Foreword

The Royal Bank of Canada should immediately pull their support for the Goodside document. The authors' technical grasp of climate change science is very disappointing at best. My original plan was to go through the document systematically and comment on the science that the authors' have presented. Sadly, there is very little science in the document since science requires empirical data. The authors' empirical data, one graph that shows the over-homogenized (i.e.: over manipulated) NASA-GISS surface data Modern Temperature Record (MTR, 1850 to the Present) temperature estimates and one graph that shows the atmospheric CO_2 concentration estimates extracted from the Antarctic Ice Cores with the modern-day measurements superimposed on the end. That data is fine, but as you will see, it is not a representative cross-section of the available data. CO_2 concentration and temperature also needs to be presented on consistent time scales or the presentation becomes totally meaningless and devoid of any context.

The climate system is extremely complex and is subject to a lot more than just the simplistic, unscientific Catastrophic Anthropogenic Global Warming (CAGW) alarmist CO_2 Narrative. Natural forcings (primarily solar and solar related forcings (ocean cycles, cosmic ray flux, etc., etc.)) have driven the climate for hundreds of millions/billions of years, played major roles throughout the MTR and will continue to dominate the climate in the future despite the IPCC's declaration that the natural forcings are virtually zero. The natural forcings are visible throughout the historical data (on many different time scales). What you do not see is evidence of CO_2 driving the climate. Very simply, there is no empirical CO_2/Temperature dataset (a basic scientific requirement) that shows CO_2 driving the climate on any statistically significant horizontal time scale.

The whole CAGW alarmist Narrative was highly dependent (almost exclusively) on their computer models since they do not possess the requisite empirical data. Their models, self admittedly, run too hot, the "dangerous" CO_2 emissions scenarios (like RCP8.5) have been, self admittedly, declared implausible and the economic consequences (supply disruptions, accelerating inflation, soaring energy prices, dangerous energy shortages, etc.) of switching from reliable, cheap energy sources to unreliable, expensive renewable alternatives are playing out already in Europe, China, North America, etc. As we move further into the Northern Hemisphere winter, those issues will just compound upon themselves and become deadly. Throwing trillions of dollars at an ideological problem (with no scientific (i.e.: empirical) proof) when we are struggling through one of the worst financial disasters in mankind's history is just stupid. There are many real problems being ignored that need to be addressed.

My general approach has always been focussed on obtaining the original data, presenting that data and then offering my analysis/opinions. Ultimately, the reader needs to focus on the data and come to their own conclusions. That would include the Royal Bank of Canada. Please read the review with a critical, but open mind. These unnecessary, ideological green initiatives are pushing Western Civilization towards economic suicide and much lower standards of living. If the Royal Bank of Canada truly believes in the future of Canada, now is the time to step up, speak out and defend this once great country. Conversely, your silence will speak volumes. Review the data, think for yourself and do what is right.

Goodside – Learning About Climate Change - Review (Link)

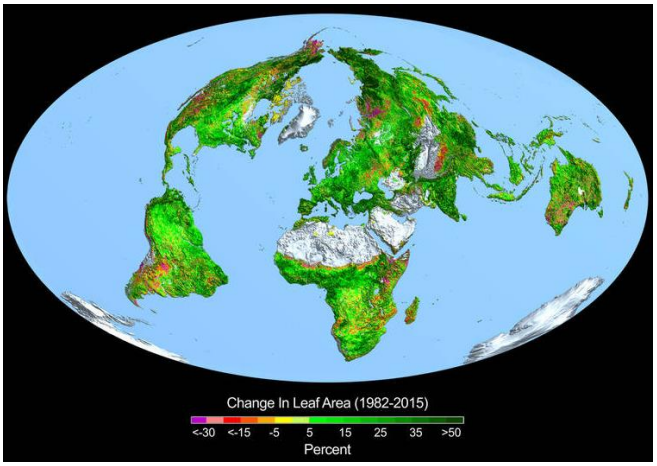
I was asked to review this Royal Bank of Canada (RBC) sponsored document. On a quick brush, I could see that this was the usual Catastrophic Anthropogenic Global Warming (CAGW) alarmist fluff. But to be fair I will go through the document in detail and lay out the misconceptions these journalists (not climate scientists) have with respect to climate change. If the authors are technically qualified, they have made many statements that are outright lies, misleading and/or subject to omission. If they are just regurgitating the CAGW alarmist Narrative, that is their right, but ultimately it reflects poorly on RBC. Promoting this document without a proper technical review is sloppy and reeks of virtual signalling. Not virtues I look for in a financial institution. You (RBC) are also being blind to the very real climate change problems that are just around the corner (more on that later). Let's get started on the first chapter.

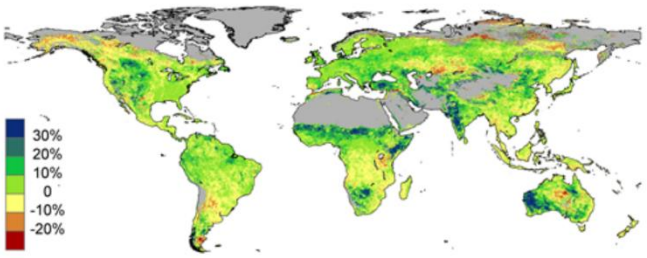
Chapter 1 - Give It to Me Straight: What Is Climate Change?

The authors start off great with the first paragraph. Any discussion on the subject is highly dependent on the terms used and their definitions. Keep in mind that the term definitions cannot change as the discussion progresses.

Photo by Parsing Eye on Unsplash

Carbon Dioxide Fertilization Greening Earth, Study Finds | NASA

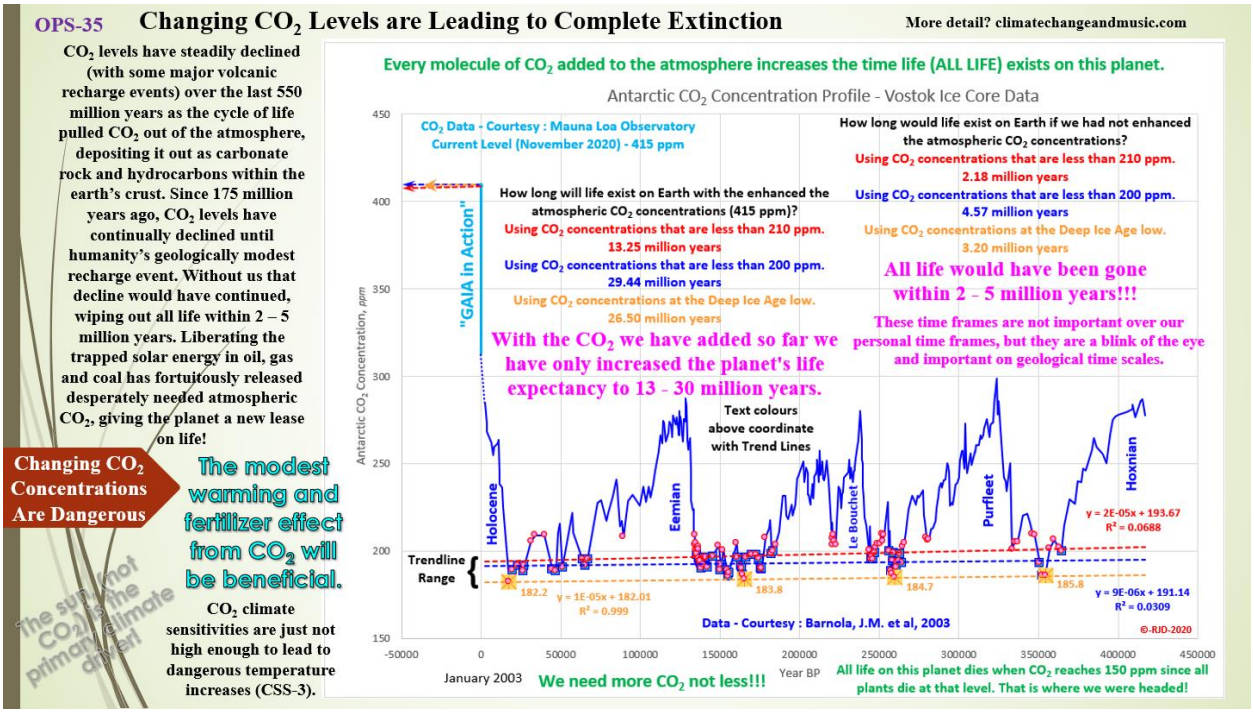




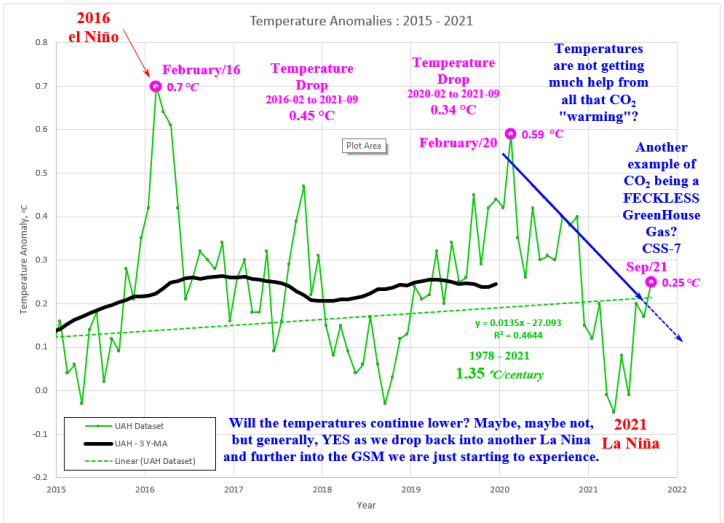
Deserts 'greening' from rising CO2 - CSIRO

Before moving to the text portion of the document, the first image (above) needs to be addressed. This picture is obviously chosen to invoke the dystopian future we face if we do not immediately stop our CO_2 emissions. Where is the picture taken, how much area is affected, what is the story behind the tree's status, is this an abandoned irrigation situation, etc.? Ultimately those questions do not matter because you cannot get more localized than a single picture. A more representative picture of CO_2's global influence would have been the greening maps produced by CSIRO (1982 to 2010) or NASA (1982 to 2015). Not much desertification happening there. CO_2 is plant fertilizer. Without CO_2, plants die. Higher atmospheric CO_2 levels also help plants survive through drought conditions because they need

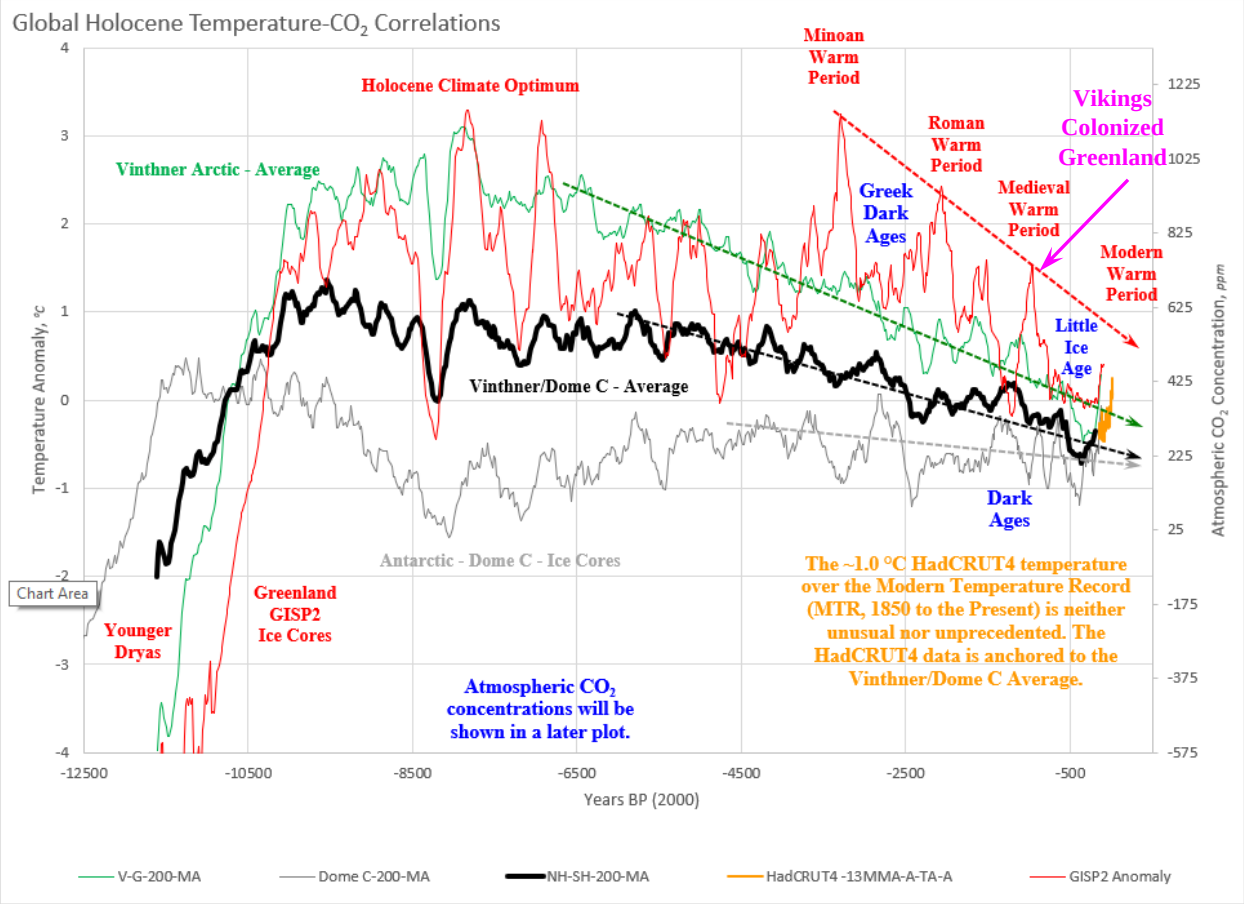
fewer stomata (meaning they retain more water while they are taking in the CO_2). Here is another bigger picture view on CO_2 that the CAGW alarmist crowd choose to ignore. As I said earlier, without CO_2, plants die. We were close to that extinction level (150 ppm) during the last deep ice age. We bottomed out at 180 ppm. As shown in the image below (OPS-35 – CO_2 Will Kill the Planet), the entire planet (all life) was headed towards extinction until we started raising CO_2 levels. The more clean CO_2 that is released into the atmosphere, the longer life will survive on this planet.



Back to the text. The authors' definition of Climate Change ("refers to long-term shifts in weather patterns") is quite correct. That means that activists cannot use a slogan like "We need to fight Climate Change immediately". That slogan is completely non-descriptive (if you conform to the authors' definition). Does this document conform to their own definition? We will find out as we go through this process. The global temperature has dropped almost 0.45 °C since the peak in 2016 (despite continually rising CO_2). Is that the Climate Change "we" are fighting? The University of Alabama, Huntsville (UAH) satellite temperature plot to the left shows that temperatures fluctuate significantly despite a continually rising CO_2 concentration over this (admittedly short) period. Obviously, there is a lot more going on in the climate than just CO_2. More on that



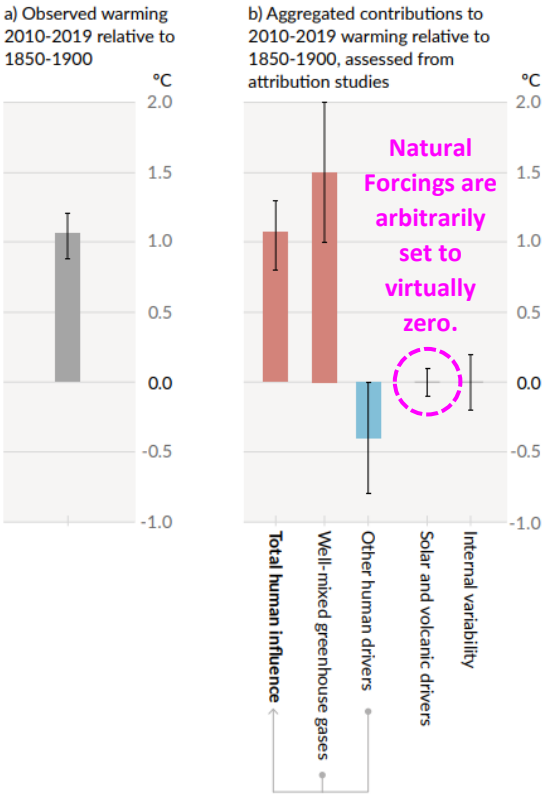
topic later. The global temperatures have also dropped 2 – 3 °C from the civilization boosting warmth of the Holocene Climate Optimum. Is that the Climate Change "we" are fighting? The Holocene temperatures fluctuated significantly over this period despite a virtually flat pre-MTR CO_2 concentration (which will be shown later in a more detailed discussion). What the plot does show is that global temperatures have been declining for thousands of years. Human civilizations



thrived in the warm periods and suffered in the cool periods. The Chinese Dynasties came and went with those temperature fluctuations. That information can be found in my post CSS-9 – What is the Ideal Global Temperature). Overall, the MTR temperature increase is neither unusual nor unprecedented. Makes you wonder why CAGW alarmists fear some minor warming. Ultimately the minor warming that CO_2 provides will be beneficial.

- ***Yes, the climate has changed naturally over the past 650,000 years, fluctuating between ice ages and warmer periods.***

This second statement is also correct, but I suspect that we will see few if any references to natural temperature changes throughout the rest of this document. The changes over time periods of hundreds of thousands of years are dominated by the longer-term Milankovitch Cycles (reviewed in my post CSS-4 – Holocene Logic – Milankovitch Cycles). Shorter natural cycles can be seen in the Holocene plot above, but there are still natural cycles that can be seen over much shorter periods like the MTR. Natural forcings did not shutdown over the MTR just because the IPCC



computer programmers decreed it to be so. Natural forcings were active pre-MTR, they were active throughout the MTR and will continue to be active in the future. The plot to the left is from the IPCC's 2021 AR6 Summary for Policymakers Report. Some additional discussion on the forcing allocations will be included later when computer programming is addressed.

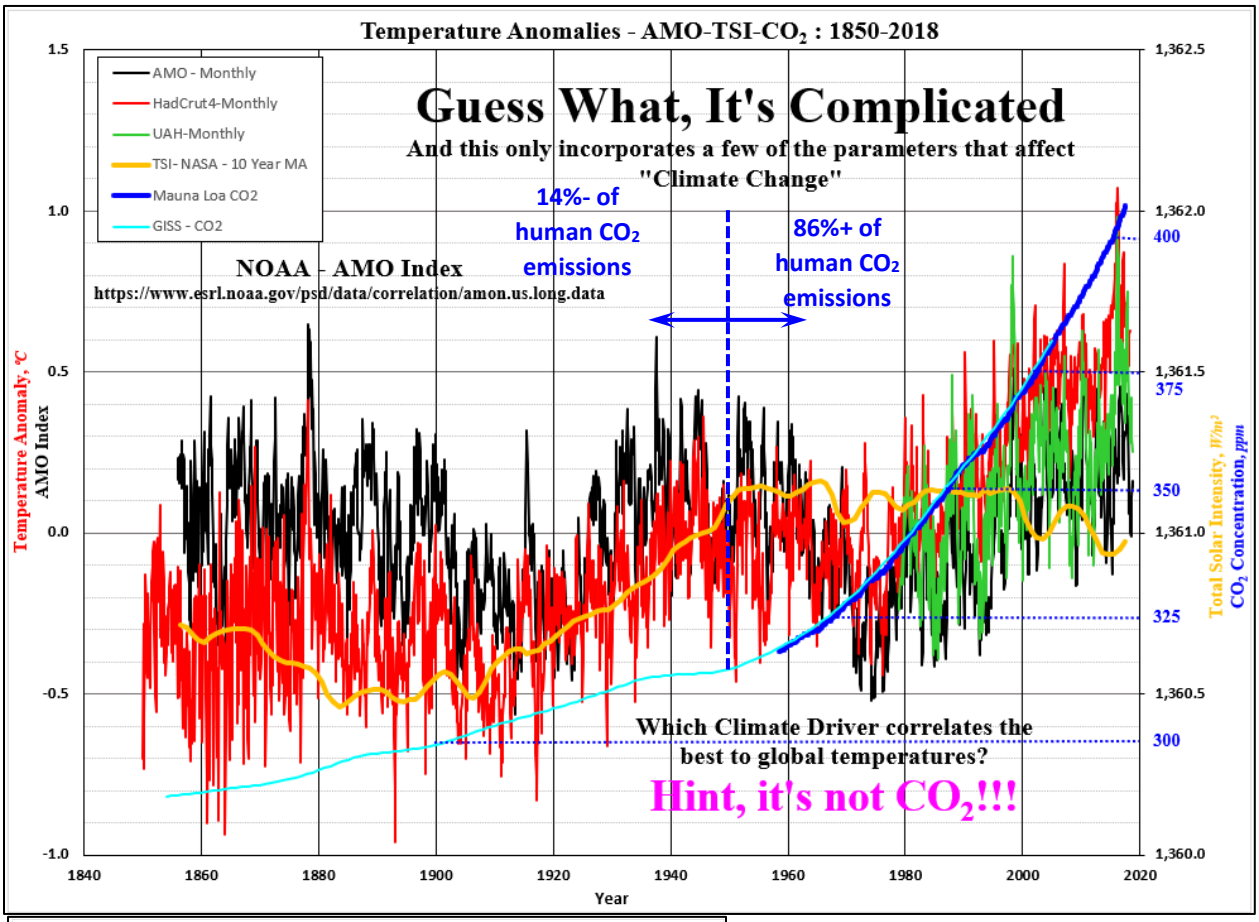
Not surprisingly, the wheels start falling off early in the document. The third statement is false.

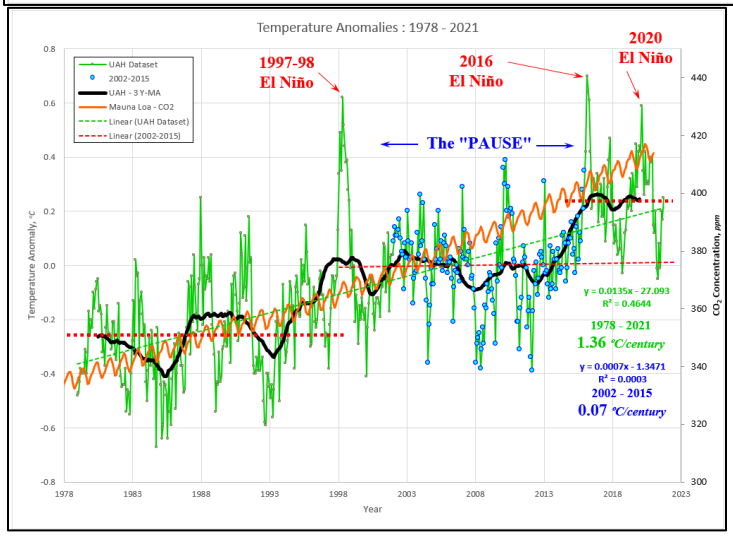
➢ ***But modern-day climate change is not a naturally occurring phenomenon. It refers to alterations in weather patterns caused by human activities.***

Firstly, the authors are already conflating the term "climate change" with human activities. Climate Change has happened over the MTR ("modern day") but that "Climate Change" is a function of both natural and anthropogenic activities. The magnitudes associated with those natural and anthropogenic activities are not "settled silence" as you will find out in the discussion on CO_2 climate sensitivities. The term "modern-day" should also be defined properly. I am assuming that "modern-day" is consistent with the MTR, but the authors could be referring to the post-1950 period. Most (86%+) of our cumulative human emissions have occurred over that period, which would make the above statement more relevant (but still false). Also, strange that half of the MTR warming occurred pre-1950 despite very minor human CO_2 emissions (i.e.: less than 14% of cumulative human emissions).

Natural forcings were still active post-1950. The ocean cycles have easily overridden or augmented the minor warming that rising CO_2 was providing over the MTR. The cool phase of the Atlantic Multidecadal Oscillation (AMO) dropped measured temperatures significantly over the 1945 to 1975 period resulting in the 1970's "The Ice Age is Coming" scare despite steadily rising CO_2. With the magic of homogenization, those temperatures have been manipulated enough to show only a minor decline. That same homogenization process was able to remove the record high temperatures of the Dirty Thirties. I am sure the people who suffered and died through those very real devastating conditions will be happy to know that things were not as bad as they perceived them to be. The temperatures from 1975 to the turn of the century were increasing. Did CO_2 contribute to that warming? Sure, but so did the AMO and a strong el Niño in 1998 (also minimized through the homogenization process). Moving into the 21st Century, the temperatures leveled off (i.e.: the infamous "PAUSE"). As shown in the second plot on the following page, the temperatures were flat through 2002 to 2015. The temperatures did increase significantly in 2016 but that was directly due to another strong el Niño. Since 2016 (as mentioned earlier) the temperatures have

generally been declining with some spikes back up and are currently at the same levels as the "PAUSE". So where is all the promised CO_2 warming? The el Niños have played a role in keeping





the average temperature up. The AMO has been essentially flat since the turn of the century (correlating well with the "PAUSE"). Prior to the turn of the century, solar activity's accumulated momentum was essentially flat (with a minor dip (Sunspot Cycle 20) in the late 60's, early 70's that probably contributed to the "Ice Age is Coming" scare). Since the turn of the century, solar activity levels have dropped slightly (also correlating with the "PAUSE"). So, **despite** rising CO_2 levels, a flat AMO and a very gradual decline in solar activity seem to be enough to keep the temperatures flat.

Human activities do affect the climate but natural forcings are obviously still very active and substantial.

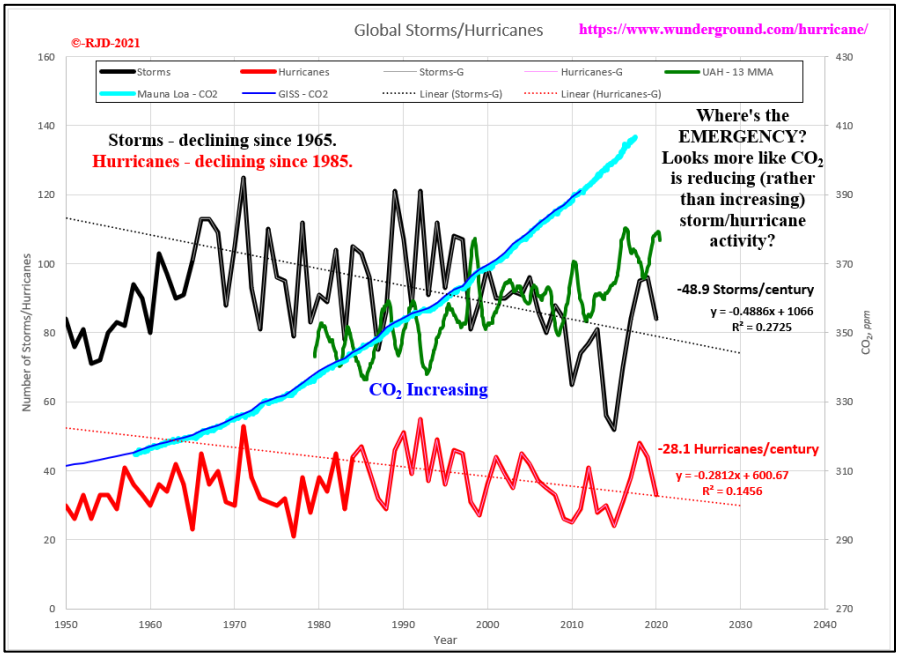
- ***"Global warming" is one measure of climate change and refers to a rise in the average global temperature. Human activities such as industrialization, deforestation and intensive agriculture have increased emissions of greenhouse gases (we'll call them GHGs, starting now), causing temperatures to rise.***

This statement can be considered correct but ultimately very vague. The planet is subject to "Global Warming", but the planet is also subject to "Global Cooling". Throughout history, the temperatures have cycled up and down and will continue to do so in the future. In fact, there is no empirical CO_2/Temperature dataset that shows CO_2 driving the climate on any statistically significant historical time scale. Empirical data is a very basic requirement of the Scientific Method. The CAGW alarmist narrative does not have that empirical data. To be fair, human activities and rising CO_2 levels will increase the temperature, but the natural forcings have always and will continue to dominate the climate cycles. A discussion on CO_2 climate sensitivity will be presented later. Solar Activity also rose (pre-1950), *"causing temperatures to rise"*.

- ***Extreme weather events, rising sea levels and melting polar ice caps are some of the effects of climate change.***

A true statement if the authors' original "climate change" definition stands. A false statement if they are trying to infer that the current extreme weather events, rising sea levels and melting polar caps are due to human activity. But just for something to do, let us break down those categories a bit and see how they fit with the CAGW alarmist narrative.

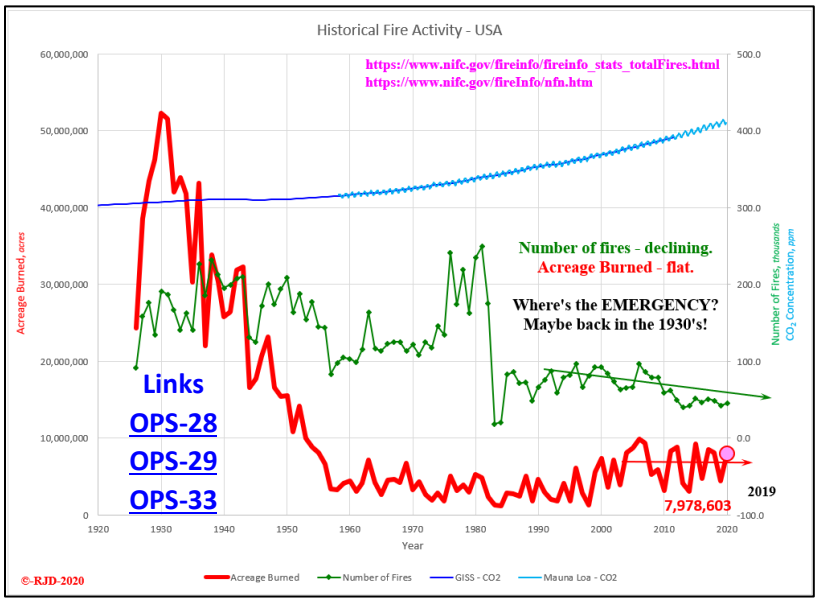
Extreme Weather



Hurricanes/Cyclones – The number of tropical storms has been decreasing steadily since the 1960s and the number of hurricanes has been decreasing steadily since the 1980s. Even the IPCC's own documents say, "There is low confidence in long-term (multi-decadal to centennial) trends in the frequency of all-category tropical cyclones" (SPM – A.3.4 – page SPM-11). More detail is provided in my OPS-46 – Hurricane Update – March 2021 post. CO_2 emissions (human activity) rose steadily through that period. Are human activities improving this extreme weather category?

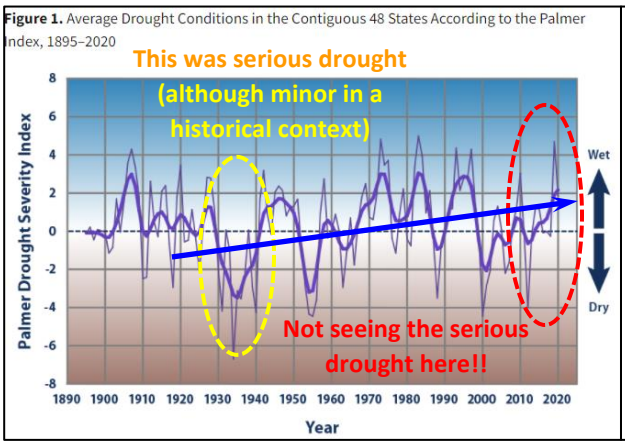
Dr. Roger Pielke Jr. has done detailed work on extreme weather events. His results were originally presented to the COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY of the UNITED

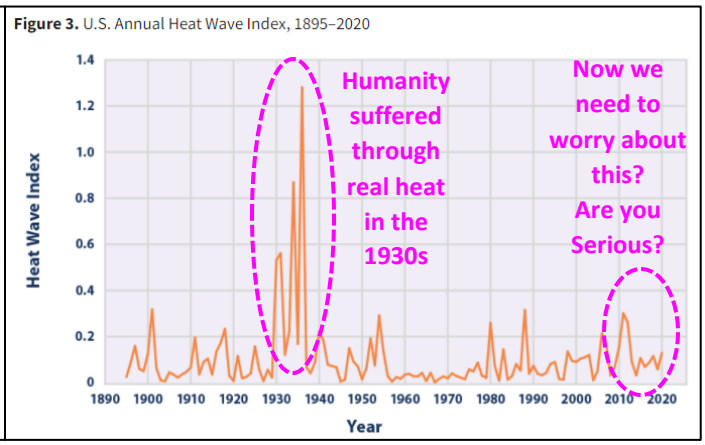
STATES HOUSE OF REPRESENTATIVES back in December 2013. The Basic Takeaway – ***"There exists exceedingly little scientific support for claims found in the media and political debate that hurricanes, tornadoes, floods and drought have increased in frequency or intensity on climate timescales either in the United States or globally"***. That original work has been updated and confirmed and can be found on his own website (rogerpielkejr.com).



Forest Fires – Historically, despite the very real devastation that forest fires can bring, the acreages currently burnt are fractions of the historical burn acreage. As shown in the plot to the left, today's US burn acreage (~10 million acres) is roughly 20% of the burn acreage typical in the early part of the 20th century (up to 50 million acres+). Hundreds of years ago, the US burnt acreage reached into the hundreds of millions. Is this another case of human activity helping an extreme climate category? Looks like it. To protect the CAGW alarmist narrative, government officials recently pulled the pre-1983 data from the public websites. Homogenization on steroids? That data cannot be adjusted so they make the data difficult to access.

Drought/Precipitation – Like the other extreme event categories, the drought and precipitation data does bear out the CAGW alarmist narrative. Here are a few plots from the US Environmental Protection Agency that lay out the drought and precipitation history. The Palmer Drought Severity



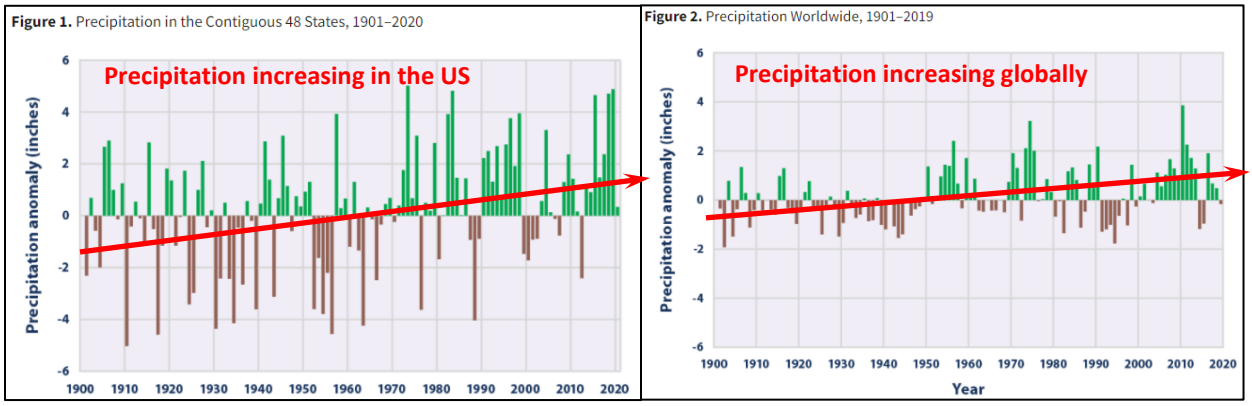


Index clearly shows that US drought conditions were much worse in the Dirty Thirties Dust Bowl and not surprisingly, the US heat wave indexes were also noticeably higher during that same period. Additional data and other relevant information can be found in the posts below.

CSS-8 – Earth Day 2021

[OPS-31 – US Drought Situation]

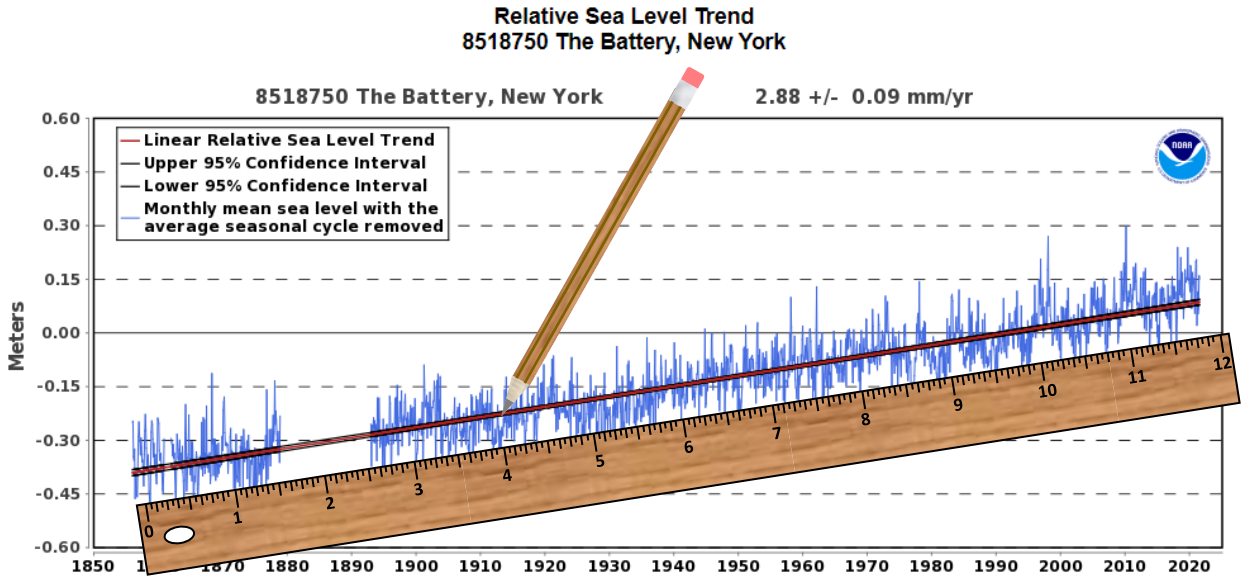
[OPS-49 – Temperature Manipulation]



The Precipitation Anomaly graphs show the same general information trends as the Palmer Drought Severity Index. The US has become wetter over the last century and so has the rest of the world. At some point the mainstream media, our political "leaders" and the rest of the CAGW alarmist crowd need to stop lying. Some integrity from our financial institutions might be a good place to start.

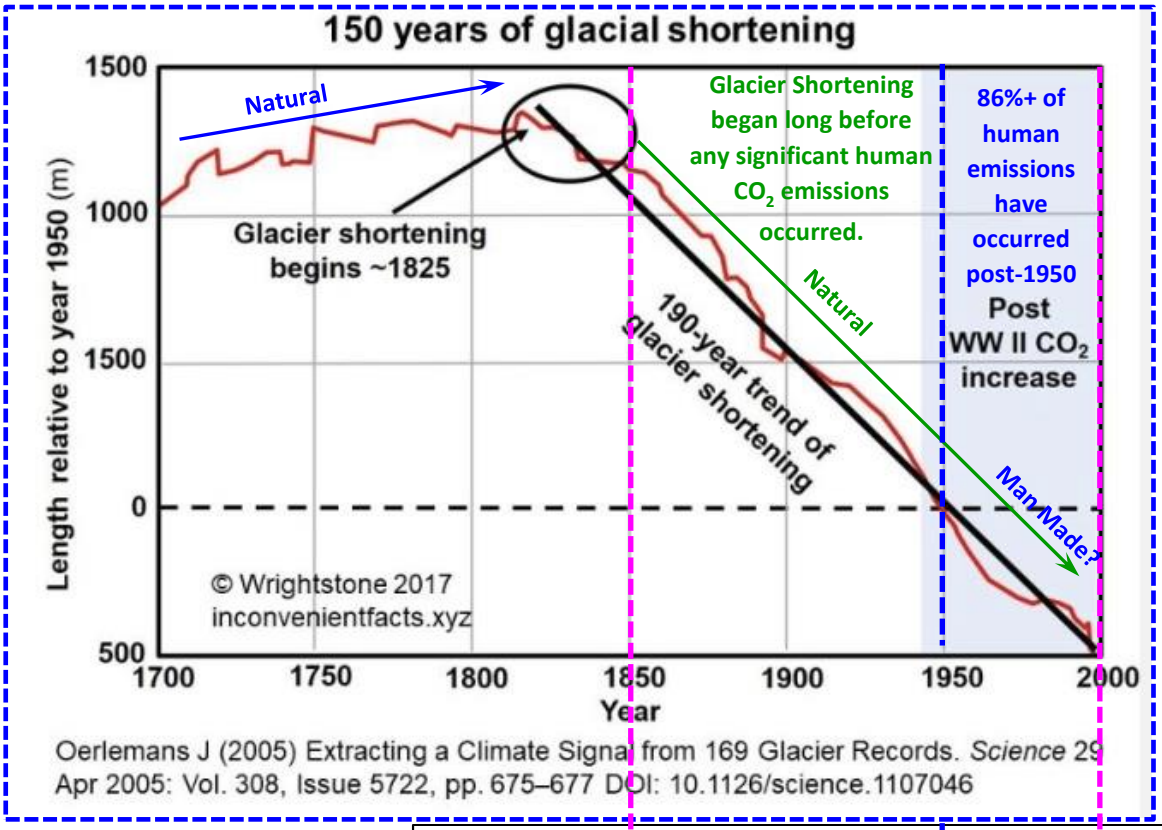
Rising Sea Levels

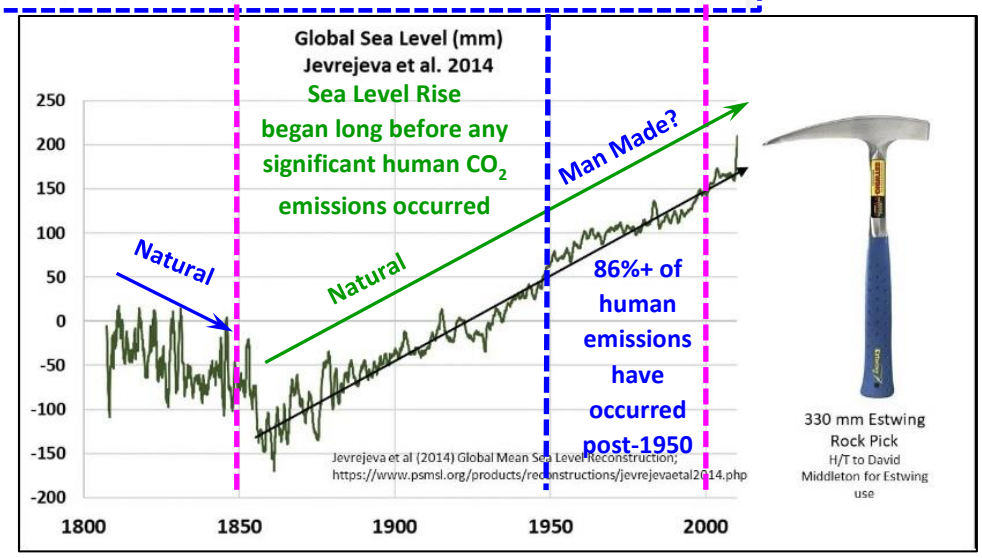
Another favorite misrepresentation from the CAGW alarmist crowd. Yes, sea levels are rising and have been rising at a steady rate since the mid-1800s. A grade 8 student in New York back in 1910 could have used a pencil and a ruler and predicted New York's Sea Level today.



The tide gauges at the Battery in New York are representative of other tide gauge data around the world. The magnitude of the perceived sea level rise or fall can change (i.e.: the land itself may be rising, falling or stationary), but the long-term trends are generally straight lines. Meaning that sea

level rise is not accelerating despite the continually increasing CO_2 levels. The natural trends were set up long before any significant human emissions ever occurred and those natural forcings (as



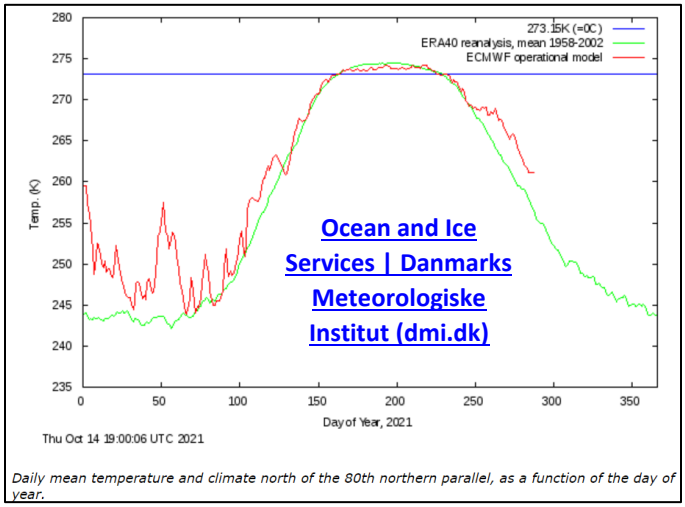


discussed earlier) did not suddenly just disappear. The temperature, glacier and sea level information are all linked together. So, when the temperature began its natural rise out of the Little Ice Age, glacier shortening and sea level rise were not surprising. What the CAGW alarmists do not show you is the glacier advancement and sea level declines that had occurred over the last several thousands of years pre-MTR. Many of the glaciers that were recently receding did not even

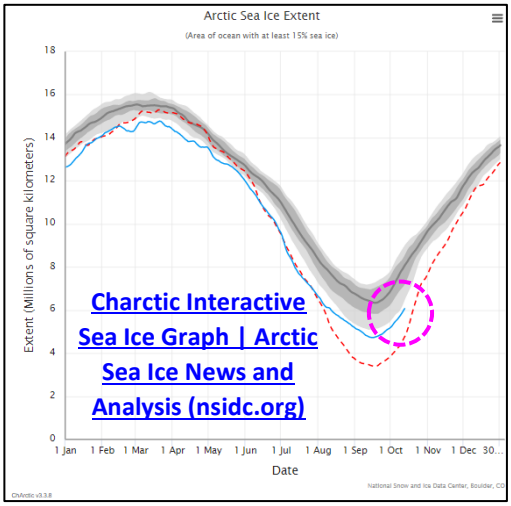
exist during periods like the Medieval Warm Period or the Holocene Climate Optimum, as evidenced by the old forests that were revealed as they receded.

Melting Polar Ice Caps

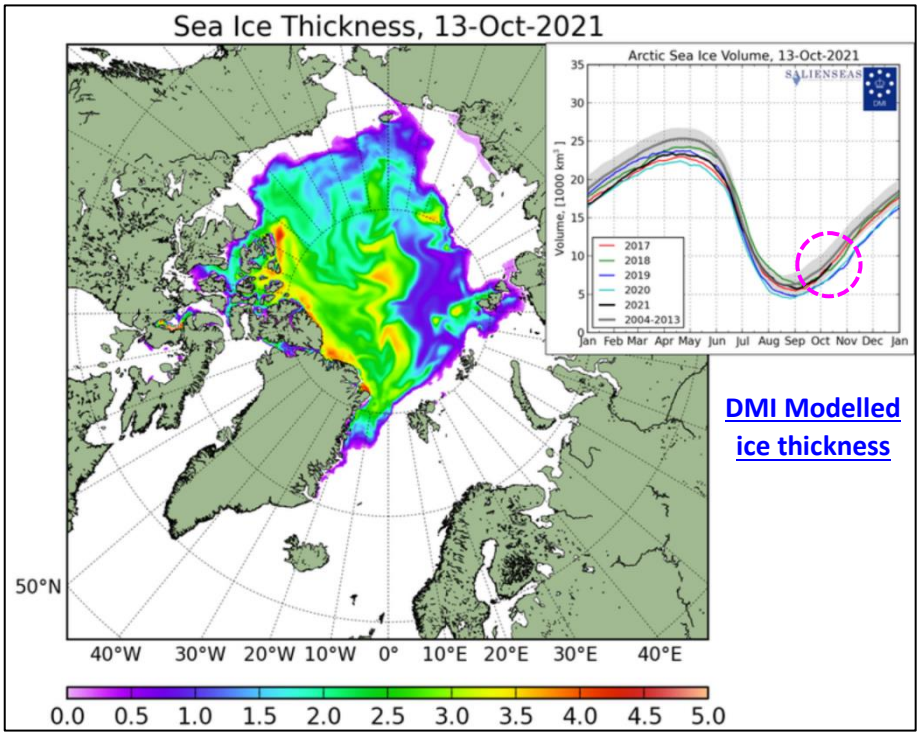
Climate Change could also be responsible for freezing the poles solid and extending the polar ice cap down into the northern United States. But the authors only mention "melting" like they might be trying to spin a narrative. I am not sure that the authors understand how cold things are at the poles. The average temperature above 80° North just barely gets above zero and only for a short

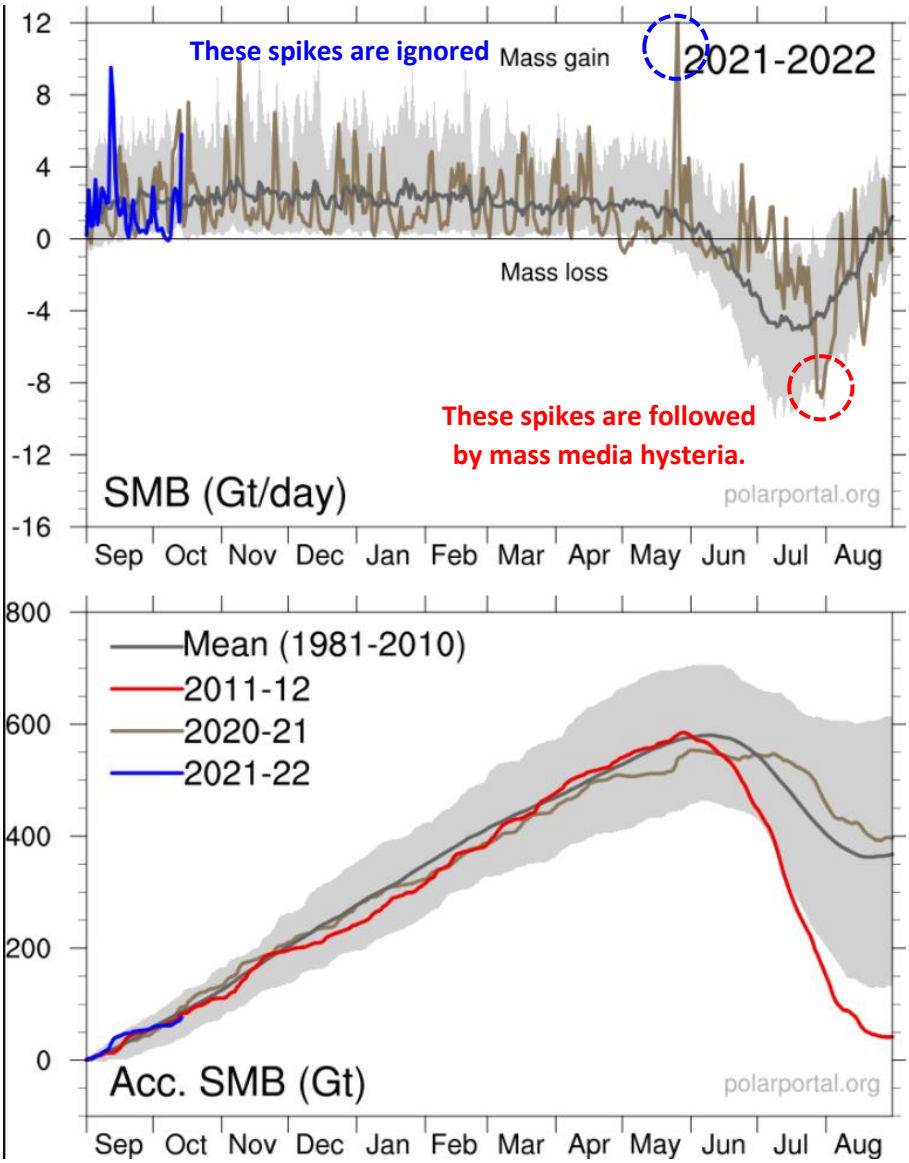


Daily mean temperature and climate north of the 80th northern parallel, as a function of the day of year.

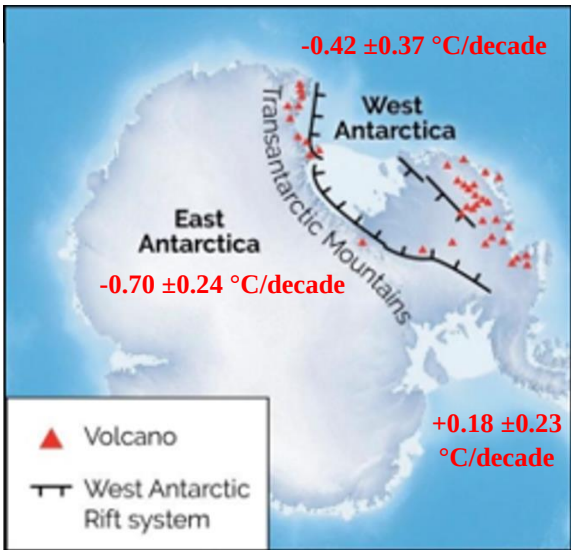


time. The dire predictions of disappearing Arctic sea ice have been commonplace in the CAGW alarmist community but they have always been wrong. Arctic Sea Ice levels are currently lower than normal, but they are well above the low experienced back in 2012. Is this a bad time to point out that our ancestors somehow managed to survive the Holocene Climate Optimum, a time when the Arctic Sea was free of ice? The sea ice area is one metric, sea ice volume is an alternative metric. In terms of volume, sea ice is still at normal levels. I have several posts that look at sea ice and the situation at the poles. It is important to remember that Arctic Sea Ice melting has nothing to do with sea level changes. The ice on Greenland could affect





the sea level, but as shown by the plot to the left, Greenland's Surface Mass Balance (SMB) has been positive every recorded year (including the high melt year in 2012). SMB is not the whole story. Glacier calving rates also contribute to ice loss, but Greenland is not melting away any time soon. A NASA study that CAGW alarmists often cite, showed that Greenland lost 3800 Gigatonnes (Gt, -148 tonne/year) from 1992-2018. That sounds like a lot but that is only 0.0051%/year of the total Greenland ice mass. (in 2100, Greenland will still have 28.4 of its 28.5 million Gt). Last year was above normal with almost 400 Gt added and an unusually short melt period.



The Antarctic is even colder. And somehow despite rising CO_2 and "Global Warming", Antarctic temperatures have been declining for the last 40 years (Zhu et al., 2021) and this was the COLDEST WINTER EVER. Not very convenient data for the CAGW alarmist narrative. Some recent noticeable ice losses in West Antarctica made the CAGW alarmist news media, but that stab at climate fear porn died down when someone pointed out the West Antarctica is underlain by a massive magma intrusion induced hot spot. Based on a couple of studies, Antarctica may or may not be losing ice. The 2015 NASA Study showed that ice gains over

the 1992 – 2008 period were 1400 Gt (88 Gt/year). The 2018 Shepherd et al. study showed an ice loss of 2720 Gt (109±56 Gt/year) over the 1992 – 2017 period. Ultimately, as with Greenland, the current ice losses are meaningless based on the current ice sheet volumes. Given that Antarctica is cooling, has 8 times the ice mass of Greenland and is losing ice at a lower rate than Greenland, we should not have to worry about losing Miami or New York City any time soon.

My CSS-13 – A Look at Homogenization post included Antarctic temperature information. My look would not be as robust as the Zhu et al. analysis, but the temperature declines are visible in the raw data. As an aside, there is very little homogenization applied in the Antarctic temperatures, but the rest of the Climate Short Story (CSS-13) provides a good overview of the homogenization (i.e.: data manipulation) process used globally to manufacture the "official" record.

- ***Although the climate has shifted throughout the Earth's history, this is the first time that climate change has been human-caused and happened so rapidly.***
- ***Looking at the climate change timeline, scientists report that temperatures are rising faster now than at any other time in history. The average global temperature on Earth has risen a little more than 1.8°F since 1880, and today's atmosphere contains 42 percent more carbon dioxide than it did before the industrial era.***

No, ***"this is not the first time that climate change has been human-caused and happened so rapidly"***. "Modern-day" climate change is occurring due to a combination of natural and anthropogenic causes. As I showed earlier (and will expand on later), the anthropogenic contributions, while present, are easily overridden by a variety of ocean cycles and solar influences. Also, as shown earlier (in the Holocene temperature plots), the current temperature rise out of the Little Ice Age is neither unusual nor unprecedented. If you want to see some real rapid

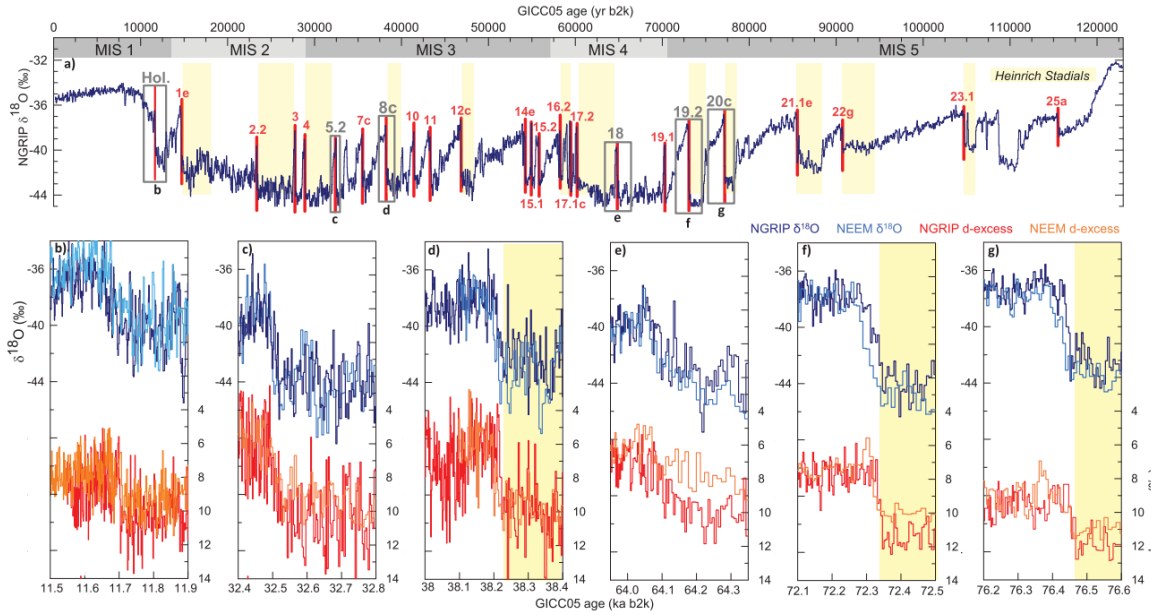
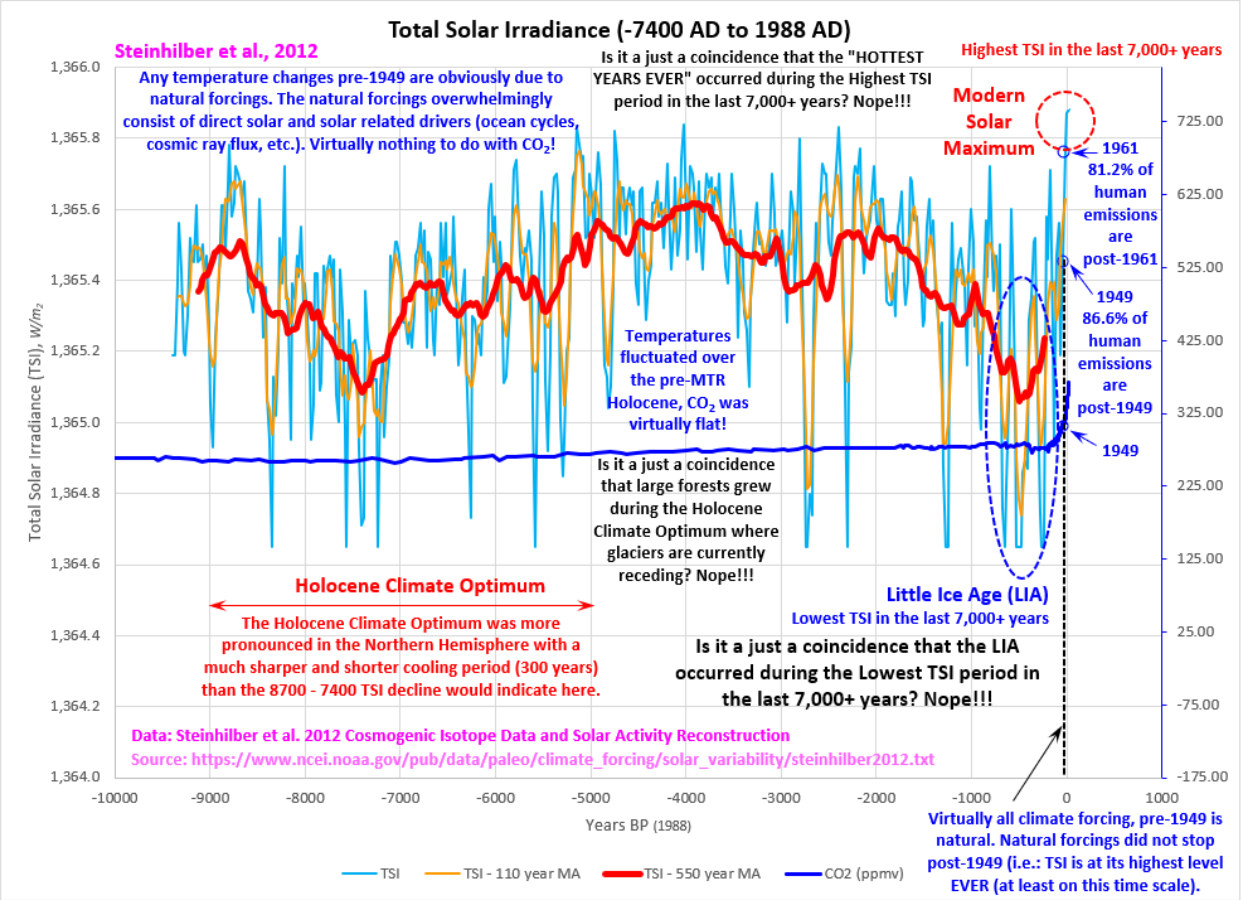


Fig. 1 Abrupt climate variability recorded in Greenland water isotopic records. a NGRIP $\delta^{18}O$ record[5]. Studied abrupt warming transitions are highlighted with red vertical bars and Greenland Interstadials (GI) are numbered[38]. Gray boxes indicate intervals shown in (**b**–**g**), illustrating the variety of abrupt GS–GI transitions across the Last Glacial; stadials containing Heinrich events are indicated in yellow following refs. [53,85], and Marine Isotope Stages (MIS) are indicated in gray. **b**–**g** High-resolution $\delta^{18}O$ from NGRIP (dark blue) and NEEM (light blue) and d-excess from NGRIP (red) and NEEM (orange) over 400 yr time intervals centered on the Holocene abrupt onset (**b**) and the abrupt transitions into GI-5.2 (**c**), GI-8c (**d**), GI-18 (**e**), GI-19.2 (**f**), and GI-20c (**g**).

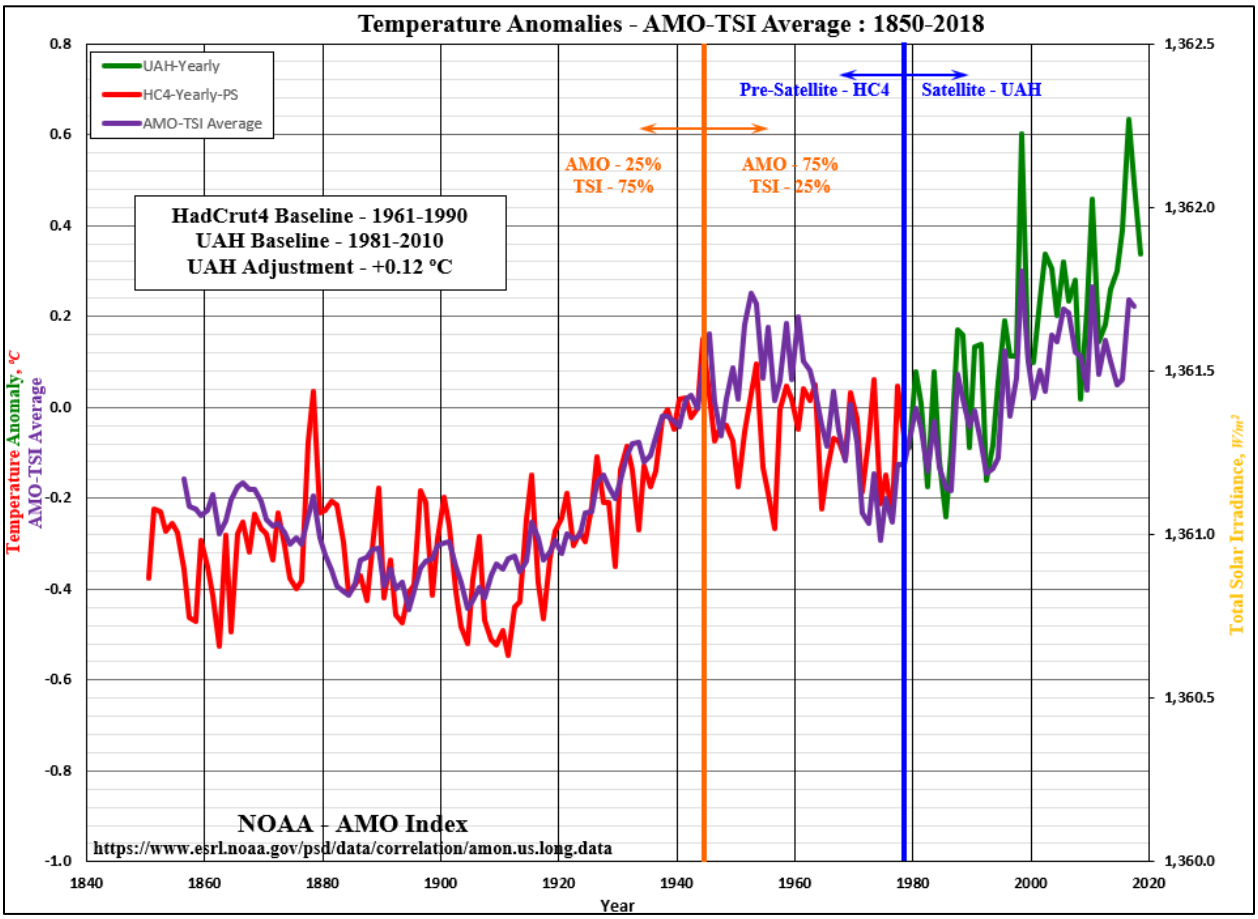
increases do some research on the Dansgaard-Oeschger (D-O) events. These events were capable of increasing Greenland temperatures by 5 – 16 °C within decades or a few centuries. The current scary Greenland temperature rise is around 2 °C (still well below the temperatures that allowed the Vikings to colonize Greenland during the Medieval Warm Period). Additional analysis (including data and links) is presented in my Open Letter Addendum – August 2021.

The second bullet point was covered off by the above discussion (apart from ***"and today's atmosphere contains 42 percent more carbon dioxide than it did before the industrial era"***). The statement is true but once again lacks context. Just because CO_2 has risen dramatically over the MTR does not mean that the warming over the MTR is all due to CO_2. Correlation and causation are two separate entities. Solar activity also rose over the MTR coming out of the Little Ice Age (the lowest level of solar activity in the last 9000 years), peaking around 1950 and generally maintaining that level until recently (the Modern Solar Maximum, the highest solar activity of the last 9000 years). Just a coincidence?



A later plot will put solar activity, CO_2 and temperature on the same plot for more context. As shown in the Guess What, It's Complicated plot (Page 5), the temperature fluctuates significantly over the MTR, while CO_2 rises steadily. There is some CO_2/temperature correlation but there is also very noticeable deviations (as was discussed). A combination of just Total Solar Irradiance (TSI, as a proxy) and the Atlantic Multidecadal Oscillation (AMO) provide a much better correlation (with no CO_2 influence) than the unscientific, simplistic approach of the CAGW

alarmist viewpoint that focusses almost exclusively on anthropogenic (i.e.: CO_2) causes. Throwing in the minor contribution from CO_2 and the effects of other ocean cycles (the Pacific Decadal Oscillation (PDO), el Niño Southern Oscillation (ENSO), etc. would tighten the correlation up nicely.



I use the TSI as a proxy to represent all the available solar forcings (TSI (the only solar forcing used in the CMIP5 protocol), Cosmic Ray Flux and High Energy Particles) that have been added into the new CMIP6 protocols. Like the plot shown here, the modellers (during beta testing) were able to replicate the MTR without using CO_2 forcings. But the CAGW alarmist community can relax, those solar forcing knobs can and obviously were turned off or at a minimum way down. But can they relax? At the end of July 2021, the "climate scientists" themselves came out and admitted that their models are running too hot. An article in the journal Science (U.N. climate panel confronts implausibly hot forecasts of future warming) contained some very interesting statements (a few are summarized below).

> ***"Many of the world's leading models are now projecting warming rates that most scientists, including the modelmakers themselves, believe are implausibly fast."***
>
> ***"For example, scientists used the new model from NCAR to simulate the coldest point of the most recent ice age, 20,000 years ago. Extensive paleoclimate records suggest Earth cooled nearly 6°C compared with preindustrial times, but the model, fed with low ice age CO_2 levels, had temperatures plummeting by nearly twice that much, suggesting it was***

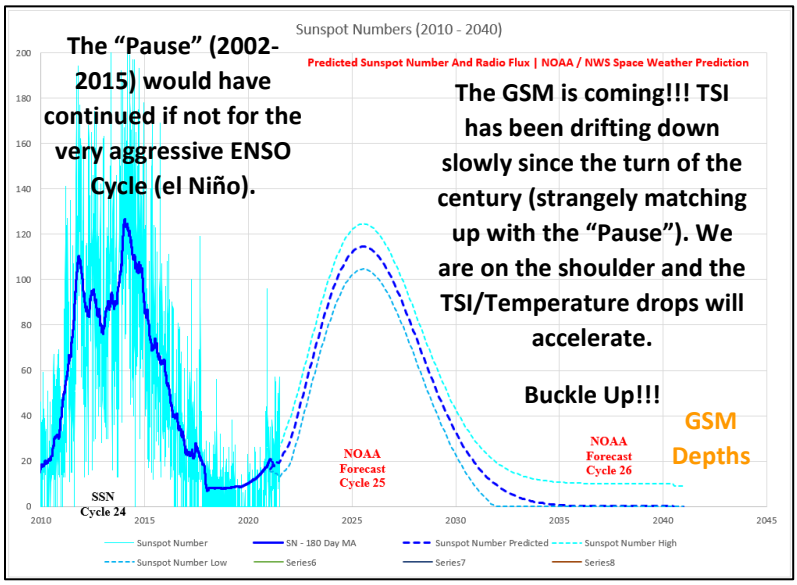
far too sensitive to the ups and downs of CO_2. "That is clearly outside the range of what the geological data indicate," says Jessica Tierney, a paleoclimatologist at the University of Arizona and a co-author of the work, which appeared in Geophysical Research Letters. "It's totally out there."”

Gavin Schmidt added this comment. ***"You end up with numbers for even the near-term that are insanely scary—and wrong."***

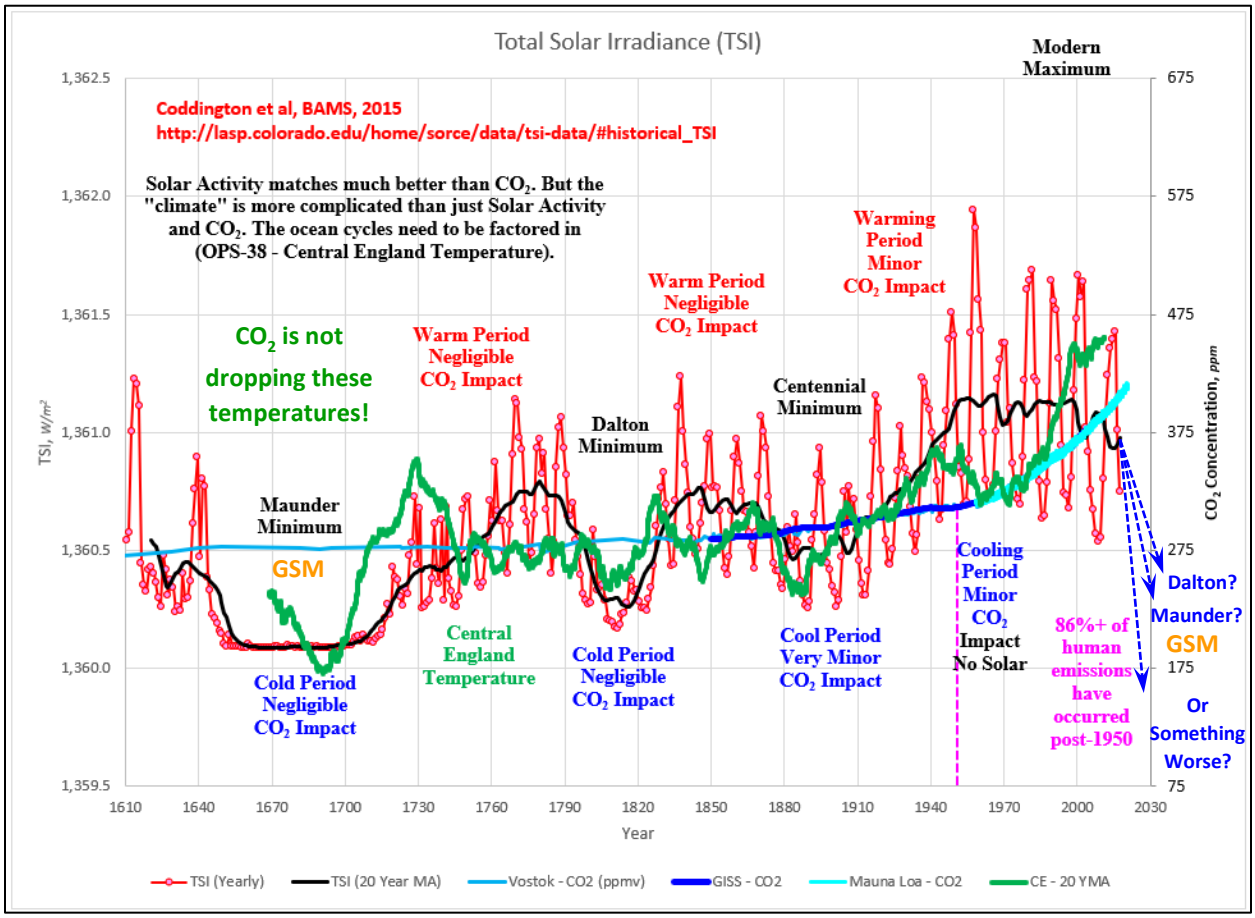
These revelations are not built into the recently released (August 2021) IPCC AR6 Report. In my opinion that casts some serious doubt on the AR6 Report's validity. The report depends heavily on the computer models (the models they say themselves are running too hot). I will give the IPCC some credit for taking their first small step back toward climate reality by also admitting that the Representative Concentration Pathways (RCP8.5) emission scenario was implausible and not a valid input for the models. Sadly, that has not stopped the CAGW alarmist message machine from using RCP8.5 to continue pushing the narrative. From a scientific viewpoint, removing RCP8.5 also takes dangerous warming (i.e.: the Climate Emergency) off the table. If you want to get more detail on the RCP emission scenarios, Roger Pielke Jr. has done extensive research on the subject here.

- ***The resulting negative effects of climate change, like rising temperatures and sea levels and extreme weather events, have far-reaching social, economic and political implications across every sector of society.***
- ***Some of the most disturbing data on climate change is that it will not happen gradually—like a line rising steadily on a graph—but rather as a series of "tipping points" that can form a cascade, unleashing a "domino effect" of irreversible consequences.***

These statements assume that the simplistic, unscientific premise that the MTR warming was essentially all anthropogenic (primarily CO_2). They also assume that the unsubstantiated water vapor feedbacks that are built into those IPCC computer models are valid (those same models that are running too hot, Hmmmmm…..). They also completely and knowingly ignore the natural forcings (as shown earlier). The IPCC computer programming cannot replicate the low temperatures that were experienced during the Maunder and Dalton Solar Minimums. And the programming is also incapable of recognizing the Grand Solar Minimum that we are just now entering (as predicted by NOAA with more detail available in my OPS-52 – Solar Activity – NOAA Forecast). After a few decades of cooler (and potentially very devastating) temperatures, we will all be grateful for any



warmth that rising CO_2 levels may provide. While our leaders dedicate/waste huge quantities of taxpayer money to fix a problem that might develop a century from now, they ignore the very real problems that climate change (in the form of Global Cooling) is already having. The cold/devastation that Texas experienced this last winter will seem small compared to the energy/distribution problems that Europe, China and most of the world are projected to experience this winter. The over investment in renewables and under investment in fossil fuels have played a key role in these developing issues. Unfortunately, these problems will just accelerate as temperatures drop further into the GSM. Delaying all these unnecessary green initiatives and giving our economies a chance to recover from the COVID-19 induced financial devastation would be the smart thing to do. I do not have much hope that is going to happen.



That takes care of the bullet points, leaving just the first page wrap-up paragraphs.

The consensus among experts—people who study climate science for a living—is that climate change is happening, and human activity is causing it.

While a small number of climate change deniers do exist—and they can be noisy—their anti-climate change arguments have been debunked by the scientific community.

These two statements confirm the limited scientific knowledge that these authors possess. Consensus is a meaningless term in science. When Albert Einstein's theories were disputed by a consensus among experts, he pointed out that you do not need a consensus, since it only takes one person to prove him wrong. In addition, most of the world's greatest scientific discoveries were

made by people who thought for themselves and went against the consensus. I might even posit that CAGW alarmism falls into the same category as the Eugenic, Continental Drift, the World is Flat and the Earth is at the Centre of the Solar System/Universe consensuses.

The authors' effort to conflate climate skeptics/realists with Holocaust Deniers is a standard practice with the CAGW alarmist crowd. Those climate skeptics consist of thousands of very qualified climate scientists (more than the IPCC's *"1300 independent scientific experts"* (not all of which are climate scientists and few of which are solar/astrophysicists)). Many of those skeptical scientists were IPCC reviewers at one time. The vast majority of those skeptical scientists (myself included) would also agree with the consensus depending on how the statement is worded. The authors dutifully throw out the 97% consensus later in the document (another indication that they lack scientific integrity). So, given its relevance to this section, I will give some feedback. The 97% consensus has been debunked many times. My OPS-14 – Consensus and OPPS-6 – Confessions of an Anthropogenic Global Warmist posts lay out my position on the consensus and the absurdity of the 97% consensus concept. Anthropogenic warming is real (just not catastrophic), but so are the more dominant natural warmings and coolings (with cooling being far more dangerous than warming). To put it another way, the planet has warmed over the last 150 years, humans played a role in that warming but the natural forcings (outlined below) are all lining up to cool the planet over the next few decades (with potentially devastating consequences). But sure, we should really focus on a trace atmospheric gas (CO_2) that has increased from 0.03% to 0.04%.

- Milankovitch Cycles (eccentricity, obliquity and precession are all headed cooler, Insolation, slightly cooler).
- Ocean Cycles (AMO – cooling, PDO – Cooling, ENSO – cooling)
- Solar Activity (TSI decreasing and accelerating as we move further into the Modern GSM).
- Volcanic Activity (increasing aerosols (i.e.: cooling), typical in GSMs)
- Possible near-term catastrophic events (Beaufort Gyre release, lower latitude ice migration, Dansgaard-Oeschger (D-O) events, solar micro-nova, Bill Gates geo-engineering)

Perhaps the authors could also point out which of the thousands of peer-reviewed, published papers (showing solar influences on the climate) that they are referring to as debunked. Is it the Svensmark et al 2021 paper (Atmospheric ionization and cloud radiative forcing) that was just published in Nature confirming the relationship between solar activity, Cosmic Ray Flux, cloud cover and Global temperatures? Or maybe it was the recent Connolly et al 2021 paper (How much has the Sun influenced Northern Hemisphere temperature trends? An ongoing debate.). Another very unscientific statement. I have more on this subject, but I will bring in the next section (the authors' scientific summary) to finish that discussion off.

But why is it happening? What is the science behind climate change?

"The basic scientific facts about climate change are actually simple, and interesting too. Here are the top three things you need to know:

> → ***The average global temperature is directly linked to the concentration of greenhouse gases in the atmosphere. (See below for more on GHGs.)***

→ The concentration of greenhouse gases has been rising steadily since the Industrial Revolution, and global temperatures are increasing as a result.

→ Carbon dioxide (CO_2) is the most abundant, accounting for about three-quarters of GHGs. Its increased concentration is largely due to burning fossil fuels."

Climate Change is actually simple? That must be one of the least insightful statements that could be made in the any scientific field (let alone climate science). Perhaps the authors would like to critique the two papers I just referenced (should be easy, climate change is simple). Or go back over the previous 17 pages of this document and provide some empirical data refuting my position. Or start a campaign to stop funding the "climate science" community. After all, if climate change science is "simple" (and settled), most of the billions spent to date have been wasteful and any future expenses would also be wasteful.

Even the IPCC understands that the field of climate science is a massively complex system (quote below and linked here). They have just made a conscious decision to essentially ignore the natural forcings and focus on the simplistic, unscientific narrative that climate change is essentially driven by an atmospheric trace gas (CO_2) that has increased by 0.01% in the last century and a half.

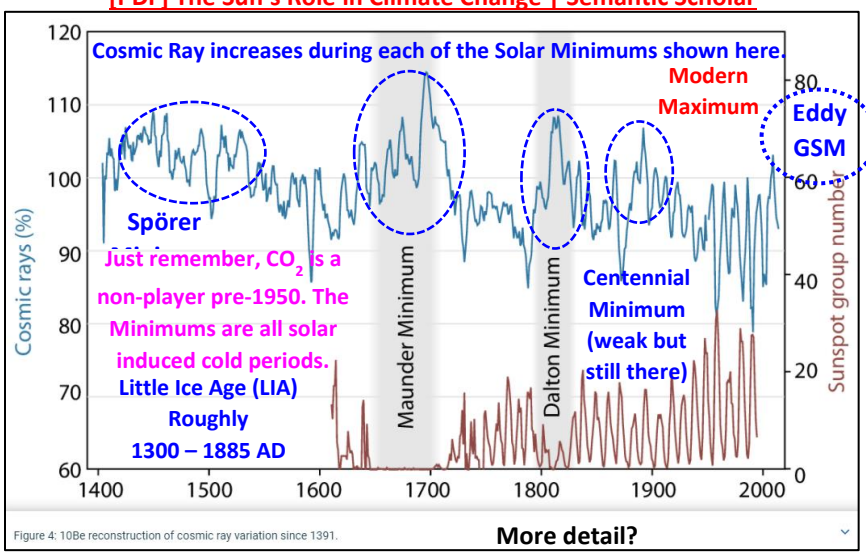
"The climate system is a coupled non-linear chaotic system, and therefore the long-term prediction of future climate states is not possible."

Given that their models are running too hot, the IPCC has easily confirmed that the statement they made above was correct.

The first bullet point above should read – ***The average global temperature is directly linked to the many natural forcings (primarily solar through direct and indirect means) and the concentration of greenhouse gases in the atmosphere***. The following addendum would also be informative. ***The relative magnitudes of those different radiative forcings is highly dependent on CO_2's Climate Sensitivity which is far from settled science***. That concept will be covered in a separate subsection of this document.

The second bullet point should read – ***The concentration of greenhouse gases has been rising steadily since the Industrial Revolution, and global temperatures are increasing as a result (subject to establishing CO_2's Climate Sensitivity)***.

[PDF] The Sun's Role in Climate Change | Semantic Scholar



The third bullet point should read – ***Carbon dioxide (CO_2) accounts for less than 5% of atmospheric GHGs. Its increased concentration is largely due to (but not limited to) burning fossil***

fuels. Water is by far the most abundant and important GreenHouse Gas. Water through many processes has a significant impact on the climate. Not the least of which is its role in cloud cover and precipitation (all of which cool the planet). As we move further into the GSM, solar activity will drop, cosmic ray flux will increase, cloud cover will increase and temperatures will drop. Just like it always has through hundreds of millions of years. My Open Letter Addendum – August 2021), CSS-10 – A Ride through the Cenozoic and CSS-12 – Cosmic Ray Discussion posts provide additional detail on the subject.

I will switch tactics at this point and focus in on a few key scientific climate concepts (properly scaled CO_2/temperature graphs, CO_2 Climate Sensitivity and Computer Models). The whole Goodside Document could be subjected to the same process that generated these first 19 pages. A review of these three concepts will round out the scientific discussion quite well.

Properly Scaled CO_2/Temperature Graphs

I will start with The Scientific Method. Here is Britannica's definition followed by the CAGW alarmists' adaptation. My OPS-47 – Fact Checking post expands on this subject.

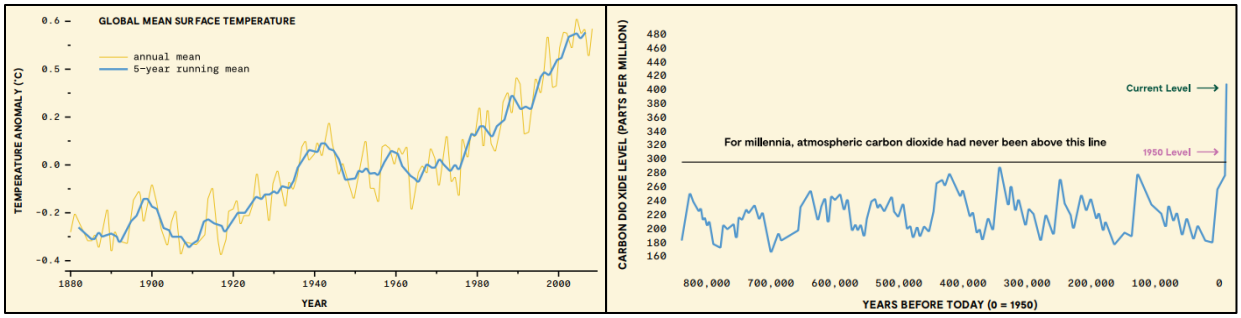
Scientific Method | Definition, Steps, & Application | Britannica

In a typical application of the scientific method, a researcher develops a hypothesis, tests it through various means, and then modifies the hypothesis on the basis of the outcome of the tests and experiments. The modified hypothesis is then retested, further modified, and tested again, until it becomes consistent with observed phenomena and testing outcomes.

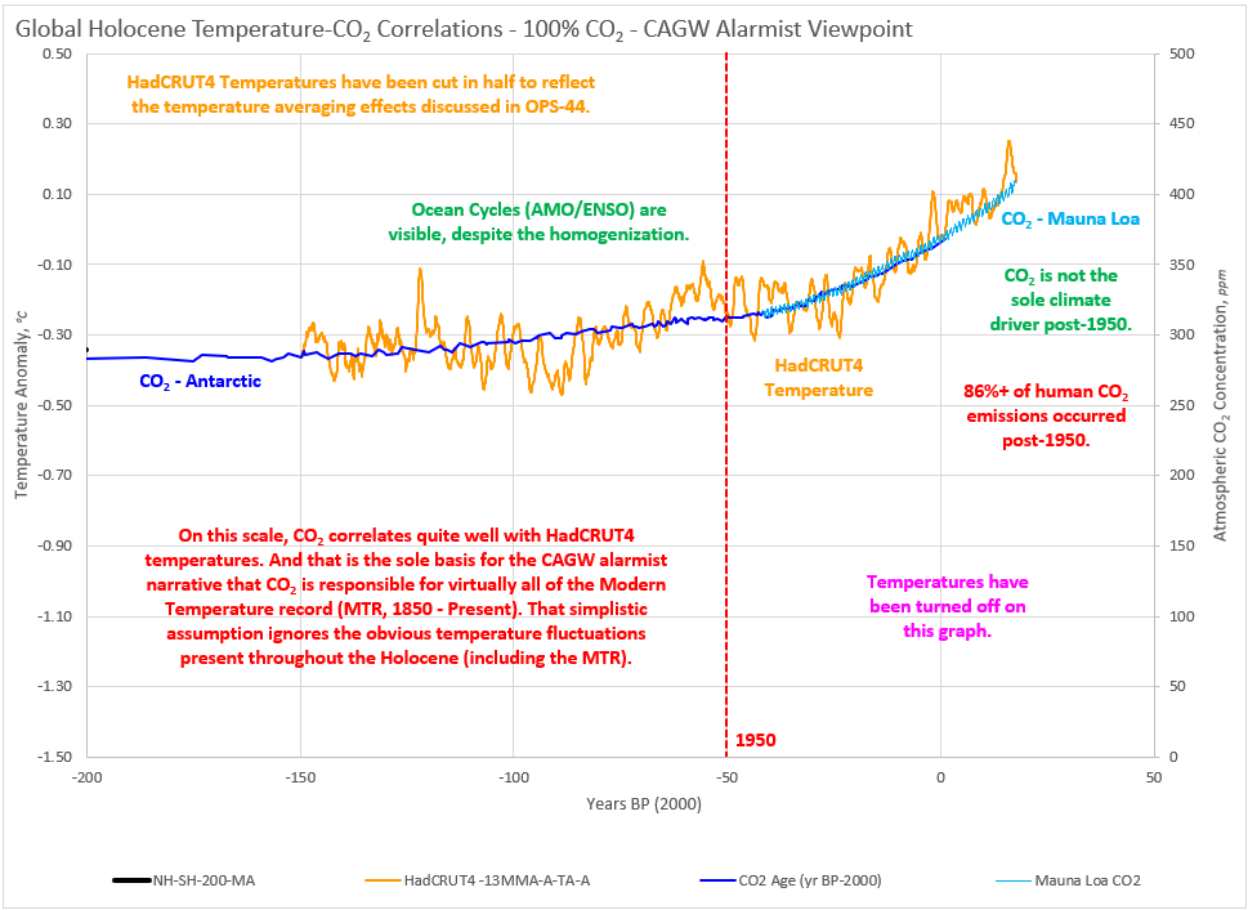
Unscientific Method - Climate Alarmists Adaptation

In a typical application of the CAGW unscientific method, a "climate scientist" develops a hypothesis, programs a computer model to get the results they want, and then modifies the "data" to match the computer model outputs. The "data" is further modified, as new unconforming data becomes available, until the "data" again becomes consistent with the "hypothesis". Add on - never change the hypothesis and ignore all dissenting information.

The scientific method requires "EMPIRICAL" data to move a theory from speculation to accepted scientific principle (in the case of Catastrophic Anthropogenic Global Warming (CAGW) alarmism, a narrative). Unfortunately for the CAGW alarmist crowd, there is no "EMPIRICAL" CO_2/Temperature data showing CO_2 driving the climate on any statistically significant historical time scale. It always comes down to the empirical data, not the scientist's background or opinion or place in society, not the consensus, not the organization. The data can be manipulated and cherry picked (as per the CAGW alarmist handbook), but the data does not lie. CO_2 plays a minor role in climate.

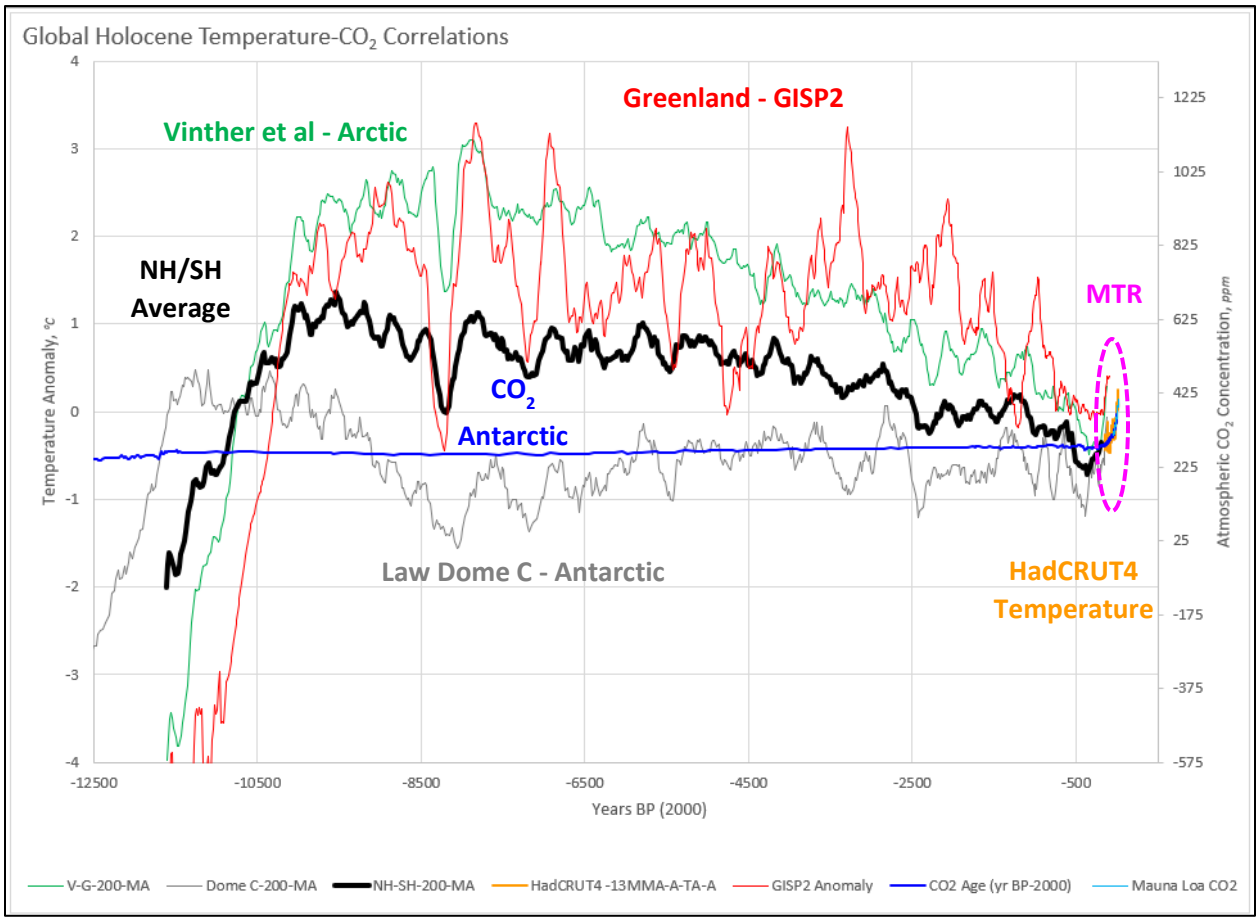


The authors did provide some empirical data on Page 6 of their document (shown above). But in true CAGW alarmist fashion, that was limited to the over-homogenized (i.e.: highly manipulated) NASA/GISS surface temperature data over the MTR (on the left) and the MTR CO_2 superimposed on the Antarctic ice core CO_2 measurements (on the right, for that CO_2 concentrations are rapidly rising and we are all going to die effect). What the CAGW alarmists almost never do is plot the CO_2 levels and global temperatures together on scales that reflect their narrative.



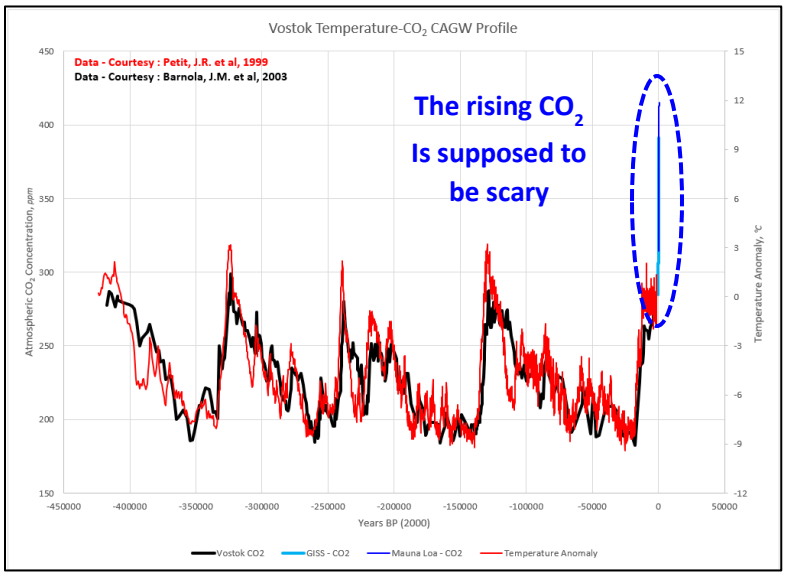
I will start with the Modern Temperature Record (MTR, 1850 to the Present, shown above). I use the HadCRUT4 surface temperature dataset since they use a more moderate level of homogenization. The discussion would not change if I used the NASA-GISS data. This plot represents the CAGW alarmist position that the MTR warming is due almost exclusively to Anthropogenic (CO_2) radiative forcings. The CO_2 concentrations have increased from the pre-industrial level of 285 ppm to the current 420 ppm level. And the global temperature has risen by

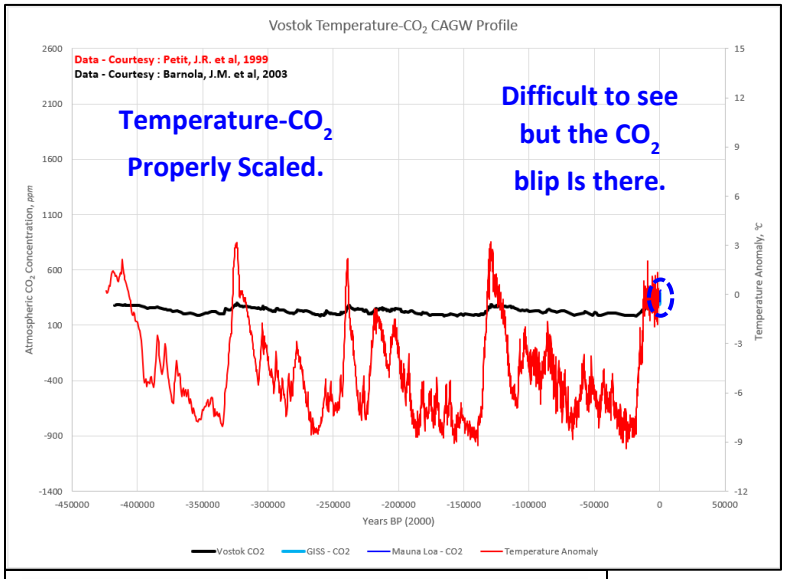
1.07 °C over that period (according to the recently released IPCC AR6 Report). Ergo, 135 ppm is equivalent to 1.07 °C. Given that history did not start at the MTR, we can expand our review to include pre-MTR temperatures and the authors' ice core CO_2. I will step out gradually starting with the Holocene data.

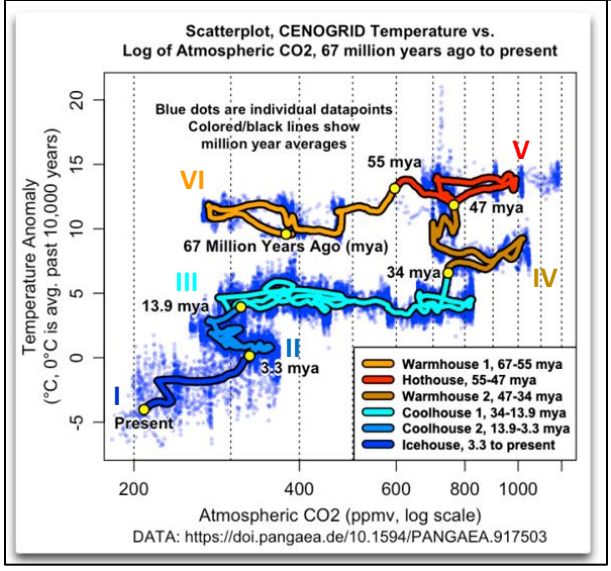


That sharp spike in CO_2 is not nearly as spectacular when the vertical scales reflect the CAGW alarmist CO_2 /Temperature correlation properly. This plot also exposes just how useless the IPCC Climate Models are for forecasting future global temperatures. CO_2 levels are virtually flat throughout the pre-MTR Holocene. But somehow the temperatures still seem to fluctuate significantly. Those fluctuations are due to natural forcings (primarily solar (directly and indirectly)). Those natural forcings (as I showed earlier) were still active during the MTR and will continue to be active in the future. The only place they have been turned off is in the virtual reality world created by the IPCC programmers.

Now we can step out to include the ice core data. The upper plot on the next page plots the Antarctic ice core atmospheric CO_2 concentration with the Antarctic ice core temperatures. The scales used in the upper plot are consistent with those used by the CAGW alarmist crowd. CO_2 and Temperature correlate well over these time intervals. But the temperature is driving the atmospheric CO_2 concentration. CO_2 generally lags the temperature by centuries when the planet is warming (the oceans are outgassing CO_2) and millennia when the planet is cooling (the oceans







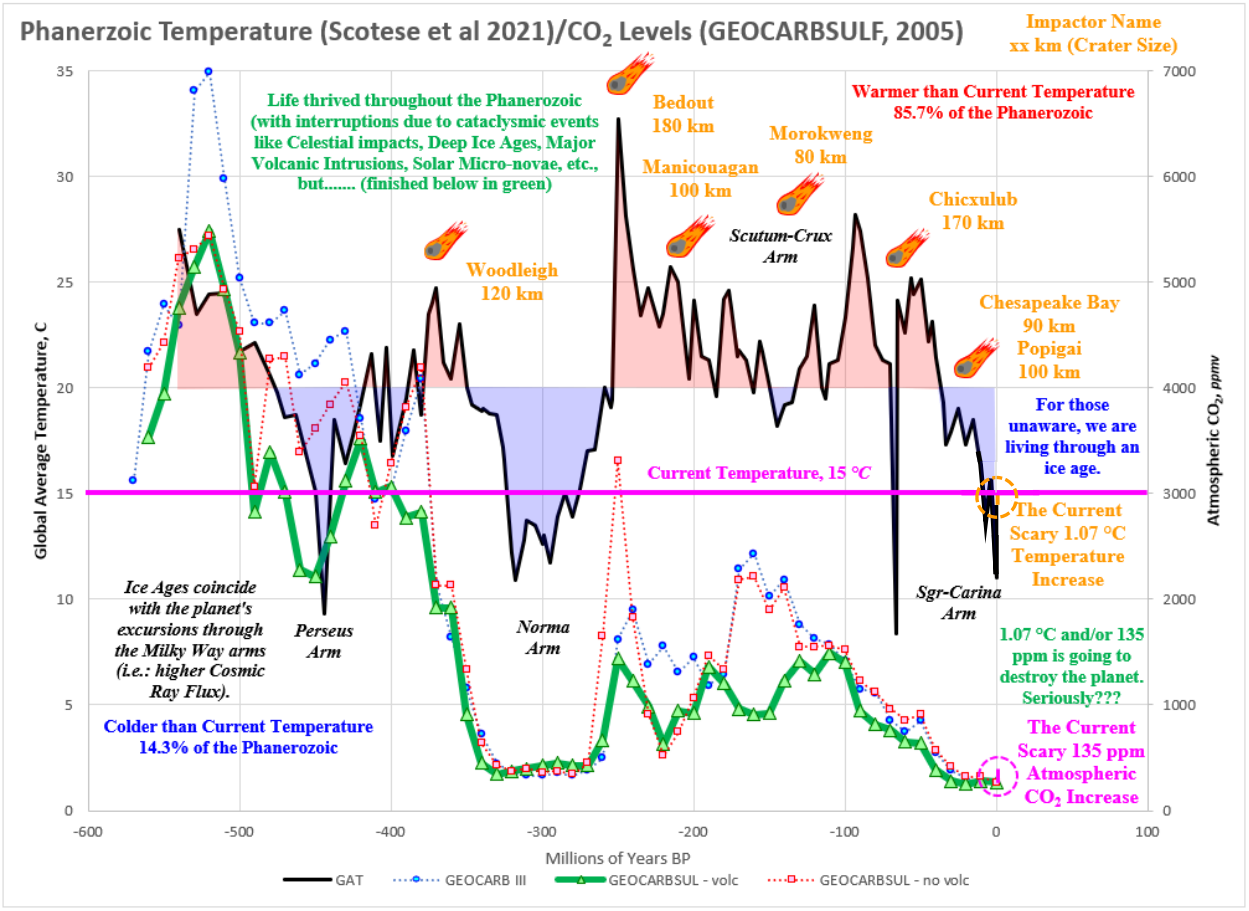
are reabsorbing CO_2). The temperatures rise and fall based on the Milankovitch Cycles (CSS-4 – Holocene Logic – Milankovitch Cycles) for those interested in more information).

When the CO_2 concentrations are properly scaled (i.e.: 135 ppm = 1.07 °C). the plot looks very different (as shown in the lower plot to the left). The runaway CO_2 effect in the upper plot becomes lost in the natural variability of the temperature data. CO_2 is obviously not causing the temperature fluctuations in the ice core data. So, like the previous Holocene discussion, the natural forcings are dominating these time scales as well.

CO_2 does add some warming as its concentration rises, but as the data shows there are no positive feedbacks leading to runaway warming. And there is no evidence of any CO_2 tipping points that will magically propel us to any dangerously high temperature levels. Temperatures drive CO_2 and the climate on these time scales. The plot to the left shows that the same CO_2/Temperature fluctuations (individual blue data points) have occurred regularly for millions of years. More information is available on my website (CSS-10 – A Ride Through the Cenozoic). The data was presented in Westerhold et al.'s 2020 Paper *("An astronomically dated record of Earth's climate and its predictability over the last 66 million years")*. This plot (similar versions are available in the Westerhold Paper) was prepared by Willie Eschenbach, and highlights some interesting climate change information. The original data

comes from the oxygen ($\delta O_{18} \equiv O_{18}/O_{16}$) and carbon ($\delta C_{13} \equiv C_{13}/C_{12}$) isotope ratios present in benthic foraminifera pulled from deep sea sediments. To summarize, the climate over the last 66 million years has been characterized by periods of stable Temperature (Climate Platforms I to VI on the previous page), separated by major geological and celestial events, ocean current disruptions, etc. Those platform temperatures were relatively stable despite changing CO_2 levels. As with the ice core data, a 135 ppm change in CO_2 concentration and/or a 1.07 °C MTR temperature change is small and insignificant relative to the historical changes. I will let the reader do their own additional research (CSS-10) on this subject.

The figure below shows the CO_2 concentrations and Temperatures over the entire Phanerozoic (550 million years). Again, a 135 ppm change in CO_2 concentration and/or a 1.07 °C MTR temperature change is insignificant, not unusual and not unprecedented in the historical record. The natural forcings (solar (directly and indirectly)) that have driven the climate for hundreds of millions/billions of years were still active over the MTR and will continue to be active in the future despite what the IPCC programmers/climate "scientists" have decreed.



The last two plots are not quite properly scaled, the MTR is just not plotted on top of one another. The absurdity of declaring a Climate Emergency is readily visible without taking that step. Even the IPCC's worst scenarios are well within natural variability. And need I remind you the IPCC took those worst case, implausible scenarios off the table already.

CO_2 Climate Sensitivities

This is an area that is no where near "settled science". Even the IPCC uses a very unsettled 1.8 to 5.6 °C range (Equilibrium Climate Sensitivity (ECS)) based on their computer model output (shown below, courtesy Dr. John Christy). A detailed review of Dr. Christy's January 2021 presentation is available on my website (CSS-6). An empirical review of the historical data suggests that the CO_2 Transient Climate Response (TCR) is much lower at 1.0 (potentially less than 1.0) to 2.3 °C. Lewis and Curry August 2018 reviewed the available MTR data and established a median TCR at 1.33 °C and ECS of 1.66 °C. These values are on the high end, given that the natural forcings were also contributing to MTR warming. Any natural allocations would reduce the CO_2 ECS. A recent peer reviewed paper published in the International Journal of Atmospheric and Ocean Sciences (Coe, David et al., August 2021) has pushed the ECS down to 0.5 °C. Not a very pleasant paper for the CAGW alarmist crowd.

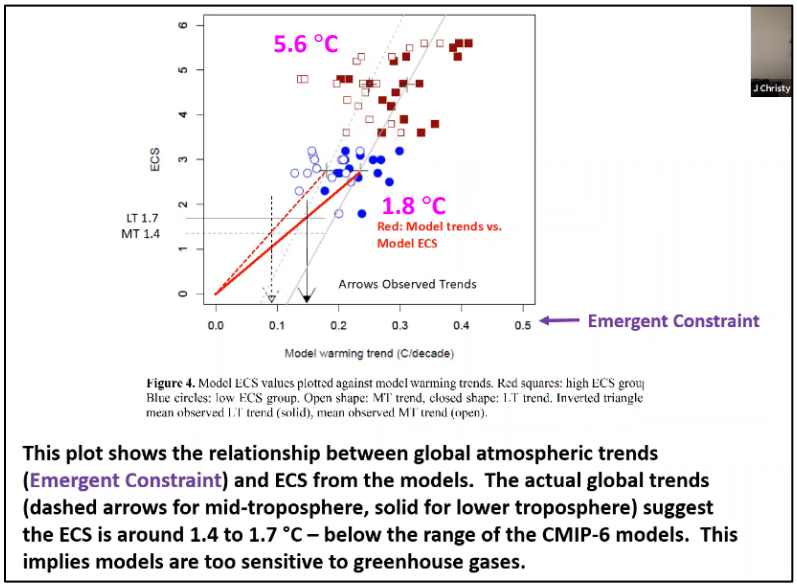


Figure 4. Model ECS values plotted against model warming trends. Red squares: high ECS group. Blue circles: low ECS group. Open shape: MT trend, closed shape: LT trend. Inverted triangle mean observed LT trend (solid), mean observed MT trend (open).

This plot shows the relationship between global atmospheric trends (Emergent Constraint) and ECS from the models. The actual global trends (dashed arrows for mid-troposphere, solid for lower troposphere) suggest the ECS is around 1.4 to 1.7 °C – below the range of the CMIP-6 models. This implies models are too sensitive to greenhouse gases.

For those unaware, the climate sensitivity reflects how much the planet will warm every time CO_2 doubles. The IPCC does use a theoretical TCR of roughly 1.2 °C, but then multiplies that number by what amounts to a fudge factor that represents their unsubstantiated positive water vapour feedback theory. **Could that have anything to do with their models running too hot?** The definitions for ECS and TCR are shown below. ECS values are higher because they represent the long-term (centuries to millennia) adjustment to any CO_2 stimulus. Do not get too wrapped up in the difference between ECS and TCR. TCR represents the changes we might expect to see over our lives.

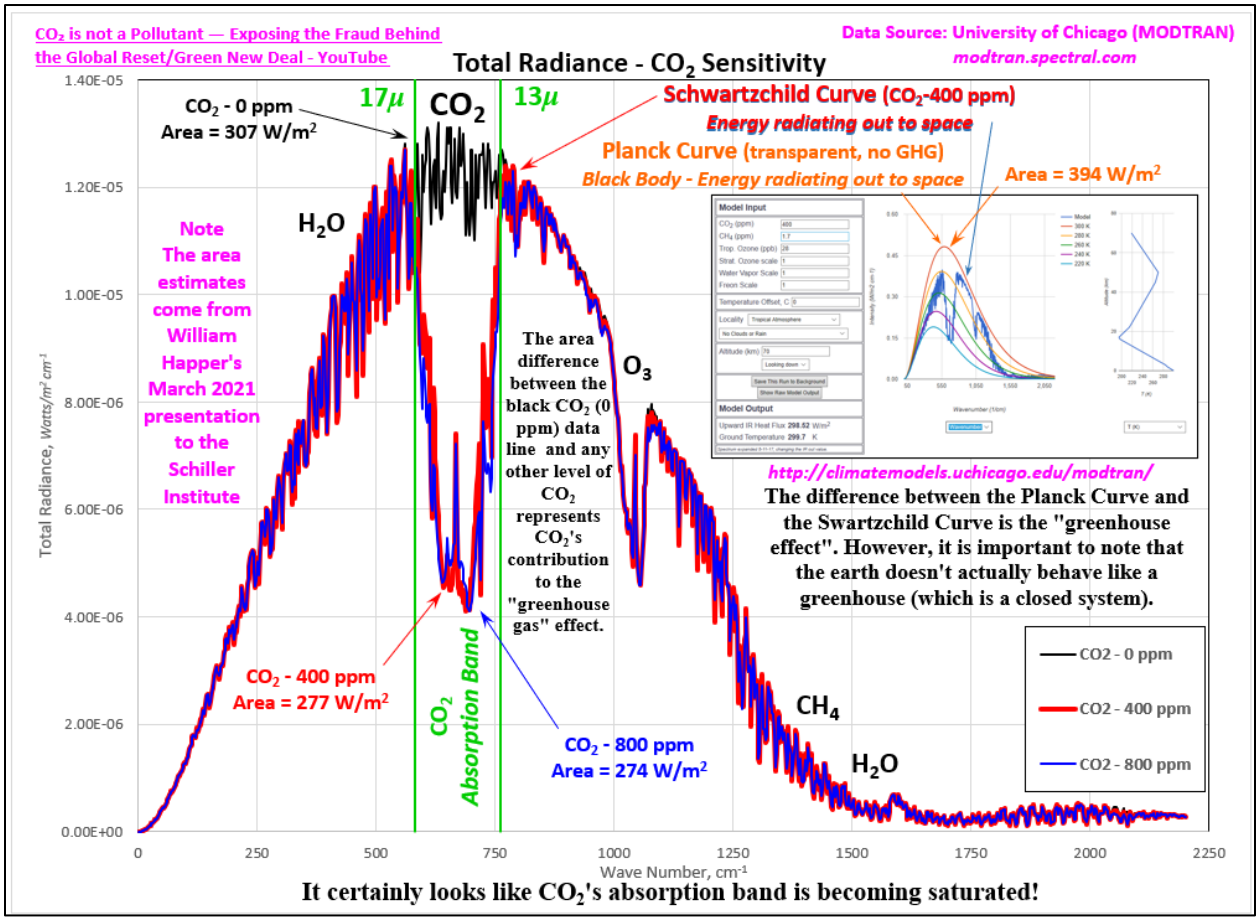
The Equilibrium Climate Sensitivity (ECS) refers to the equilibrium change in global mean near-surface air temperature that would result from a sustained doubling of the atmospheric (equivalent) carbon dioxide concentration (ΔTx2).

The Transient Climate Response, or TCR, is traditionally defined in terms of a particular calculation with a climate model: starting in equilibrium, increase CO_2 at a rate of 1% per year until the concentration has doubled (about 70 years).

CO_2's climate sensitivity is a complex subject. But regardless of which historical based ECS/TCR estimate you choose, the climate warming does not reach into the dangerous range. You can (as the IPCC does) program the models to ignore those historical estimates and almost arbitrarily, use multiples instead. Remember, that is on top of ignoring most of the available solar forcings

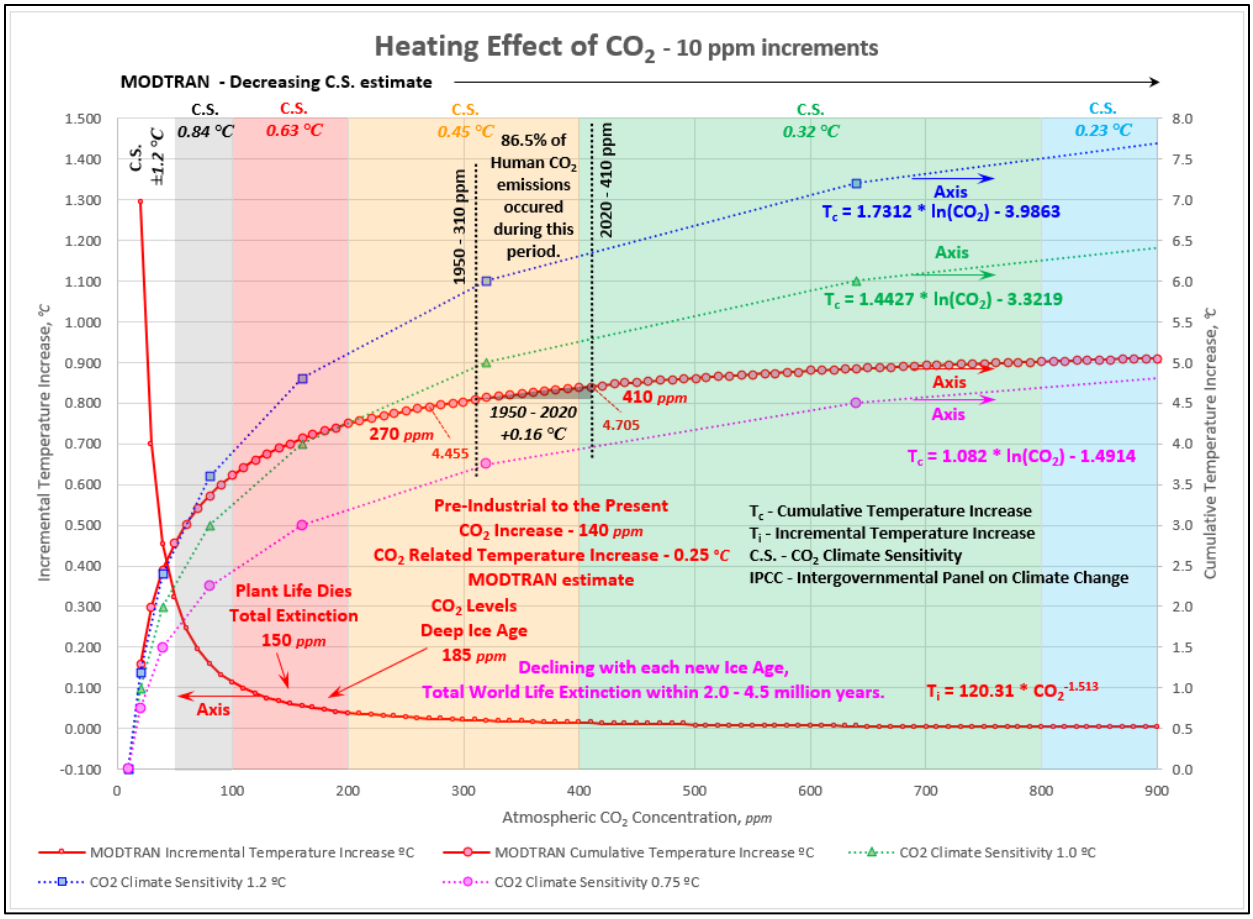
available within their CMIP6 models. Again, not surprising that their models are running too hot (based on their own self admission).

A great place to start a discussion on CO_2 Climate Sensitivity (CCS) is at the University of Chicago (specifically their MODTRAN model). The model (calibrated based on satellite measurements) simulates the energy radiating back out to space. The figure below represents that radiative process and shows the effects that gases like water (by far the most important GreenHouse Gas) and CO_2 have on the energy flow. CO_2 does have a significant effect on the energy flows within the atmosphere at lower concentrations. But as CO_2 concentrations increase the narrow absorption band (13 – 17 µm) begins to saturate. As shown below, doubling the CO_2 concentration from the current 400 ppm to 800 ppm has a very subdued radiative response.



The CCS discussion tends to treat the CCS as a pseudo universal constant (assuming the climate science community could ever settle on one number). In reality, the CCS declines steadily as CO_2 concentrations rise. The graph on the following page shows how the temperatures change based on constant CCS of 0.75, 1.0 and 1.2 °C. The remaining CCS curve is generated based on the MODTRAN model. Based on the model, CO_2 (270 ppm to 410 ppm) was responsible for 0.25 °C (23%) of the 1.07 °C MTR temperature rise. Focusing in on the post-1950 period (where 86%+ of human emissions have occurred), is associated with a 0.16 °C CO_2 contribution. The CCS associated with a CO_2 doubling from 200 to 400 ppm (a couple of miles of ice over Calgary to our present non-emergency living conditions) was just 0.45 °C. The CCS doubling to 800 will only

add 0.32 °C and a further doubling to 1600 ppm drops the CCS again to 0.23 °C. That brings us close to the maximum CO_2 concentration we could theoretically achieve by burning all the oil, gas and coal reserves on the planet. Realistically, that scenario will not happen. The good news, we are already well within the 1.5 °C target set by the 2015 Paris Accord.



Additional discussion is available on my website (CSS-3 – CO_2 Sensitivity and OPS-16 – CO_2 Sensitivity).

Over time, more and more CAGW alarmist narrative specifics have been shown to be inaccurate (listed below). Not surprising, given that there is no empirical data backing up the premise that our CO_2 emissions will lead to dangerous global temperature increases. And as I may have mentioned before, there is not even an empirical CO_2/Temperature dataset that shows CO_2 driving the climate on any statistically significant historical time scale. Remember, empirical data is a basic requirement of the Scientific Method. The CAGW alarmist narrative has no empirical data to back up their position.

- *The IPCC modelers have admitted that their models are running too hot. The possible reasons could include (but are not limited to) overestimates of CO_2 Climate Sensitivity, their unsubstantiated positive water vapour feedbacks are wrong, their assumption that natural forcings are essentially meaningless (i.e.: the solar forcings are limited to Total Solar Irradiance (TSI)) and their underestimated cloud contribution (i.e.: the dismissal of the Cosmic Ray Flux/Cloud connection).*

- *The historical Equilibrium Climate Sensitivity and Transient Climate Response estimates have both been declining over time.*
- *The worst-case emission scenarios were taken off the table by the IPCC themselves. Without implausible emission scenarios like RCP8.5 (discussed earlier), there is no Climate Emergency. Unfortunately, the IPCC does not appear to have the integrity to speak out against the mainstream media or the political establishment for continuing to base their rhetoric and policy decisions on outdated science and selective economic information.*

Climate Models

For those that are not familiar with computer modeling, there are a few key points that need to be emphasised.

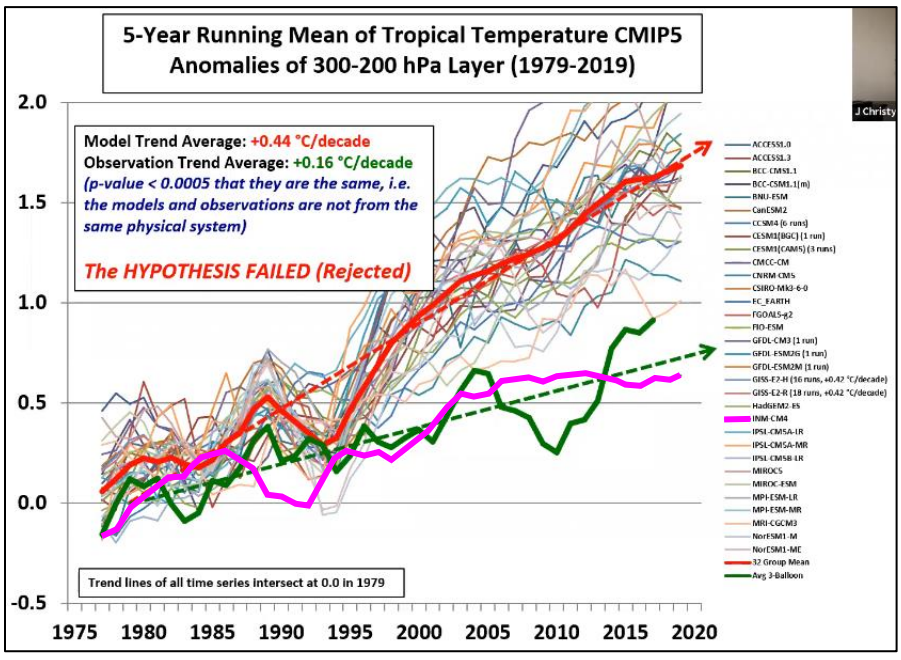
Computers are not a source of scientific proof.

Computers only output what the modelers have programmed them to. Garbage In, Garbage Out (GIGO). When the modelers admit that their models are running too hot, you might be inclined to suspect that they are operating under the GIGO principle.

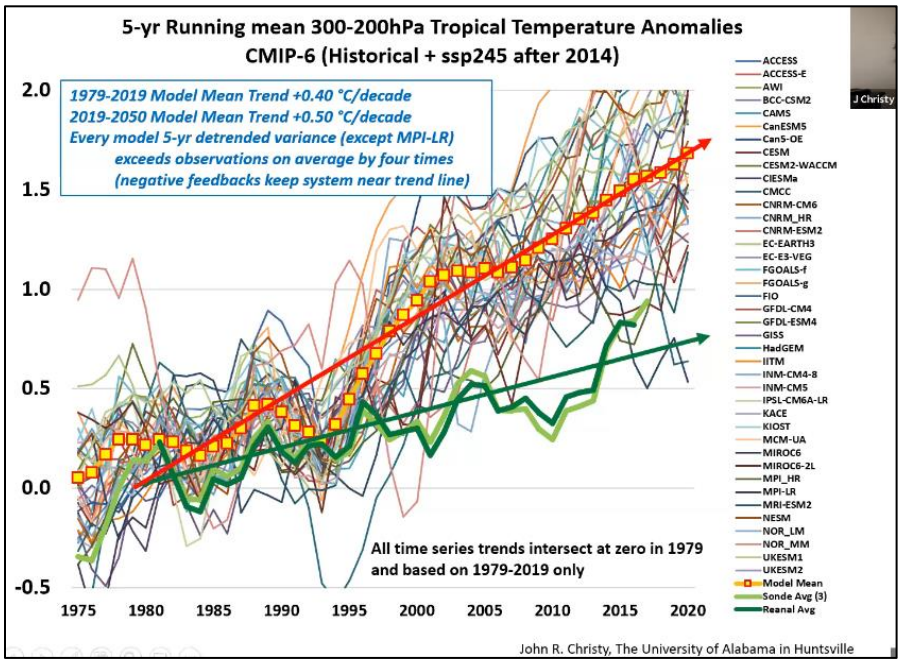
Computers can produce the same result using a near infinite number of input parameter contribution possibilities (where the subject system is complex (like "Climate Change")). With that in mind, you would think that the IPCC modelers could come up with one parameter contribution that would match the real world observations.

Computers are not capable of accurately modeling the climate system, since, in the IPCC's own words, *"The climate system is a coupled non-linear chaotic system, and therefore the long-term prediction of future climate states is not possible."*

So, here are the computer model runs (with both CMIP5 and CMIP6 protocols) compared to the observed Lower Troposphere historical temperatures. From Dr. John Christy's work (CSS-6). The



first plot is the Earlier CMIP5 protocols. We can safely say that the IPCC's July 2021 "our models are running too hot" admission is quite valid. Better late than never, but this information was readily available years ago. We do need to give the Russians some credit, since their model is at least in the right range. What was their secret? They used a low CO_2



Climate Sensitivity and a negative feedback on cloud albedo. It would appear they forgot to share that information with their peers. If the IPCC was following the real Scientific Method and basic simulation techniques, they would have recognized that 37 out of 38 models are obviously wrong. The other models should have been scrapped years ago (especially the totally embarrassing Canadian Model which has tried very hard to maintain its number one global position as the premier alarmist prognosticator). In the business world, those 37 modeling contracts would have been terminated long ago. Alternatively, the other 37 models could have adjusted their input parameters to try and actually history match the current measured temperatures and ultimately hindcast to match the longer term historical data (i.e.: the pre-MTR Holocene as an example which has negligible CO_2 influence). As per the Russians, a lower CO_2 Climate Sensitivity and a simple recognition of solar through cloud albedo would have been sufficient to get a reasonable answer (but not necessarily the right answer).

The modellers had a convenient opportunity to move away from the CAGW alarmist narrative when the new CMIP6 protocol was implemented. Significant (but not all) solar forcings (Cosmic Ray Flux and High Energy Particles) were added to the CMIP6 protocol to supplement the weak Total Solar Irradiance (TSI) forcing used in precious protocols. As mentioned earlier, beta testing showed that the MTR temperatures could be modelled without CO_2's radiative forcings. In the real world, the beta test input parameters would be adjusted to bring CO_2 back into the mix and strengthen the long-term history match. In the Virtual Reality world created by the IPCC modellers, you turn those inconvenient solar forcings off (or way down) and get back to the narrative where "the models are running way too hot".

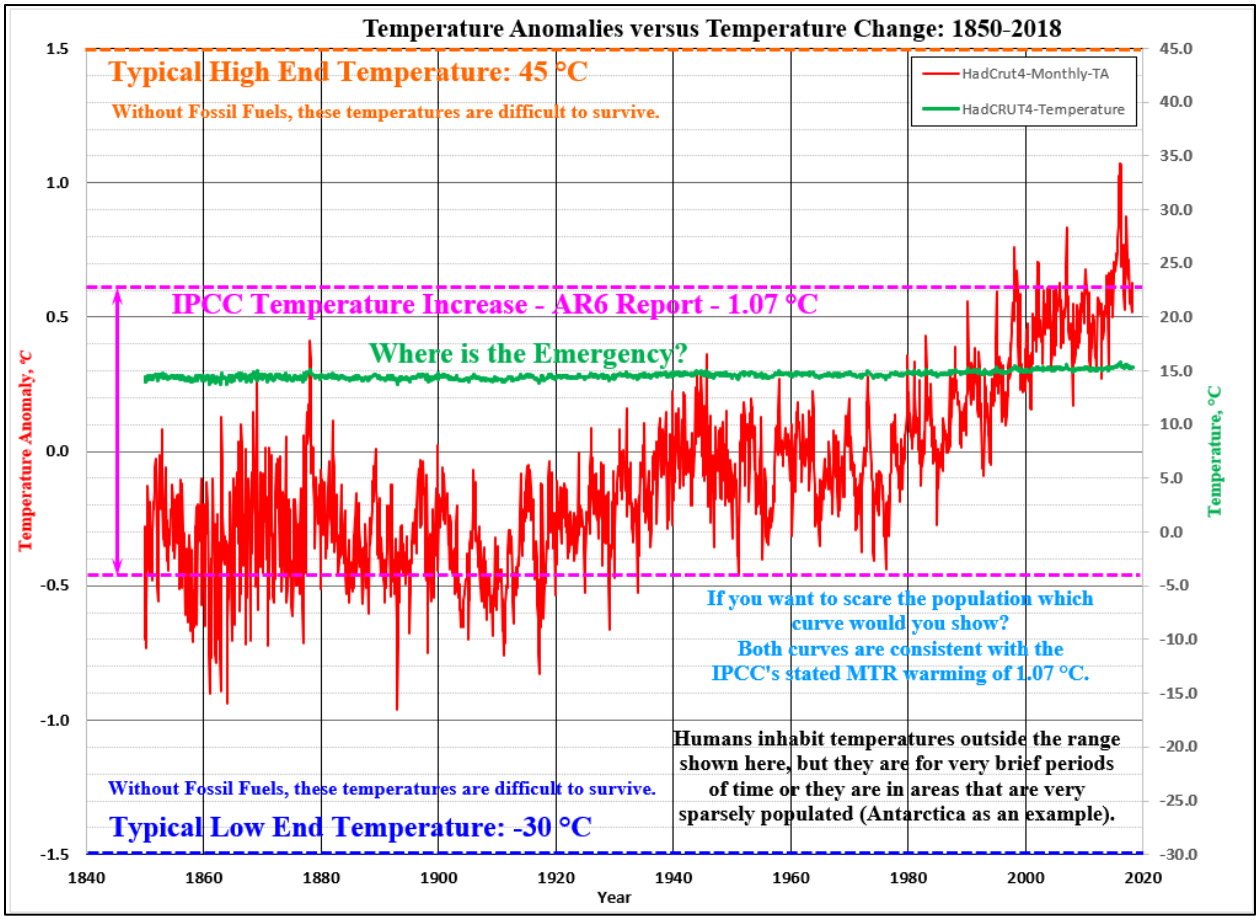
A few interesting points can be made in the transition from CMIP5 to CMIP6. Under CMIP5, the model ECS varied from roughly 1.5 to 4.5 °C. As shown earlier, the CMIP6 variation increased to a range of 1.8 to 5.6 °C. So much for settled science and scientific advancement. With the higher ECS the model outputs are more erratic and less accurate. Even the Russian model gets lost in the noise. If only there was a way to tighten up those models. The rationale for ignoring the solar forcings other than TSI was that the mechanism connecting cosmic ray flux and cloud formation was unknown/unproven. Svensmark et al.'s 2021 paper (Atmospheric ionization and cloud

radiative forcing"), referenced earlier, was recently published in Nature, laying out that connection.

The remainder of the Goodside Document is full of the same dogma that characterizes the first page. So, for those that made it this far, I applaud your willingness to listen to more than just the narrative, to at least review all the data, to make up your mind and to ultimately think for yourself.

Quick Addendum

As shown earlier, the authors put forward the usual over homogenized MTR (i.e.: the NASA-GISS surface estimates). That same temperature change, when presented in proportion to mankind's life experience, shows just how ridiculous the concept of a Climate Emergency really is. One more strike against the Climate Emergency fallacy as laid out on pages 26 and 27. I am not alone in this



position. More than 925 scientists and professionals have signed onto the Climate Intelligence Foundation's (CLINTEL) World Climate Declaration: There is no Climate Emergency.

For those with an appetite for more data, here's a couple more interesting posts, that address CO_2's ineffectiveness and the state of Snow and Ice on the planet. The last four winters have had significantly higher than normal Northern Hemisphere snow cover. Are we headed for five winters in a row? Given that many forecasts are predicting a cold snowy winter, that is a distinct possibility. Combined with the energy issues mentioned in the foreword, things are not looking that rosy.

CSS-7 – CO_2 – The FECKLESS GreenHouse Gas CSS-11 – Snow and Ice Update – July 2021