

What do alarmists say about climate change? What does Google say?

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Abstract

Many have taken the position that the planet is in danger because of carbon dioxide input to the atmosphere caused by burning fossil fuel, they urge us to stop and consider it a moral imperative. They present specific assertions of the harm this added CO₂ in the atmosphere has done or will do. But how can anyone check out these claims of this harm, actual or potential? With the advent of the Internet, it can be as simple as doing a Google (or other search engine) search. This paper does just that. There is a tremendous amount of information available at the click of a button. This data is not at all controversial; it has no political agenda (i.e. there are many charts available, all about the same). This information is used to check out these claims of gloom and doom. The data presented here indicates that these claims are either wildly exaggerated, or else concern processes that have been occurring at about the same rate since long before CO₂ in the atmosphere increased. Furthermore it also emphasizes the fact that the use of fossil fuel has been, and continues to be, the main cornerstone, which has allowed civilization to advance. It has alleviated abject poverty for billions, and there is no substitute for it at this time. End the use of fossil fuel, and this worldwide poverty returns. Thus there is also a strong moral argument for the *use* of fossil fuel. If this use of fossil fuel, at some time in the future, does begin to pose a climate risk, the solution is not simply to end it, but rather to balance competing priorities.

Keywords: climate change data, climate change alarmists, data on glaciers, energy for civilization, climate computer calculations

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SECTION I. INTRODUCTION

In a previous publication (1) in this journal (Standard Scientific Research and Essays) this author examined what seemed to him to be the science, human psychology, and theology involved in the global warming/climate change arguments that the believers and alarmists were making. He compared the arguments to other panics in American history, using arguments involving both theology and psychology. This paper examines only objective measurements and makes no attempt to guess at anyone's motive, psychology or theology.

This author is disturbed that these alarmists are almost always concerned only with ending fossil fuel, but show little or no concern with what would replace it. The replacements they do propose (solar, wind and biofuel) are very unlikely to be sufficient and they show little appreciation for that reality. How will we get the power we need? They are too busy saving the planet; that is someone else's problem! It reminds one of the rhyme from the old Tom Lehrer song about Werner von Braun:

Once rockets go up, who cares where they come down?

That's not my department, says Werner von Braun!

(Incidentally the author's scientific work has largely been on developing an advanced nuclear concept using the best of both nuclear fusion and fission. Here is a link: <http://link.springer.com/article/10.1007/s10894-014-9690-9>. With a well supported effort, it might well be able to deliver large quantities of sustainable, economical, carbon free power by about mid century).

This publication builds to some extent on that earlier one. It is the attempt of an experienced scientist, although not a climate scientist, to navigate through piles of universally available data so as to evaluate the claims of the human induced climate change believers and alarmists. In other words, let's say somebody says the world is about to come to an end because of our use of fossil fuels, and says that such and such did happen, or unless we stop, will happen. Did it? Will it? This paper attempts to answer these simpler questions. The goal here is to list some of the claims the believers and alarmists have been making, and then use an Internet search to find the appropriate data to check these out. The author used Google, and more often Google images to search for a graph for this or that, or to get a graph for that or this prediction of the future. This is something anyone can do, and the whole idea is to present data in a way that anyone can check up on what is presented here.

However there is one word of caution. A Google search is not constant. Let's say one wants to do a Google image search of, for instance, 'graph of frequency of hurricanes'. You do it, get your result, and a half hour later you check it again, but now a whole different bunch of graphs show up. Usually their conclusions are not that different, just the graphs are. Several instances in course of preparing this paper, I had to eliminate a graph that seemed particularly convincing and important, because a day or so later, I could not find it again on Google images. However the graphs presented here did seem to occur regularly in the search, but while on Monday one graph may have been the first entry, on Tuesday, it might have been the 73rd. However I have been as careful as possible, and trust no substantial distortion has occurred. The new data presented here gives both the terms used for the Google or Google image search, and the link to the particular graph shown. The data already presented in Ref. 1, gives only the link. Either way, it is a simple matter for anyone to check up on what is presented here.

This author has concluded, contrary to the doomsday scenarios, that the available data does not indicate anything remotely like a planetary emergency. The good fossil does, far overweighs the bad, assuming there is anything bad about it at all (2).

In Section II we examine some of the claims of the climate change believers and alarmists. These are not unimportant people, i.e presidents, presidential candidates, writers for important scientific journals, large organizations, etc. In Section III we take a look at what likely will happen if we follow their advice. We also look at what did happen when some followed their advice. Much of this appeared in Ref. (1). In Section IV we reexamine the global temperature data from Ref (1); some of it has changed, some may or may not have changed. Section V we examine data regarding intense storms, tornados, glacial retreats, fires, food production and sea level rise. In a nutshell, none of this gives any credence to any alarm as regards human induced climate change. In Section VI we look at computer simulations of the climate future. The author, who has spent a large part of his career on numerical simulations of complex physical processes (but not climate), also relates some of his own experience. While not claiming these climate simulations should be taken with a grain of salt, he does claim that they are not sufficiently convincing to force a change in the lifestyle of billions of people. Section VII draws conclusions.

Section II. The claims of the climate change believers and alarmists

A good place to start is with President Obama. Apparently he sees a good portion of his legacy as his fight against climate change. On the White House web site,

<https://www.whitehouse.gov/climate-change#section-clean-power-plan>,

on the section of climate change are the following statements:

THE CLEAN POWER PLAN

The Clean Power Plan sets achievable standards to reduce carbon dioxide emissions by 32 percent from 2005 levels by 2030. By setting these goals and enabling states to create tailored plans to meet them, the Plan will:

SAVE THE AVERAGE AMERICAN FAMILY:

- Nearly \$85 a year on their energy bills in 2030
 - Save enough energy to power 30 million homes in 2030
- Save consumers \$155 billion from 2020-2030

Also, in the summer of 2015, President Obama was in Alaska inspecting the retreat of glaciers, especially on a boat ride in Resurrection Bay. He pointed out the recent retreat of glaciers, arguing that this is proof of climate change caused by fossil fuel, and argued that government action can somehow prevent this in the future.

Now take a look at a December, 2014 speech of Hillary Clinton, who hopes to succeed him as president, to the league of conservation voters.

“The science of climate change is unforgiving, no matter what the deniers may say. Sea levels are rising; ice caps are melting; storms, droughts and wildfires are wreaking havoc. ... If we act decisively now we can still head off the most catastrophic consequences.”

Another claim is in the July 3, 2015 editorial, by Marcia McNutt (3), editor of Science Magazine, the prestigious magazine of the American Academy for the Advancement of Science (AAAS).

The beyond-two-degree inferno

But now with climate change, we face a slowly escalating but long-enduring global threat to food supplies, health, ecosystem services, and the general viability of the planet to support a population of more than 7 billion people.

The time for debate has ended. Action is urgently needed.To set more aggressive targets, developed nations need to reduce their per-capita fossil fuel emissions even further, and by doing so, create roadmaps for developing nations to leapfrog technologies by installing low-CO₂-emitting energy infrastructure rather than coal-fired power plants as they expand their energy capacity.

Notice that she claims that ‘the time for debate has ended’. Believers often claim that 97% of climate scientists concur that humans are largely responsible for climate change. They get this number by scanning scientific journals that publish on the topic and finding that 97% of the papers do support this view. However there *are* skeptics, many who are prestigious scientists, some in various American national academies, some with endowed chairs in such well-established universities as Princeton and MIT. But in view of her editorial, can anyone believe that a skeptic would be able to publish a skeptical article in *Science*? Does the 97% really have any meaning in view of her statement? The editorial continues

Contributions (INDCs)] from the world's nations are insufficient to avoid warming the entire planet by an average of more than 2°C above the preindustrial level. This is a target viewed as the boundary between climate warming to which we can perhaps adapt and more extreme warming that will be very disruptive to society and the ecosystems on which we depend.

Does this make any sense? Can it even pass the laugh test? The temperature has already warmed by 1°C above the preindustrial level, and there has been no major sign or precursor to any calamity; in fact this warming has probably been beneficial. Is it really likely that *an additional 1°C will be very disruptive to society and the ecosystems on which we depend?* I would think that if a 2°C rise were going to be a calamity, we would all see something pretty bad with a 1°C rise.

But in case anyone still does not get the idea, Dr. McNutt says that skeptics belong in one of the circles of Dante's inferno. Figure 1, is her picture of this.



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.

The previous three authorities are moderate. At least they do not seem to insist upon an immediate or nearly immediate end to the use of fossil fuel. Now let us take a look at a few of the more extreme alarmists.

Another candidate who hopes to succeed President Obama is Bernie Sanders. At the first Democratic presidential debate in October 2015, the last question asked, was what is the biggest national security threat facing the United States. With China building, claiming, and arming islands in the South China Sea; ISIS killing every American it can get its hands on, blowing up airplanes midflight, and invading major western cities; Russia fomenting wars in Eastern Europe right on the border of NATO members; and nuclear proliferation from Pakistan, North Korea, and perhaps Iran, you would think there would be no dearth of possible answers. However to Bernie Sanders, the *greatest* national security threat the United States faces is climate change!

Another organization that advocates a nearly immediate break away from fossil fuels is 350.org, (web site at www.350.org), an organization led by Bill McKibben. Its goal is to reduce the concentration of CO₂ in the atmosphere to 350 parts per million. Considering that it is now over 400, and the CO₂ in the atmosphere lasts for centuries, it is unlikely to achieve this goal any time soon. On their web site, they state:

When world leaders meet in Paris this December, we need a signal that the age of fossil fuels is coming to an end.

So far, however, commitments from world governments just aren’t adding up — even after the two hottest years in history, and at a moment when renewable energy is becoming a revolutionary economic force that could power a just transition away from fossil fuels.

The solutions are obvious: we need to keep at least 80% of fossil fuels in the ground, finance a just transition to 100% renewable energy, and make sure communities on the front lines of climate change have the resources they need to respond to the crisis. This could be a turning point — if we push for it.

To accomplish their goals, they use political pressure and protest marches that have attracted large crowds. But how many come to these protest marches by car, bus, or airplane; instead of by foot, bicycle, or on horseback? How does Bill McKibben get to them? Their emphasis is keeping 80% of fossil fuel in the ground. Since it is likely that 20% of it is already out of the ground, they are demanding a virtually immediate end to the use of fossil fuels.

Another organization advocating a nearly immediate abandonment of coal, oil and natural gas is the Sierra club, whose web site has links to ‘beyond coal’, ‘beyond oil’, and ‘beyond natural gas’, <http://www.sierraclub.org>. Apparently they claim that the world can convert to solar and wind right now, this only being prevented by corrupt coal, oil and gas companies.

Even one of my own parent organizations, the American Institute of Physics seems to support demanding a nearly immediate end to the use of fossil fuels. In the October 2011 issue of its flagship publication, *Physics Today* (4), an article there had the chart shown in Figure 2 for the time schedule for abandonment of fossil fuels under varying assumptions. In all cases, the use of fossil fuel must end in about 20 years.

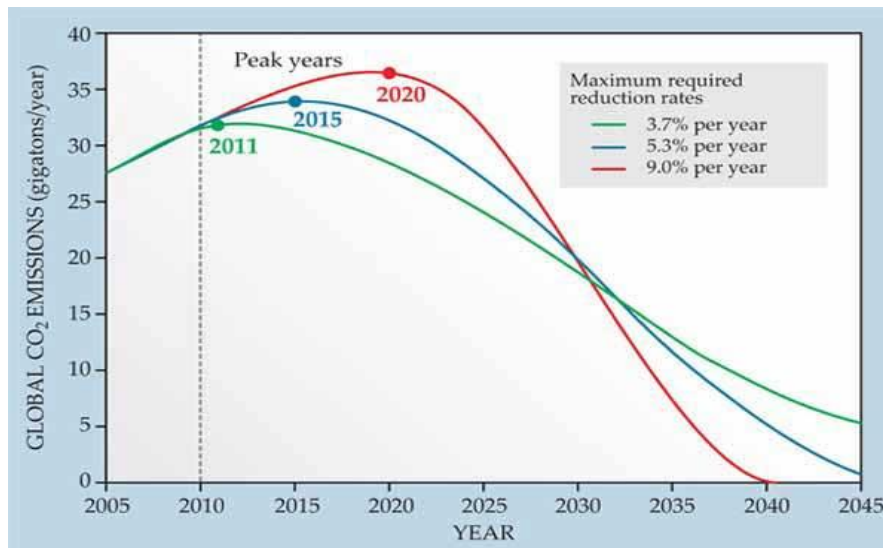
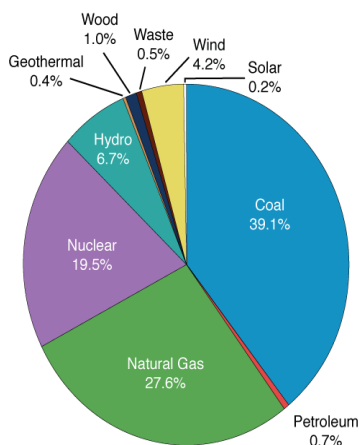


Figure 2. A graph from Ref. (4) showing their various proposed schedules for the phase out of fossil fuels.

Al Gore, the former American vice president has gone one step further. He is not satisfied with a 20-year phase out of fossil fuel. In 2008, he called for completely ending the use of fossil fuels in 10 years, as reported by The Guardian (<http://www.theguardian.com/world/2008/jul/17/algore.energyefficiency>). Namely he called for an end to fossil fuel use by 2018! What about his mansion and private jet?

But what will take their place? Right now, and for at least the next few decades, there is nothing. To see this, information abounds on the Internet. Shown in Figure (3) is a plot of the components of world electricity in 2013, along with the link. After 25 years of heavily subsidized development, wind and solar hardly make a dent. Is there any chance that in the next 5, 10 or 20 years, it can possibly reach 100%? This author says no, despite the claims of 350.org and the Sierra Club and Al Gore.

ELECTRICITY GENERATION, 2013



Source: http://www.eia.gov/totalenergy/data/monthly/pdf/sec7_5.pdf

IER INSTITUTE FOR ENERGY RESEARCH

Figure 3. The fuels used to generate electricity, worldwide in 2013

To see how seriously countries take their electrification programs, also shown in Figure (4) is a plot of coal use, along with the link. All derivatives are positive. The world realizes that taking such extreme measures so quickly would condemn billions to abject poverty. Clearly the world will not listen as we browbeat them to switch from coal to solar to 'save the planet'.

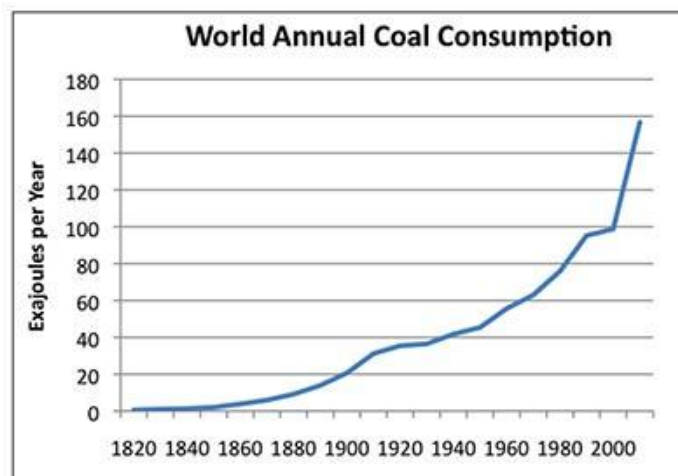


Figure 4. Coal use over the years. It is currently the fastest growing component of the energy mix. Source: <http://theenergycollective.com/gail-tverberg/107831/long-term-tie-between-energy-supply-population-and-economy>

A much better idea would be to encourage the world to switch from coal to natural gas, as Britain has largely done and as the United States is in the process of doing. Natural gas emits about 60% of the CO₂ that coal does per unit energy produced, and it is very economical and reliable. Better still, switch to nuclear, as France has done, and as even Japan is starting to do once again. This produces no global warming. Best of all, continue the increases in energy efficiency and increases in dollars of GDP per Watt of power which has occurred over the past century or so (5).

Section III. What sort of world do the believers and alarmists advocate?

There are all sorts of speculations of what the climate changed world might look like in 100 years. But what will the world look like in 20 years if we stop using carbon based fuel? All we could burn for energy are plants. But the United States as done this before. Until 1850, we burned mostly wood for energy. With a population of 30 million, we deforested half a continent. What about liquid fuel? The only possibility seems to be ethanol (or maybe whale oil?). Currently 1/3 of the American corn crop produces ethanol. This gives the energy of about 1% of the gasoline we use. There certainly will not be enough electricity or ethanol to power very many cars or airplanes. Hence no cars or airline travel for anyone except for society's grand pooh-bahs. Getting more than 20 miles from your house will be a real challenge. Every few years you might be able to take a trip on a crowded, uncomfortable railroad car. Air condition will be gone and space heating in the winter will be greatly reduced. Everyone will be cold all winter, indoors and out, and hot all summer. Getting to the store for food and clothing will be a difficult and time-consuming process. Modern high tech health care will be gone except for the very wealthy, as few people will have the time or energy to make the difficult trip to the doctors or dentists. According to Figure 3, only about 1/3 of electric power will remain; if the anti nuclear activists have their way as well, that 1/3 becomes 1/6.

In any case there will be virtually no electric power except for the very wealthy. Your house might have a small refrigerator and a few low wattage light bulbs. Manufacturing, which takes a lot of power will come to a nearly crashing halt. Look around your house at all the manufactured items; few of them will remain. Walk through any large city – is it really credible that the gigantic buildings there could have been constructed using only wind and solar power? Look at any major port – same for the gigantic ships. There is simply no denying this; civilization takes power and lots of it.

Unlike the speculation of what the climate calamity may be like in 100 years, this is what the world will definitely look like in 5, 10, or 20 if Al Gore, Bernie Sanders, 350.org, the Sierra Club, or Somerville and Hassol (4) have their way.

The indisputable fact is that fossil fuel has alleviated abject poverty for billions. Turn off the oil, coal and natural gas, and the poverty comes roaring back for all but the privileged few. The world would then be as it has been for most of human history, the privileged few living well off of animal and human energy, that is the energy of *other* humans, while the rest of us live in squalor. There is a moral issue here too.

Solving what these alarmists see as the climate problem alone, assuming it is a problem at all (2), is only solving half of humanity's problem, powering civilization is the other half. But solving only half will not help humanity; any more than building half a wall helped the French in 1940.

But what about President Obama’s claim that reducing CO₂ input into the atmosphere by 30% will save the average American family \$85 on their energy bill by 2030 and will save the country \$155 billion between 2020 and 2030. How can we judge this assertion?

A useful data point here is Germany. It has decided to embark on an *energiewende*, or energy transition. It has heavily subsidized solar and wind power; not only that, it has decided to phase out its 17 nuclear reactors. It has succeeded in transitioning about 25-30% of its electrical power to solar and wind, just as President Obama hopes to do in the United States. But despite the large government subsidy, the price of electricity in Germany is now at least triple its price in the United States, and it is rising fast. Shown in Figure 5 is a plot of the price of a kilowatt of electricity in many different countries, along with the link.

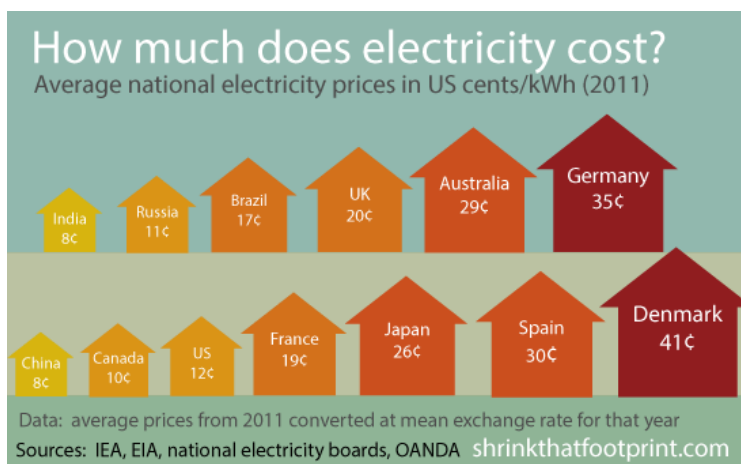


Figure 5. Cost of a kilowatt hour of electric energy in various countries. Source: <http://www.theenergycollective.com/lindsay-wilson/279126/average-electricity-prices-around-world-kwh>

Based on this, the author believes that with President Obama’s plan, it is much more likely that the American consumers will be hit with large price hikes, just like their brethren in Germany.

But even with the *energiewende*, Germany has not especially decreased its carbon input into the atmosphere. It still needs coal fired power for when the sun does not shine, the wind does not blow, or to replace lost nuclear power. Shown in Figure 6 is a plot, along with the link, of per capita carbon input into the atmosphere of a bunch of countries. German carbon input is considerably greater than that of its European neighbors.

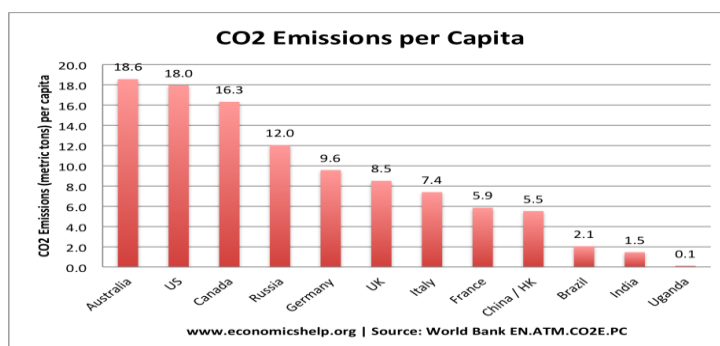


Figure 6. Per capita CO₂ input into the atmosphere for various countries

But Germany is a rich country. If it wants to price itself out of the market, it can do so. What about India, or Mexico, or Nigeria, can they afford their own ‘*energiewende*’? This author’s answer is no. The cost of electricity is a vital consideration for most of the poorer, less developed world, which is struggling hard to provide a decent life for its citizens. If reducing CO₂ in the atmosphere is the goal, isn’t France, which is largely nuclear, a better model for the world than Germany? The French pay about half for a kilowatt-hour, and its per capita CO₂ input into the atmosphere is about 2/3 of Germany’s.

IV. Google data on world temperature

Reference 1 presented Figures (7 and 8 here), graphs of NOAA measured ground-based temperature since about 1880, and NASA space-based temperature measurements since 1979, archived at the University of Alabama Huntsville, along with the links:

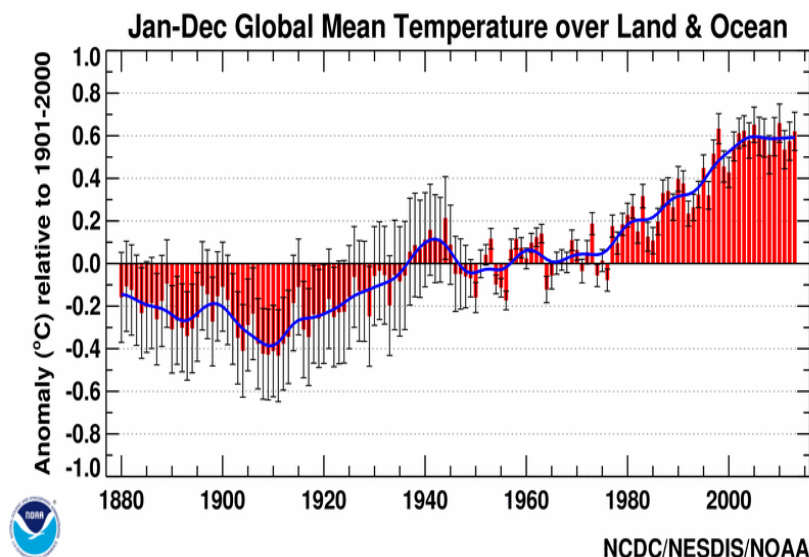
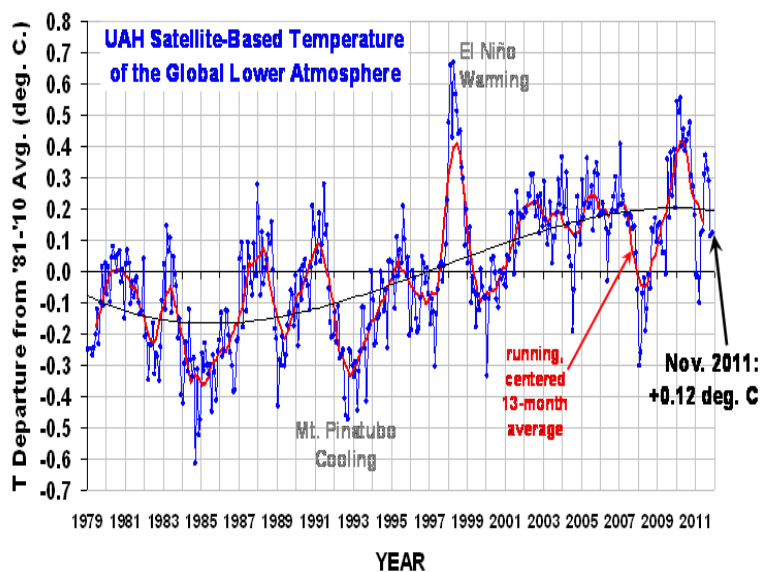


Figure 7. NOAA data on ground based worldwide temperature measurements source: <http://www.carlineconomics.com/archives/303>



[Latest Global Temps « Roy Spencer, PhD](#)

Figure 8: NASA data on space based temperature measurements. Raw data is in blue, a 13 month average showing a rough 5 year oscillation is in red, and a rough 40 year oscillation in black.

The obvious conclusion is that there has been a nearly 20 year hiatus in the increase of the world's ground based temperature measurements, and that the space based measurements have been dominated roughly by a series of oscillations of various periods.

However the situation may have changed. NOAA now claims that there is no pause in global temperature rise. Doing a Google image search of "Pause in global warming" turns up the new graph in Figure (9), along with the link

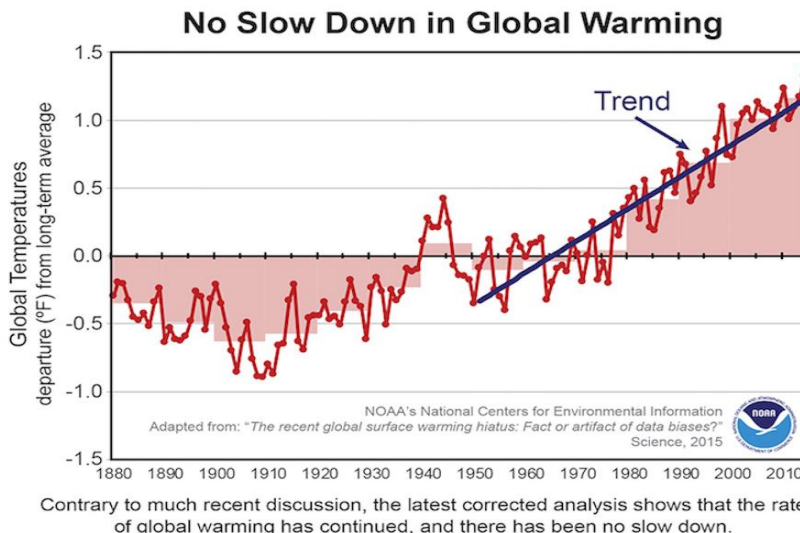


Figure 9. New NOAA graph showing a recent rise in temperature of about 0.17°C per decade. Source: <http://blogs.discovermagazine.com/collideascape/2013/04/08/about-that-global-warming-pause/#.VKHZFoRhNSU>

In attempting to find Figure 8, the author discovered that it is no longer shows up on Google images (or is buried deep below the other images). Instead the University of Alabama at Huntsville has decided to present its data differently. Their data is now presented as in Figure 10.

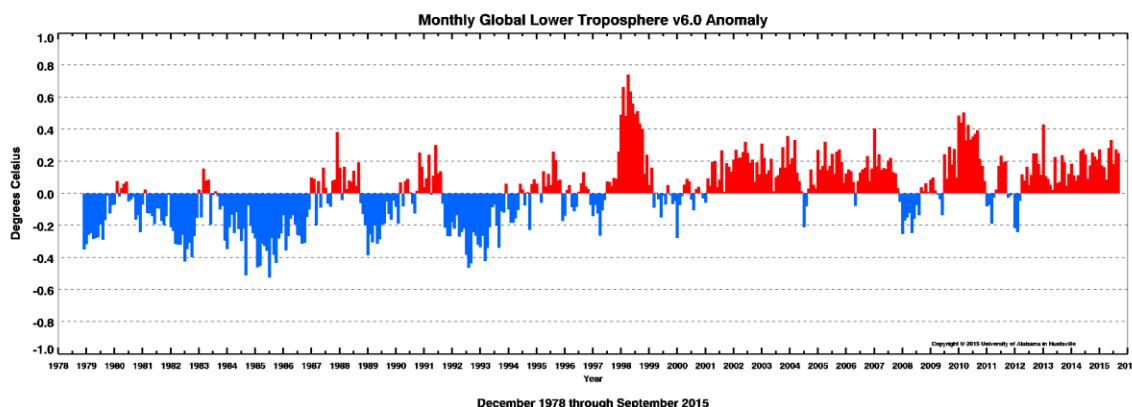


Figure 10. More recent presentation of UAH space based temperature measurements. Their text claims a warming of about 0.11°C per year. Source: <http://nsstc.uah.edu/climate/>

AUTHOR COMMENTS

Note that the space-based temperatures are in Centigrade, while the ground based are in Fahrenheit. The temperatures we quote have all been converted to Centigrade.

While the latest NOAA graph shows a recent temperature rise of about 0.17°C per decade, this same graph also shows a 0.22°C rise per decade between about 1910 and 1945, when CO₂ input into the atmosphere was not an issue.

After nearly 20 years of measurements, NOAA decided that its measurements are incorrect. It suddenly presents new measurements much more in line with the attitude of its political bosses. We have all seen enough cop and court shows on TV to know that when a witness or defendant changes his long held 'story', warning flags go up all over the place. How many times have we heard the TV cop say: "So is this the story you are sticking with?" To this author's mind, NOAA has lost all credibility. The ground based temperature measurements cry out for reexamination by an independent

agency, an agency not wedded to a particular ideology regarding climate change.

NASA seems to have mostly deemphasized the interpretation of space based temperature measurements as a series of oscillations of varying periods. However, a careful examination of Figure 10 shows that it is still consistent with a 5 and 40 year oscillation. But now the emphasis seems to be to confirm a steady rise in temperature. However the rate of rise is about 2/3 of that of the most recent ground based measurements.

Measuring worldwide temperature as a function of time is a complex undertaking.

V. Google data on other aspects of climate change

As we saw in Section II, Hillary Clinton has mentioned that, [The science of climate change is unforgiving, no matter what the deniers may say. Sea levels are rising; ice caps are melting; storms, droughts and wildfires are wreaking havoc...](#) Reference 1 commented on the storms and rising sea levels and presented data on both along with the links. This data is reproduced in Figures 11-13.

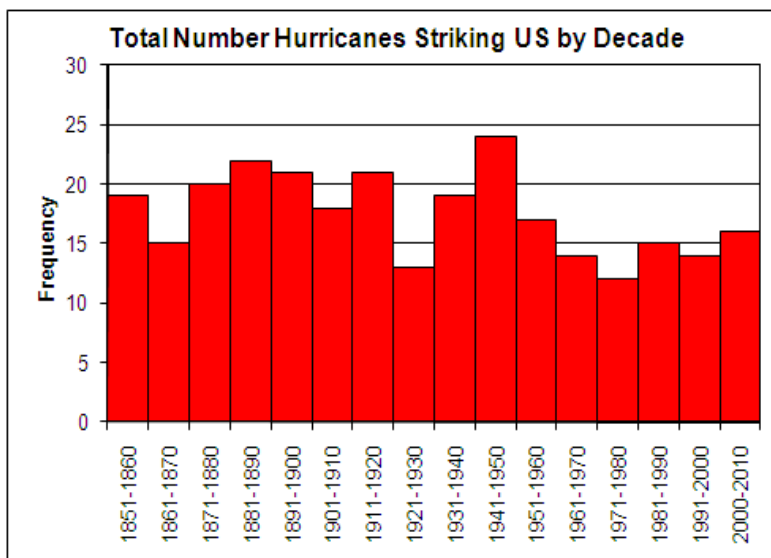


Figure 11. Hurricanes in the United States decade by decade. Source: <http://buzzardsbay.org/hurricane.htm>

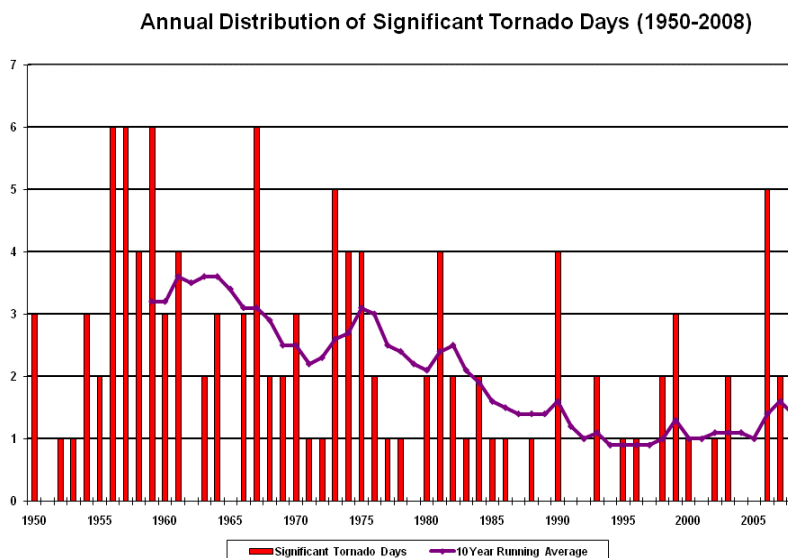


Figure 12: Year by year tornados in the United States. The ten year average shows a decreasing trend. Source: http://www.weather.gov/lx/tor_climatology

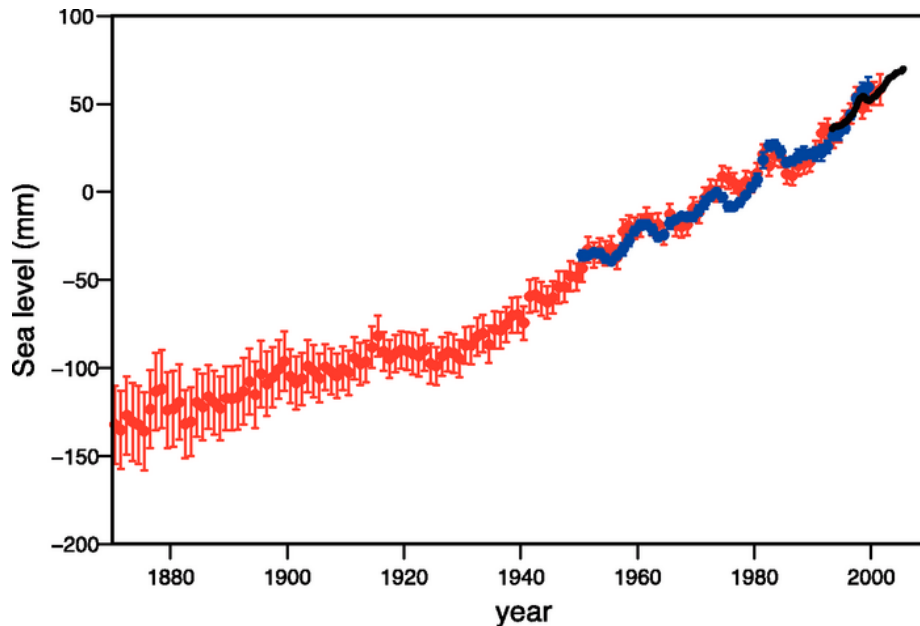


Figure 13. Sea level over the past century. It has been rising at a steady 20 cm per century. https://www.ipcc.ch/publications_and_data/ar4/wg1/en/figure-5-13.html

Clearly neither man made climate change, nor anything else has caused any increase in hurricanes or tornados, in fact their occurrence seems to be gradually *decreasing*. Regarding sea level rise, Figure 13 shows that it has been rising at about 20 cm per century for decades, at least since about 1925 with no recent increase. The earlier decades of this rise clearly cannot be due to man made CO₂ input into the atmosphere. Ms Clinton also said that wildfires are also wreaking havoc. Again, this is easy to check, simply Google image “area burned by wildfires” and lots of graphs will turn up, all about the same. Figure 14 is a graph for the United State; Figure 15, for Canada, along with the links.

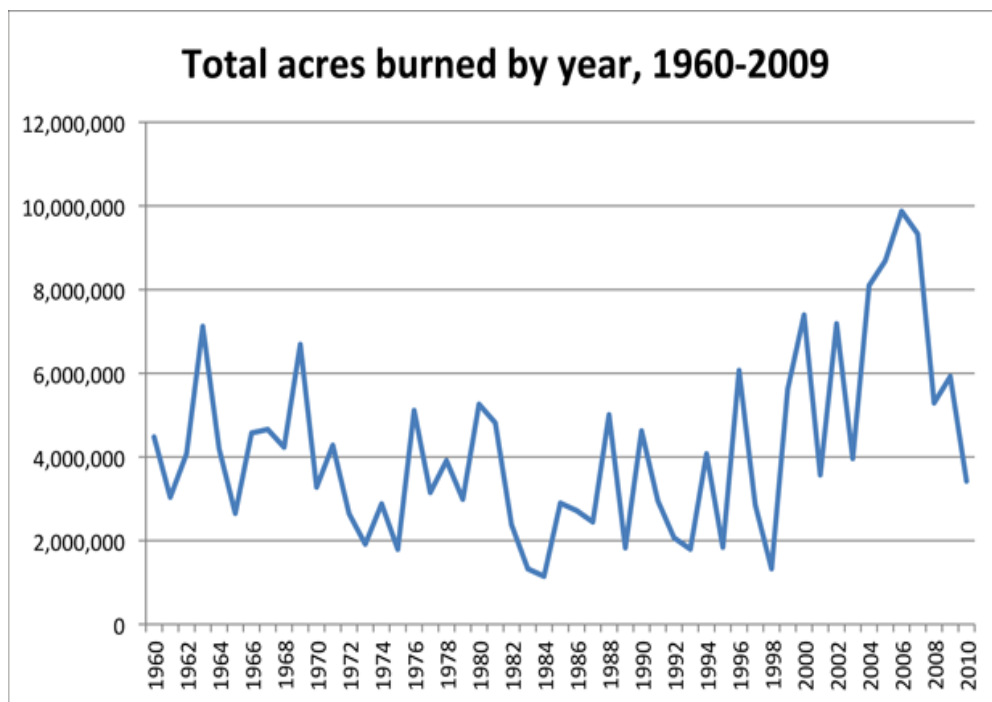


Figure 14. Data on acres burned by wildfires in the United States since 1960. Source: <http://whyfiles.org/2011/wildfire-2/>

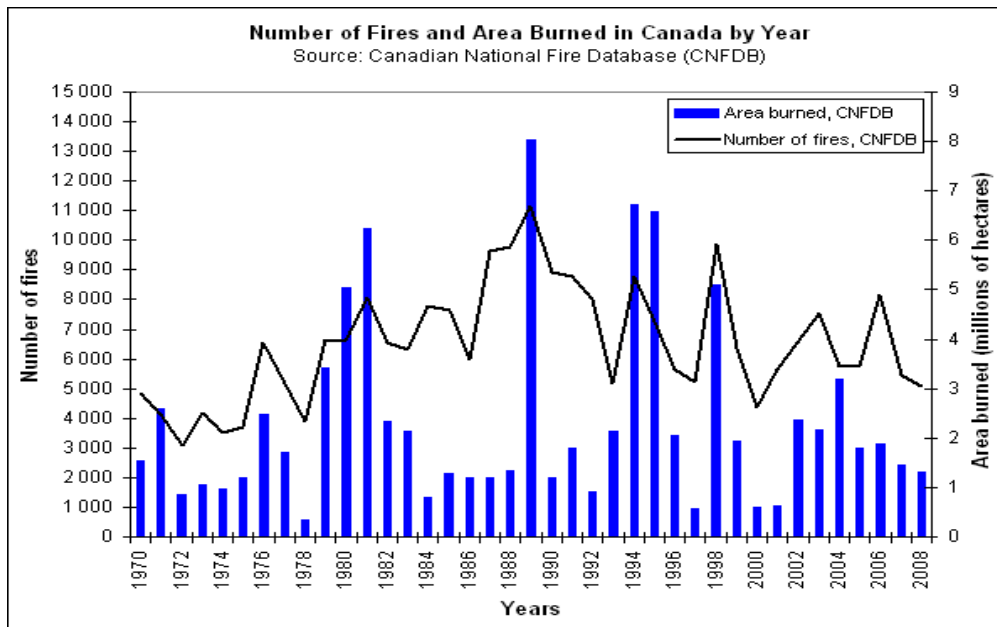
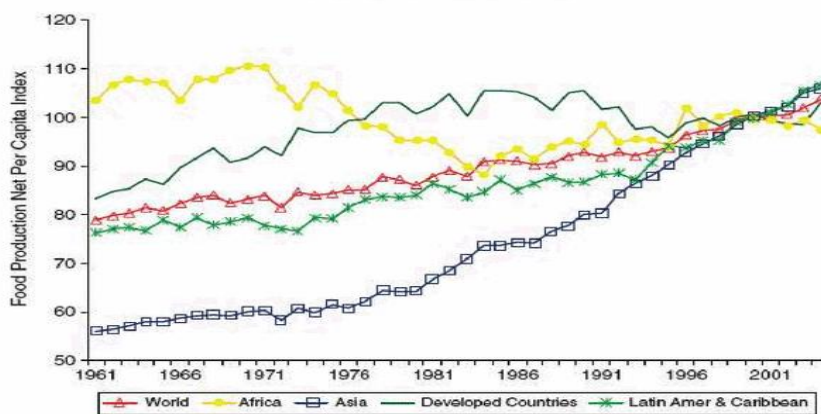


Figure 15. Data on acres burned by wildfires in Canada since 1970. Source: <http://archive.sciencewatch.com/inter/ins/10/10octNRCpt21/>

Clear there has been no increase in wildfires that can be attributed to man made climate change. In the United States, the rate has been about constant except for a peak between about 2004 and 2008. From 1960 to about 1984 there has been a slight dip. Then from 1984 to the present there has been a slight increase up to the 1960 level except for the aforementioned jump from 2004 to 2008. In Canada, these peaks appeared earlier, in the early 1980's and 1990's, but otherwise there has been no upswing in either country.

What about Marcia McNutt (from Section II)? In addition to preemptively rejecting a paper like this for the journal *Science*, and saying that this author belongs in one of the circles of Dante's Inferno, she also said that man made climate change will cause [slowly escalating but long-enduring global threat to food supplies](#). Let's see what the data says. It is simple, just google image "world food production graph". All graphs appearing are about the same. One graph is shown in figure 16.

Per capita food production index 1961-2005



Source: Ugarte 2007

Figure 16. A graph of per capita food production from 1961 to 2005. Source: http://www.zanran.com/q/Per_capita_food_production_index

Clearly worldwide per capita food production is rising, not falling; with a particularly dramatic rise in production in Asia. The red graph shows a gradually increasing per capita food supply worldwide. If there is to be any escalating but long-enduring global threat to food supplies, there is no evidence of it yet.

In addition to his scheme to reduce fossil fuel by ~30% while lowering energy costs, President Obama also noted that glaciers are retreating and accused human induced climate change. The author remarked on this in Reference 1. He did a Google search and found mostly graphs like Figure 17.

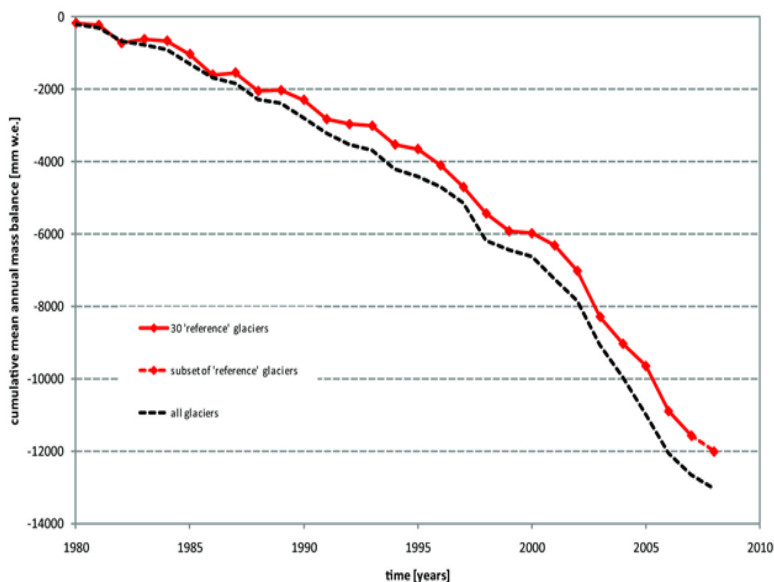
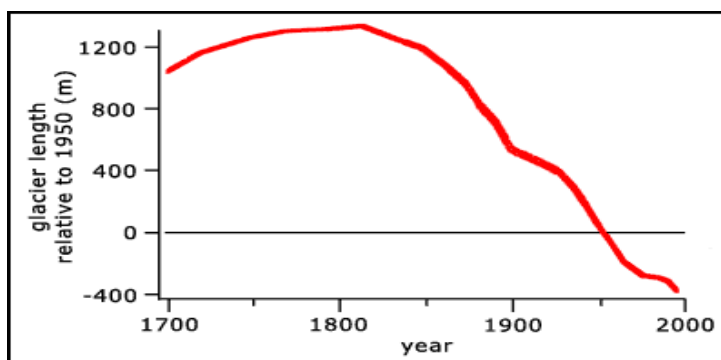


Figure 17. Decrease in glacier mass from 1980 to 2008. Source: http://www.realclimate.org/images/cum_bal_total.jpg

It looked like, if anything the glacier retreat has been accelerating recently. Accordingly, in Reference 1, the author stated:

“As I write this, President Obama is in Alaska pointing out the retreat of glaciers and arguing that it is a sign of global warming, one that we could somehow control. Again, consistent information is available all over the Internet; President Obama is correct. While glaciers have been receding for several hundred years, their retreat has accelerated in the past 50 or 60 years”.

However doing the aforementioned Google image search on “Glacier retreat” the author found no data that looked further back in history. Doing a new Google image search on “graphs of 300 years of glacier retreat” tells a different story. The pages were still dominated by recent history, but earlier history did show up. Figure 18 shows 2 graphs, along with the links, of glacial retreat going back to 1700. The author found no other graphs going back 300 years, which contradicted these. The conclusion then must be that the retreat of glaciers has little or nothing to do with man made climate change.



<http://blog.heartland.org/2014/05/glaciers-and-global-warming/>

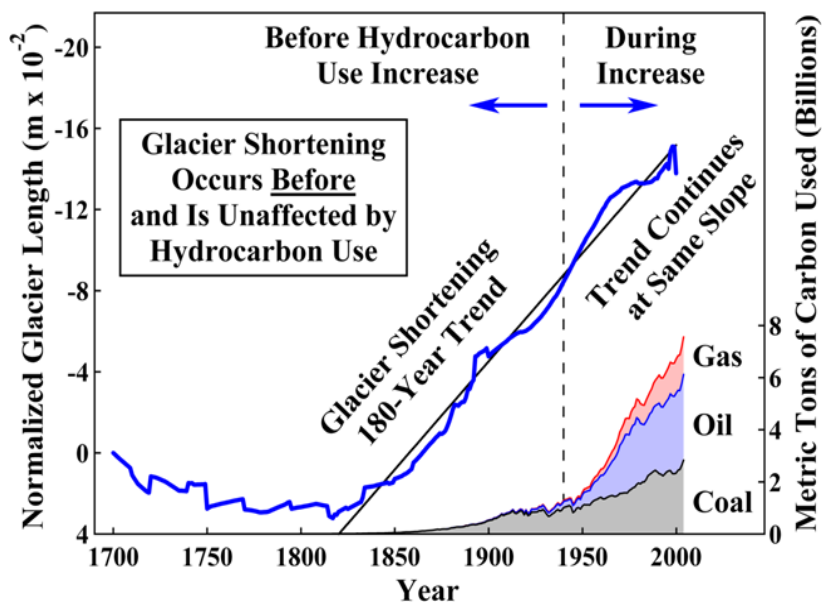


Figure 18. Two graphs showing glacial retreat over about 300 years. Clearly the trend toward melting glaciers has been proceeding at about the same rate since about 1825. Source: <http://joannenova.com.au/2010/04/the-debate-continues-dr-glikson-v-joanne-nova/>

As an example of a single glacier system, there is a great deal of evidence for the yearly retreat of glaciers in Glacier Bay, Alaska, obtained by various voyages there over the years. To see this, simply Google image “graph of glacier history of glacier bay AK”. Figure 19 shows such an annotated map, along with the link.

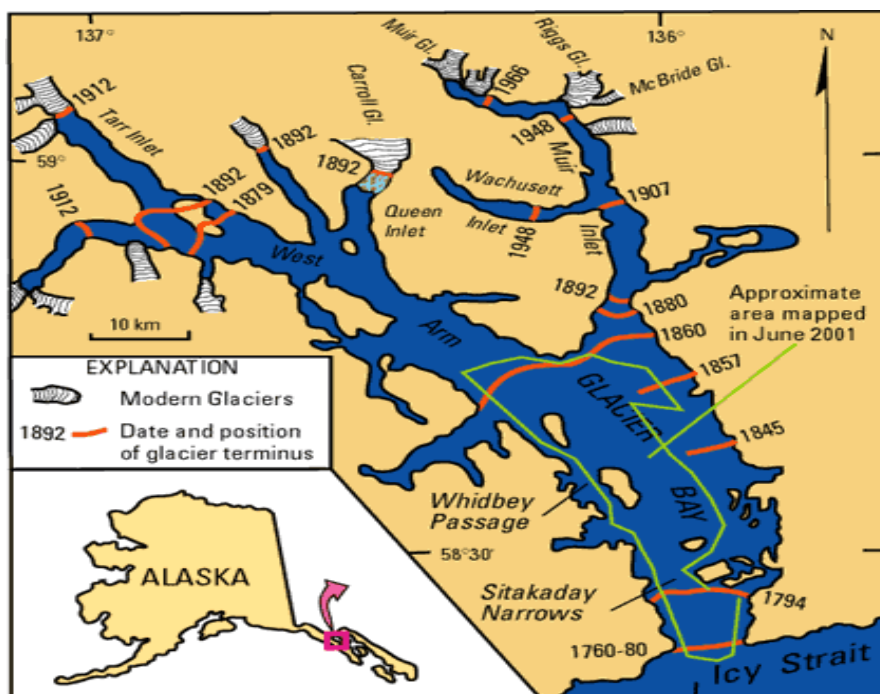


Figure 19. Map of Glacier Bay, Alaska showing the glacier edges at various times in history. The red lines mark the glacier boundaries at the various years shown. Source: <https://stevengoddard.wordpress.com/2013/07/19/alaskas-most-famous-glacier-retreated-eight-feet-per-day-between-1794-and-1897/>

Clearly, most of the glacial retreat in Glacier Bay occurred before 1907, and has little or nothing to do with man made climate change caused by burning fossil fuels.

VI: Google data on computer simulations of climate change

The author has spent a good part of his career developing and using computer simulations to model complex physical processes. Accordingly he now gives a brief explanation of what computer simulations can and cannot do. He sees 3 categories of difficulty in computer simulations.

For the simplest category, let us say that the goal is to develop an antenna system for radar operation at some particular frequency. The equations describing the propagation of the radiation in the vacuum or in air are known, (Maxwell's equations, in a vacuum or using the dielectric constant of air), and the interaction of the radiation with the antenna is also known, (the reflectivity, dielectric constant and conductivity of the antenna material). While well known, the equations are complicated; and the design of any but the simplest antenna would be very difficult without a computer solution of them. Fortunately there are numerous computer codes to handle this problem, codes which are publically available or for sale. They work and are used all the time.

Let us now go up to the next level of difficulty. Let us say that the configuration is well known, but the relevant physics is not. An example is the National Ignition Facility at the Lawrence Livermore National Lab in Livermore California. The lab built a gigantic laser, costing billions, (in a building hundreds of meters in each direction) which produces about a megajoule of light energy in a pulse lasting several nanoseconds. This light is focused on a target about a millimeter in size. The idea is that this light is absorbed by the target, compresses and heats it, so that fusion reactions take place. That is the target becomes a mini hydrogen bomb. LLNL has done many computer calculations of the process and concluded that fusion energy should be ten times the laser light energy. When they did the experiment, they found, to their dismay, that the fusion energy was about 1% of the laser energy on a good day. They missed by a factor of 1000!

What went wrong? The problem is that there is a great deal of physics going on in the target, which is not understood well. For instance there are instabilities of the target driven by the interaction of the laser with the target plasma; instabilities of the fluid implosion, generation of a small number of extremely energetic electrons, generation of a small number of extremely energetic ions, generation of intense magnetic fields, unpredicted mixing of various regions of the target,... Don't get me wrong; LLNL is a first class lab, which hires only the very best scientists and computer engineers. The problem is that the physics is too complex, or as Hillary Clinton would put it, 'unforgiving'.

However there is hope that they can ultimately get it right. Given sufficient resources they can perform many variations of the experiments on a target. Furthermore they can use the information from their experiments to see where they went wrong in their computer simulation. They may or may not succeed in getting fusion, but ultimately it is extremely likely, given sufficient resources, that they will figure out the physics and get their computer simulations to reproduce what is going on. The key is that it is possible (assuming the sponsor does not lose patience and pull the plug) to keep doing experiments and iterate between their experimental results and computer codes and in doing so learn the physics of the process.

Now let us go to the third level of difficulty. There are cases where neither the configuration, nor the basic physics needed for a simulation is well known. Add to that the fact that it is not possible to repeat experiments in any controlled way. When this author first got to NRL, the problem we were all working on was to figure out plasma processes going on in a on a nuclear disturbed upper atmosphere, or High Altitude Nuclear Explosions (HANE). When a nuclear bomb, or multiple nuclear bombs explode in the upper atmosphere, the atmosphere forms ionized plasma. With the strong flows generated there, the behavior is not governed by conventional fluid mechanics, but by the nonlinear behavior of plasma instabilities. The key was to work out a theory of these extremely complicated processes. This theory would then be put into the other computer codes used in the radar, tracking, communication, and electronic warfare etc. simulations. An unclassified version of our conclusions is in Reference 6.

Is our theory correct? Who knows. Will anyone ever do the experiment? Hopefully not. If the experiment is done and the theory does not work, will there be an opportunity to continue to work on it and improve it? Nobody will be alive to do it.

This author makes the case that the climate computer simulations, on which the governments have spent billions, are of this third level of complexity. Also the basic physical system is almost certainly much more complicated than the LLNL laser target configuration. The scientists at Livermore at least know what they are starting out with. First of all, there is there is the fact that these are computer simulations involving the entire earth. To do the simulations, the earth is broken up into a discrete grid, both around the surface and vertically. Since the computer can only handle a fine number of grid points, the points are dozens of miles apart horizontally (perhaps the distance from Washington to New York would be handled by 2 or 3 grid points). But many important atmospheric effects are on a much smaller scale. For instance cities are usually warmer than the surrounding countryside, so the computer calculation would have to somehow approximate

this effect since it occurs on a space scale smaller than the grid spacing. Then there is a great deal of uncertain physics. The effect of clouds is not well understood, and they are parameterized in one way or another. Also what effects do the deep ocean, aerosols and their content and size, cosmic rays, variations in solar radiation, and solar flares have? What impurities are in the atmosphere and where and when were they here or there?

Add to all of this uncertainty, the fact that one does not know very well the conditions, globally, which one needs to initialize the computer calculation, and that it is impossible to do repeated controlled experiments and compare with the calculations. Mix in the fact that the atmospheric fluid is in many places turbulent. Turbulence still is one of the great-unsolved problems of classical physics.

Here is Richard Feynman on the subject: 'Turbulence is the most important unsolved problem of classical physics'.

Here is Horace Lamb, a British hydrodynamicist, about a half century earlier: 'I am an old man now, and when I die and go to heaven there are two matters on which I hope for enlightenment. One is quantum electrodynamics, and the other is the turbulent motion of fluids. And about the former I am rather optimistic.'

With that introduction to what computer simulations can and cannot do reliably, let's Google image: computer calculation of world temperature. Figure 20 is the result of a series of many different computer predictions of of a series of many different calculations in the literature, along with the actual measurements, along with the link.

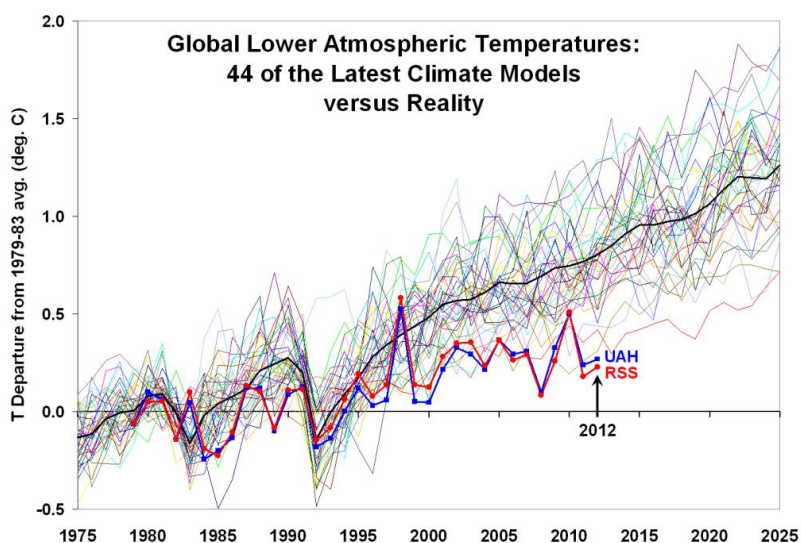


Figure 20. A compendium of many different numerical simulations of predictions of global temperature rise. The actual measurements are also shown as the red and blue solid lines with the dots. Source: <http://www.attivitasolare.com/wp-content/uploads/2015/01/ClimateModelsVsReality-1024x768.png>

All of the calculations shown in Figure 20 show more temperature rise than were measured from 1975 to 2012 (i.e. the present). Perhaps the believers and alarmists would say this makes their case; all calculations show warming; none show cooling. To this author, the wide variation emphasizes the fact that the physics and knowledge underlying the simulations is itself uncertain, the computer grid is likely too coarse and could miss many important effects, and there is no capability to do multiple controlled experiments and compare with simulation. To this author, Figure 20 makes the case that climate computer simulations have a long way to go before one can base public policy on them, especially public policy that would have a major effect on the lifestyle of billions of people.

VII: CONCLUSIONS

So where are we now? Ground based temperature measurements show that the temperature has increased by about one degree centigrade in the past century. Perhaps there has been a recent 20-year pause in the warming, perhaps not. Spaces based measurements show a lesser increase, and perhaps show instead an oscillatory behavior. It is not at all clear to what extent any increase was caused by human intervention in the climate system, maybe none of it, maybe all of it, most likely some of it. All other data contradicts the assertions of the believers and alarmists of imminent gloom

and doom, caused by additional atmospheric CO₂. At this point, the computer simulations used to predict the future, cannot even predict the present.

So the question is why is there such a forced attempt by so many influential people to switch to solar or wind power? Why force such a gigantic lifestyle disruption for billions of people based on such scanty evidence? A switch of this magnitude would be extremely expensive and disruptive for the richer parts of the world, and would be a crushing setback for the poorer parts, which are just beginning to get on their feet, but still have a very long way to go before they can enjoy a reasonably affluent life style.

Reference 1 gives one possible speculation, by the author, as to the motivation and convictions of the believers and alarmists. But whatever their motive, as far as this author is able to discern from examining readily available data, there is no reason to panic. Global warming at some point may be a serious concern, but there is no planetary emergency. The fossil fuel, which they wish to eliminate or greatly reduce has lifted billions out of abject poverty, and has the possibility of lifting up billions more. When a substitute energy source becomes available, at about the same quantity and price as fossil fuel, one can reasonably choose to eliminate or reduce fossil fuels; but not until then.

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