earth's temperature.

**Acknowledgement**

This work was not supported by any organization, public or private.

**References**

Antarctic Ice Sheet. Retrieved from https://en.wikipedia.org/wiki/Antarctic_ice_sheet

BBVA foundation, tribute to Kerry Emanuel. Retrieved from https://www.frontiersofknowledgeawards-fbbva.es/noticias/the-bbva-foundation-recognizes-kerry-emanuel-for-detecting-and-predicting-the-intensification-of-hurricanes-as-a-consequence-of-climate-change/

Brown, A. G., Meadows, I., Turner, S. D., & Maitingly, D. J. (2001). Roman vineyards in Britain: stratigraphic and palynological data from Wollaston in the Nene Valley, England. *Antiquity, 75*(1), 745-57. https://doi.org/10.1017/S0003598X00089250

Buchholz, K. (2022). *Statistica Climate Change.* Retrieved from https://www.statista.com/chart/19418/divergence-of-ocean-temperatures-from-20th-century-average/

Chavez, H. (n.d.). *How and when did Greenland become covered with ice, Oceanwide expeditions*. Retrieved from https://oceanwide-expeditions.com/blog/how-and-when-did-greenland-become-covered-in-ice#:~:text=Scientists%20studied%20Greenland%20for%20decades,approximately%203%20million%20years%20ago.

Christy, J. (n.d.). *Testimony before congress.* Retrieved from https://docs.house.gov/meetings/SY/SY00/20160202/104399/HHRG-114-SY00-Wstate-ChristyJ-20160202.pdf

Climate change indicators: Arctic sea ice, EPA. Retrieved from https://www.epa.gov/climate-indicators/climate-change-indicators-arctic-sea-ice

$CO_2$coalition.org. Full disclosure, this author is proud to be a member.

Davis, W. J. (2017). The Relationship between Atmospheric Carbon Dioxide Concentration and Global Temperature for the Last 425 Million Years. *Climate, 5*(4), 76. https://doi.org/10.3390/cli5040076

Easterbrook, J. (2016). *Using Patterns of Recurring Climate Cycles to Predict Future Climate Changes, Evidence Based Climate Science* (2nd ed., Chapter 21). Elsevier Inc. https://doi.org/10.1016/B978-0-12-804588-6.00021-5

IPCC Sixth Assessment Report, Chapter 2. Climate Change 2021: The Physical Science Basis – IPCC. Retrieved from https://www.ipcc.ch/report/ar6/wg1/

Koonin, S. E. (2021). *Unsettled, what climate science tells us, what it doesn't, and why it matters*. Ben Bella Books, Dallas.

Lamb, H. H. (1995). *Climate history and the modern world* (2nd ed.). Routledge Publishers, New York and London.

Lomborg, B. (2009). The Climate-Industrial Complex. *Wall Street Journal.*

Manheimer, W. (2017). Original sin, prophets, witches, communists, preschool sex abuse, and climate change. *International Journal of Engineering and Applied Sciences, 4*(7), https://doi.org/10.21474/IJAR01/840

Manheimer, W. (2019). Climate change, on media perceptions and misperceptions, Forum of Physics and Society. *American Physical Societal essay journal.* Retrieved from https://www.aps.org/units/fps/newsletters/201910/climate-change.cfm

Manheimer, W. (2020). Some dilemmas of climate simulations watts up withthtat. Retrieved from https://wattsupwiththat.com/2020/04/27/some-dilemmas-of-climate-simulations/

Manheimer, W. (2022a). Civilization Needs Sustainable Energy – Fusion Breeding May Be Best. *Journal of Sustainable Development, 15*, 98. https://doi.org/10.5539/jsd.v15n2p98

Manheimer, W. (2022b). *Fusion breeding and pure fusion development – perceptions and misperceptions*. Fusion Science and Technology.

Mayer, J., Khairy, K., & Howard, J. (2010). Drawing an elephant with four complex parameters. *Am. J. Phys., 78*, 648. https://doi.org/10.1119/1.3254017

McNutt, Marcia Science Magazine, July 3, 2015, editorial.

McVetanovic. (2016). *Climate Change- A Geological Perspective*. Good earth energy blog. Retrieved from https://www.fortitudeenergyconsultants.rocks/climate-change-a-geological-perspective/

Moore, P. (2021). *Fake invisible catastrophes and threats of doom.* Ecoscience, Amazon.

Mulhern, O. (2020). *A Graphical History of Atmospheric CO2 Levels Over Time.* Retrieved from https://earth.org/data_visualization/a-brief-history-of-co2/

NOAA Graph. Retrieved from https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202113

Perry, L. (n.d.). Cold Climate Grapes, University of Vermont Extension Department of Plant and Soil Science. Retrieved from https://pss.uvm.edu/ppp/articles/grapes.html#:~:text=With%20potential%20for%20growing%20in,www.lincolnpeakvineyard.com

Predictions of climate change gloom and doom. Retrieved from https://www.ehso.com/climatechange-predictions-doom-and-gloom.php

Shellenberger, M. (2020). *Apocalypse never, why environmental alarmism hurts us all*. Harper Collins.

Spencer, R. (2018). *Graph of hurricanes striking the United States.* Retrieved from https://www.drroyspencer.com/2018/09/u-s-major-landfalling-hurricanes-down-50-since-the-1930

Spencer, R. (2022). *Space based measurements of lower atmosphere temperature.* Retrieved from https://www.drroyspencer.com/latest-global-temperatures/

Viking Barley in Greenland, Ancient Foods, February 17, 2012. Retrieved from https://ancientfoods.wordpress.com/2012/02/17/viking-barley-in-greenland/

Vossen, P. (2016). Climate scientists open their black boxes to scrutiny. *Science, 354*(6311), 401. https://doi.org/10.1126/science.354.6311.401

Watts, A. (2012). *James Hansen's climate forecast of 1988: a whopping 150% wrong*. Retrieved from https://wattsupwiththat.com

Wijngaarden, W. A., & Happer, W. (2020). *Dependence of Earth's Thermal Radiation on Five Most Abundant Greenhouse Gases.* Retrieved from https:arXiv.org/pdf/2006.030098.pdf