Holocene – Temperature-CO_2 Logic (Modern Temperature Record - MTR)
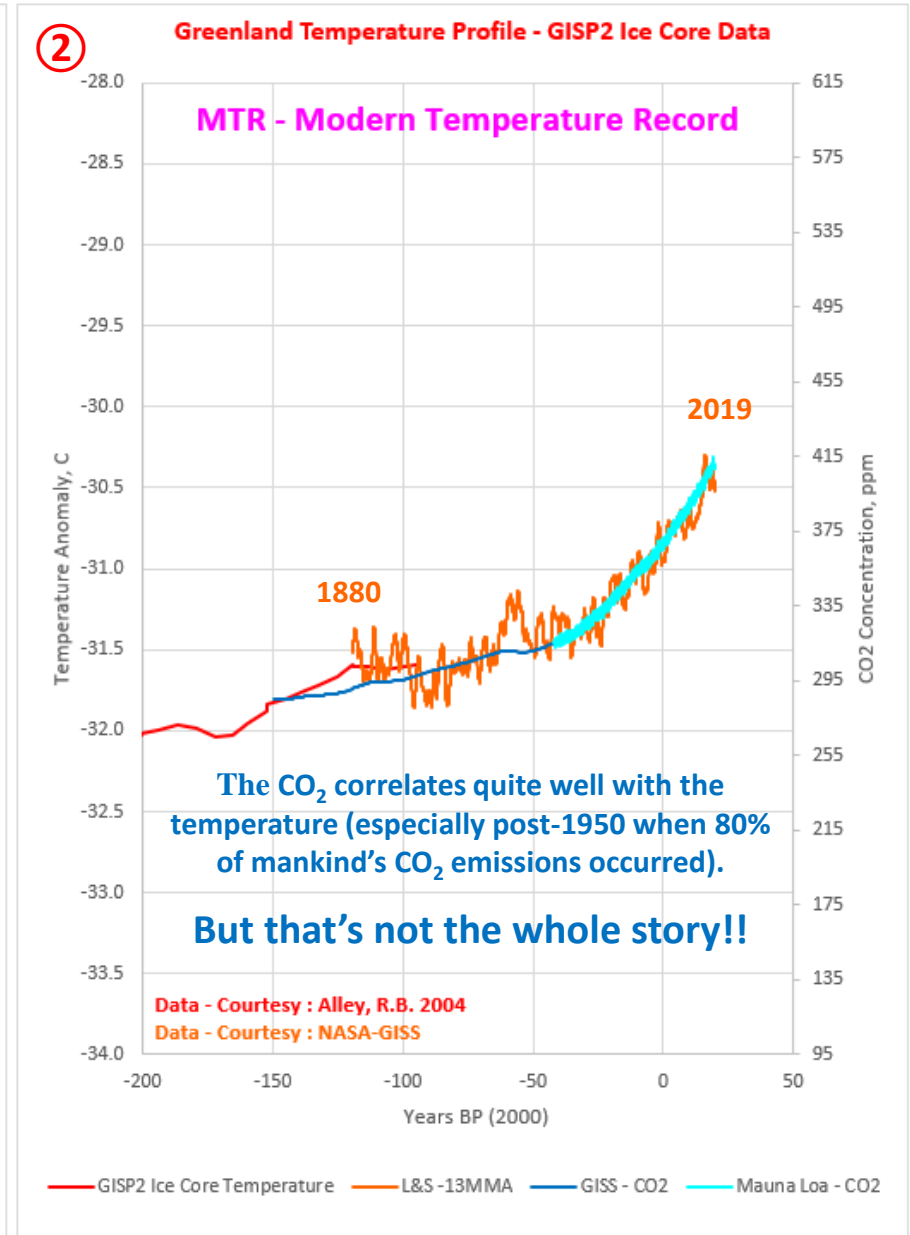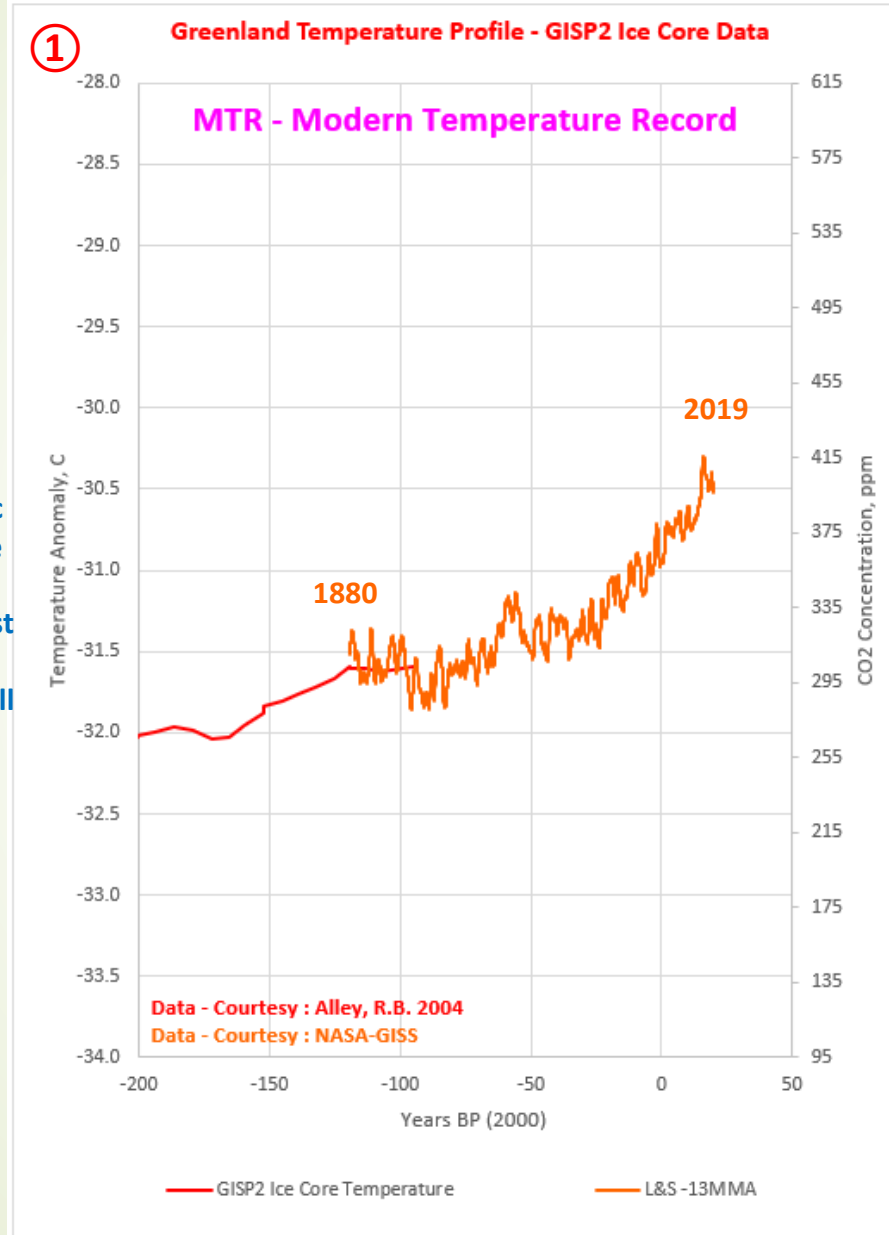
This is the first Page of my first Climate Short Story (CSS) – A look at the Holocene (Temperatures, CO_2 concentrations and Solar Activity (direct and indirect))

The first figure (①) just shows the Modern Temperature Record (MTR) based on NASA-GISS's surface data temperature record. In my opinion over-homogenized (i.e.: manipulated) to exaggerate the temperature rise so that it matches the model temperatures more closely. Regardless we'll use NASA-GISS for the bulk of the discussion.

The next figure (②) adds in the atmospheric CO_2 concentrations over the MTR. This will be the type of correlation plot that the Anthropogenic Global Warming (AGW) alarmist crowd will put forward as "proof" that CO_2 is the primary driver of "Climate Change" and will lead to catastrophic future temperatures.

H-TC-Logic MTR

The sun (not CO_2) is the primary climate driver!

Better to adapt to Climate Change (hot or COLD)!

---

① Greenland Temperature Profile - GISP2 Ice Core Data

MTR - Modern Temperature Record

2019

1880

Temperature Anomaly, C

CO_2 Concentration, ppm

Data - Courtesy : Alley, R.B. 2004
Data - Courtesy : NASA-GISS

Years BP (2000)

— GISP2 Ice Core Temperature   — L&S -13MMA

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② Greenland Temperature Profile - GISP2 Ice Core Data

MTR - Modern Temperature Record

2019

1880

Temperature Anomaly, C

CO_2 Concentration, ppm

The CO_2 correlates quite well with the temperature (especially post-1950 when 80% of mankind's CO_2 emissions occurred).

But that's not the whole story!!

Data - Courtesy : Alley, R.B. 2004
Data - Courtesy : NASA-GISS

Years BP (2000)

— GISP2 Ice Core Temperature   — L&S -13MMA   — GISS - CO2   — Mauna Loa - CO2

Figure (③) gives a brief description of what each of the main three parameters were doing during each of the five ocean cycle stages. Ocean cycles were active throughout the MTR. Solar Activity was primarily active pre-1950. If CO_2 forcings play a major role they would be more prominent post-1950 (since 80%+ of mankind's CO_2 emissions occurred since 1950). More detail on the forcings will be included later in the CSS.

The next figure (④) factors in the temperature difference between the average global temperature and what the temperature would be in a northern climate (i.e.: Greenland). The NASA-GISS surface data temperature anomaly was multiplied by 2 to reflect the arctic conditions.
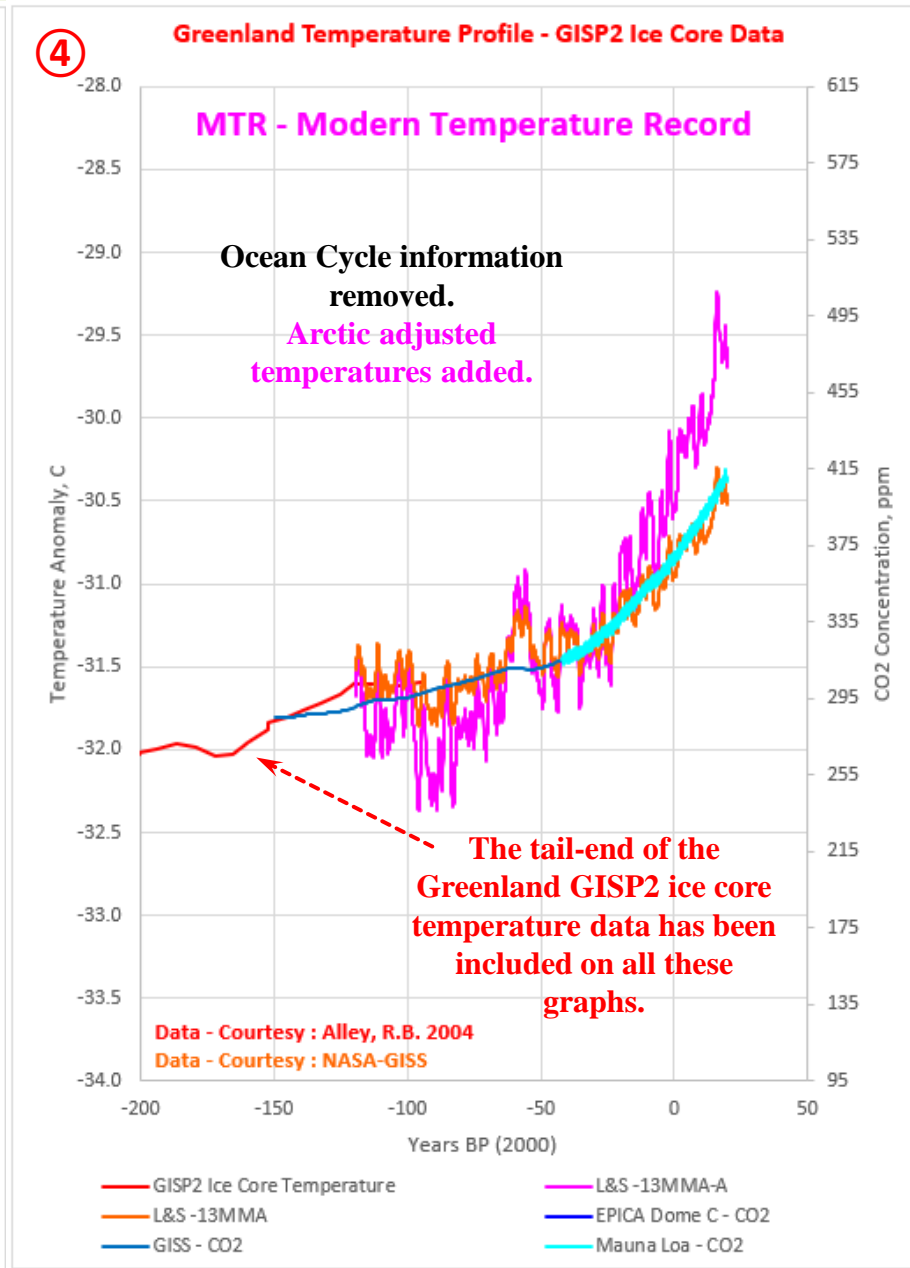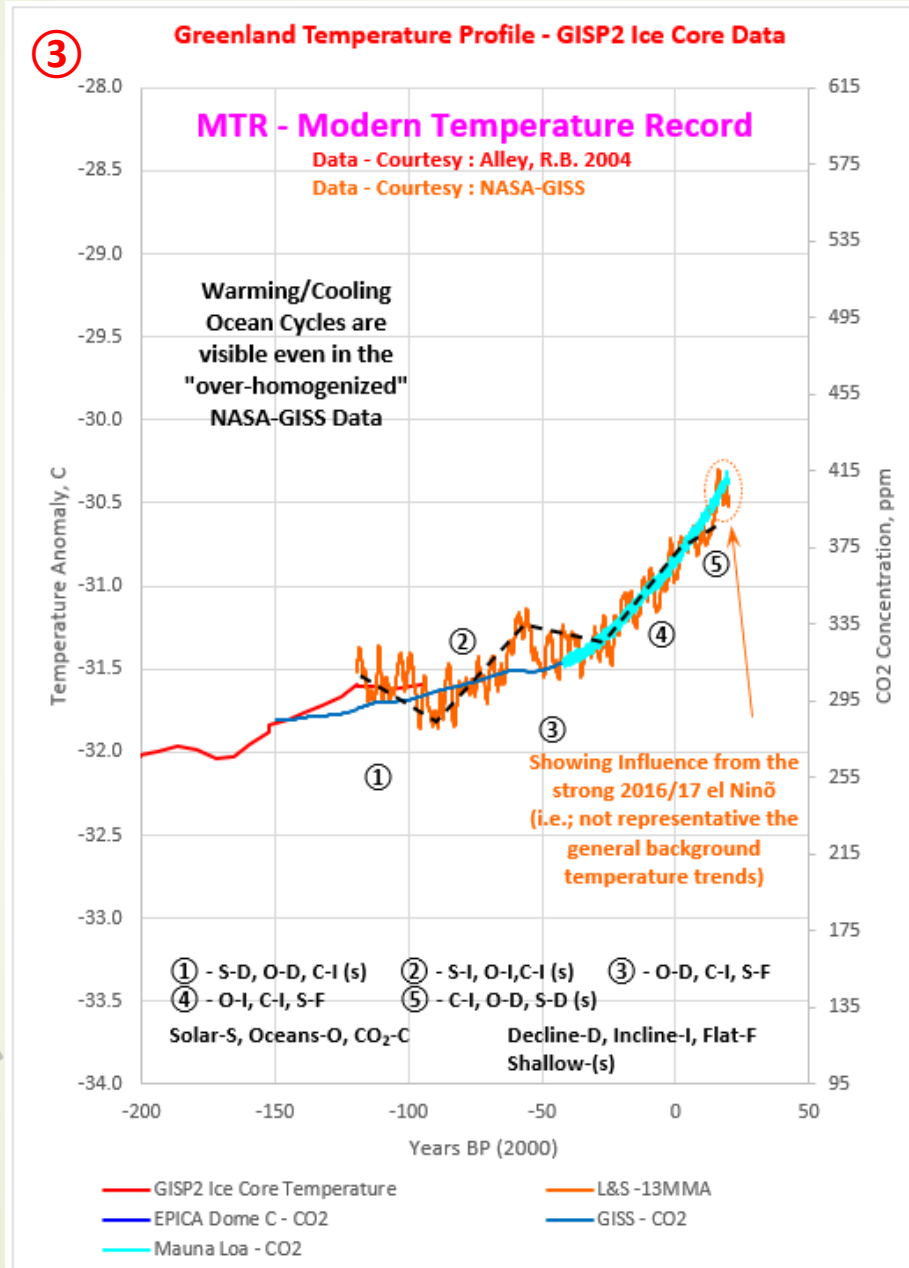
Holocene Ocean Cycles, T_{adj}

The sun, (not CO_2) is the primary climate driver!

Better to adapt to Climate Change (hot or COLD)!

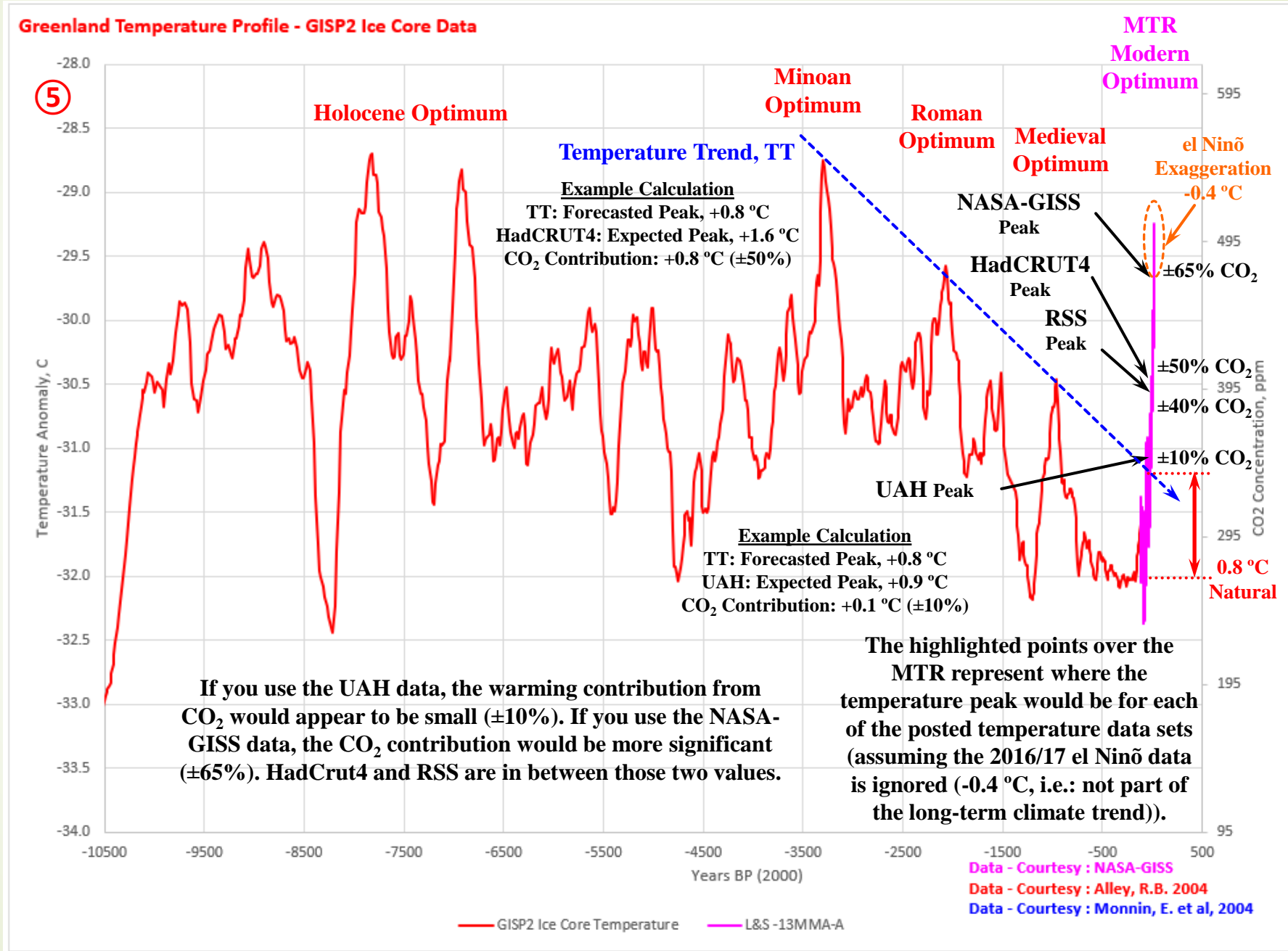Greenland Temperature Profile - GISP2 Ice Core Data

③ MTR - Modern Temperature Record
Data - Courtesy : Alley, R.B. 2004
Data - Courtesy : NASA-GISS

Warming/Cooling Ocean Cycles are visible even in the "over-homogenized" NASA-GISS Data

Showing Influence from the strong 2016/17 el Ninõ (i.e.; not representative the general background temperature trends)

① - S-D, O-D, C-I (s) ② - S-I, O-I,C-I (s) ③ - O-D, C-I, S-F
④ - O-I, C-I, S-F ⑤ - C-I, O-D, S-D (s)

Solar-S, Oceans-O, CO_2-C   Decline-D, Incline-I, Flat-F Shallow-(s)

GISP2 Ice Core Temperature   L&S -13MMA
EPICA Dome C - CO2   GISS - CO2
Mauna Loa - CO2

Greenland Temperature Profile - GISP2 Ice Core Data

④ MTR - Modern Temperature Record

Ocean Cycle information removed.
Arctic adjusted temperatures added.

The tail-end of the Greenland GISP2 ice core temperature data has been included on all these graphs.

Data - Courtesy : Alley, R.B. 2004
Data - Courtesy : NASA-GISS

GISP2 Ice Core Temperature   L&S -13MMA-A
L&S -13MMA   EPICA Dome C - CO2
GISS - CO2   Mauna Loa - CO2

Holocene – Temperature-CO_2 Logic (Temperature Profile)

Figure (⑤) broadens the picture out to include the temperature profile over the entire Holocene (based on Greenland ice core derived temperatures). Even using the over-homogenized NASA-GISS temperature data set, the MTR temperature rise is not unusual or unprecedented. Note the temperature trend has been down since the Minoan Optimum (3,400 years ago). That trend intersects the Modern Warm Period, suggesting that the expected temperature rise over the MTR due to natural processes (solar activity) would have been around 0.8 ºC (assuming the natural processes that were responsible for that trend are still active (and they are)). As with all "Climate Change" discussions, that is not the whole story. CO_2 is a factor and needs to be recognized.

The temperature trend is getting noticeably colder over the last 3,400 years (and not because of CO2). We should be thankful for whatever warming CO2 provides. The alternative (cold) would/will be disastrous!

Holocene Temperature

The sun (not CO_2) is the primary climate driver!

Better to adapt to Climate Change (hot or COLD)!

Greenland Temperature Profile - GISP2 Ice Core Data

⑤

Holocene Optimum

Minoan Optimum

Roman Optimum

Medieval Optimum

MTR Modern Optimum

Temperature Trend, TT

Example Calculation
TT: Forecasted Peak, +0.8 ºC
HadCRUT4: Expected Peak, +1.6 ºC
CO_2 Contribution: +0.8 ºC (±50%)

el Ninõ Exaggeration -0.4 ºC

NASA-GISS Peak

HadCRUT4 Peak

RSS Peak

UAH Peak

±65% CO_2

±50% CO_2

±40% CO_2

±10% CO_2

0.8 ºC Natural

Example Calculation
TT: Forecasted Peak, +0.8 ºC
UAH: Expected Peak, +0.9 ºC
CO_2 Contribution: +0.1 ºC (±10%)

If you use the UAH data, the warming contribution from CO_2 would appear to be small (±10%). If you use the NASA-GISS data, the CO_2 contribution would be more significant (±65%). HadCrut4 and RSS are in between those two values.

The highlighted points over the MTR represent where the temperature peak would be for each of the posted temperature data sets (assuming the 2016/17 el Ninõ data is ignored (-0.4 ºC, i.e.: not part of the long-term climate trend)).

Temperature Anomaly, C

Years BP (2000)

CO2 Concentration, ppm

Data - Courtesy : NASA-GISS
Data - Courtesy : Alley, R.B. 2004
Data - Courtesy : Monnin, E. et al, 2004

GISP2 Ice Core Temperature   L&S -13MMA-A

Holocene – Temperature-CO₂ Logic (Temperature-CO₂ Profile)

Figure (⑥) adds in the atmospheric CO_2 concentrations over the rest of the Holocene. Plotted assuming that most of the MTR warming was due to CO_2 (as per Figure (②)) and the CAGW alarmists). What immediately becomes obvious is the significant temperature fluctuations that occur over the Holocene despite a very steady and generally flat atmospheric CO_2 concentration prior to the MTR. CO_2 is obviously not responsible for those temperature fluctuations and neither is mankind (again, 80+% of mankind's CO_2 emissions have occurred post-1950).
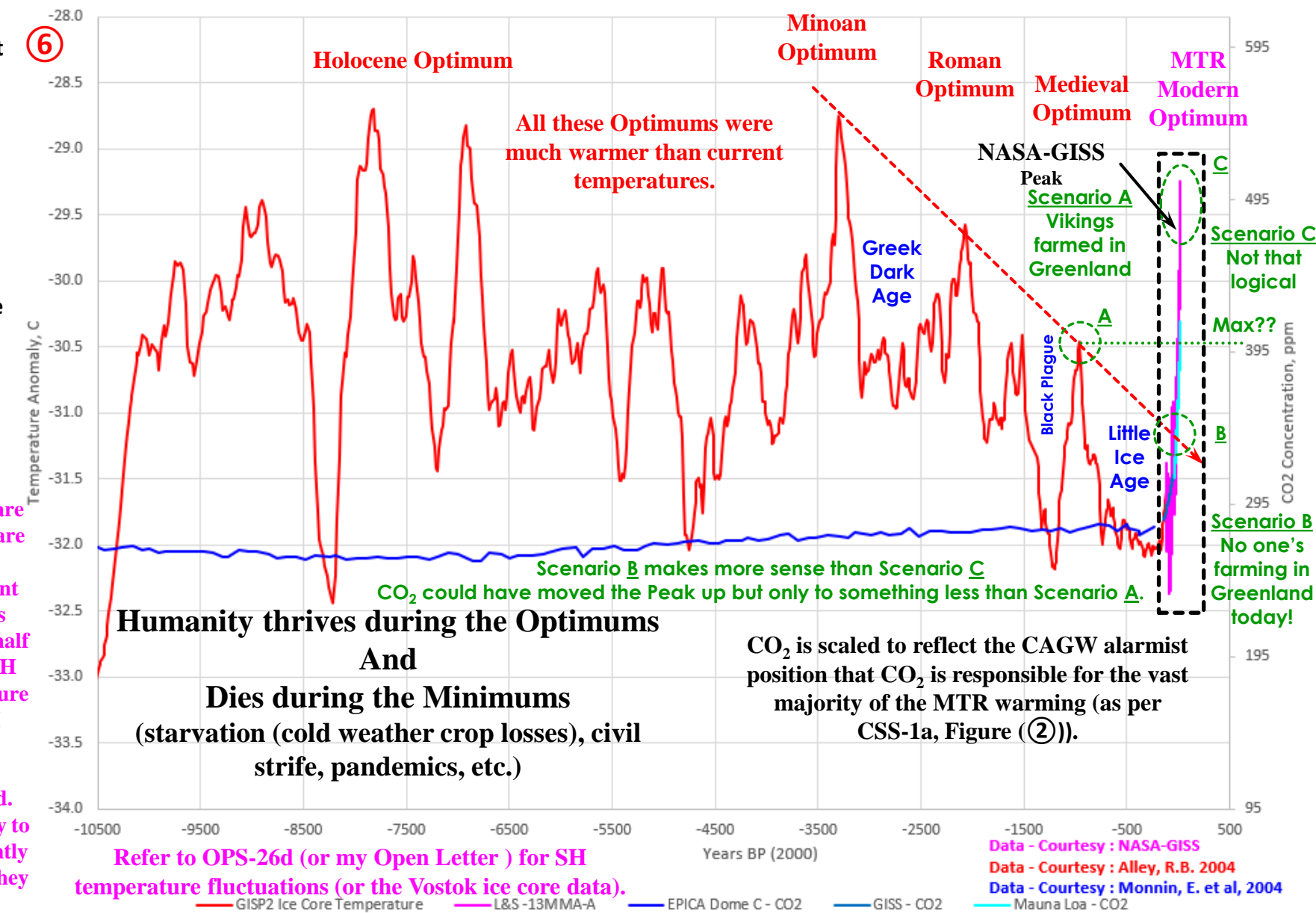
Natural processes (primarily solar related) are the origin of these temperature fluctuations and they are still active regardless of what the IPCC programming community has decreed. Ignoring solar activity projections is a very dangerous policy decision (but that is exactly what our respective world governments are doing).

Holocene - T-CO₂

The sun, (not CO₂) is the primary climate driver!

For those that will quickly declare these temperature fluctuations are a northern hemisphere (NH) phenomena and do not represent the global temperature, that is partially correct, but the NH is half of the global average and the SH has its own significant temperature fluctuations. The NH and SH consolidated temperature fluctuations are still very significant and not CO_2 related. The NH and SH react differently to solar inputs due to the significantly different land/ocean splits, but they do not cancel each other out.

Greenland Temperature Profile - GISP2 Ice Core Data

⑥

Holocene Optimum

Minoan Optimum

Roman Optimum

Medieval Optimum

MTR Modern Optimum

All these Optimums were much warmer than current temperatures.

NASA-GISS Peak

Scenario A Vikings farmed in Greenland

C

Scenario C Not that logical

A

Max??

Greek Dark Age

Black Plague

Little Ice Age

B

Scenario B No one's farming in Greenland today!

Scenario B makes more sense than Scenario C
CO_2 could have moved the Peak up but only to something less than Scenario A.

Humanity thrives during the Optimums
And
Dies during the Minimums
(starvation (cold weather crop losses), civil strife, pandemics, etc.)

CO_2 is scaled to reflect the CAGW alarmist position that CO_2 is responsible for the vast majority of the MTR warming (as per CSS-1a, Figure (②)).

Refer to OPS-26d (or my Open Letter) for SH temperature fluctuations (or the Vostok ice core data).

Temperature Anomaly, C

CO2 Concentration, ppm

Years BP (2000)

Data - Courtesy : NASA-GISS
Data - Courtesy : Alley, R.B. 2004
Data - Courtesy : Monnin, E. et al, 2004

— GISP2 Ice Core Temperature   — L&S -13MMA-A   — EPICA Dome C - CO2   — GISS - CO2   — Mauna Loa - CO2

CSS-1e

Holocene Temperature-CO₂ Logic

Figure (⑦) is a general discussion summarizing the previous plots in terms of their relation to reality. Solar activity (directly and indirectly (for example ocean cycles)) and CO_2 all contribute to Climate Change in a **Climate Reality** (which includes the MTR).
In the computer-generated **AGW Virtual Reality** put forward by the AGW alarmist crowd, the natural processes are programmed to be virtually zero. More on that as the CSS continues.

More detail? Search "Ronald Davison climate"

Holocene Reality

The sun, (not CO₂) is the primary climate driver!

Better to adapt to Climate Change (hot or COLD)!

Greenland Temperature Profile - GISP2 Ice Core Data

⑦ **Is CO_2 a contributor to the MTR temperature fluctuation? Yes, but so are the natural processes that have and will continue to dominate the Holocene!!**

AGW Virtual Reality

MTR

Climate Reality

Is CO_2 a contributor to the pre-MTR Holocene temperature fluctuations? Marginally at best!!

As per CSS-1c, the magnitude of natural process domination is subject to the temperature data set chosen

Climate Reality
Climate Change is driven by a variety of factors (including CO_2, however briefly) and different factors dominate at different times. CO_2 has virtually no role prior to the MTR (and only a very minor role in the pre-1950 portion of the MTR).

AGW Virtual Reality
The AGW alarmist crowd lives in this virtual reality world created by the IPCC computer programmers. A world where the primary drivers of climate are virtually limited to anthropogenic causes (dominated by CO_2 emissions). As laid out in CSS-1f (the next chapter in this CSS).

Years BP (2000)

Data - Courtesy : NASA-GISS
Data - Courtesy : Alley, R.B. 2004
Data - Courtesy : Monnin, E. et al, 2004

GISP2 Ice Core Temperature — L&S -13MMA-A — EPICA Dome C - CO2 — GISS - CO2 — Mauna Loa - CO2

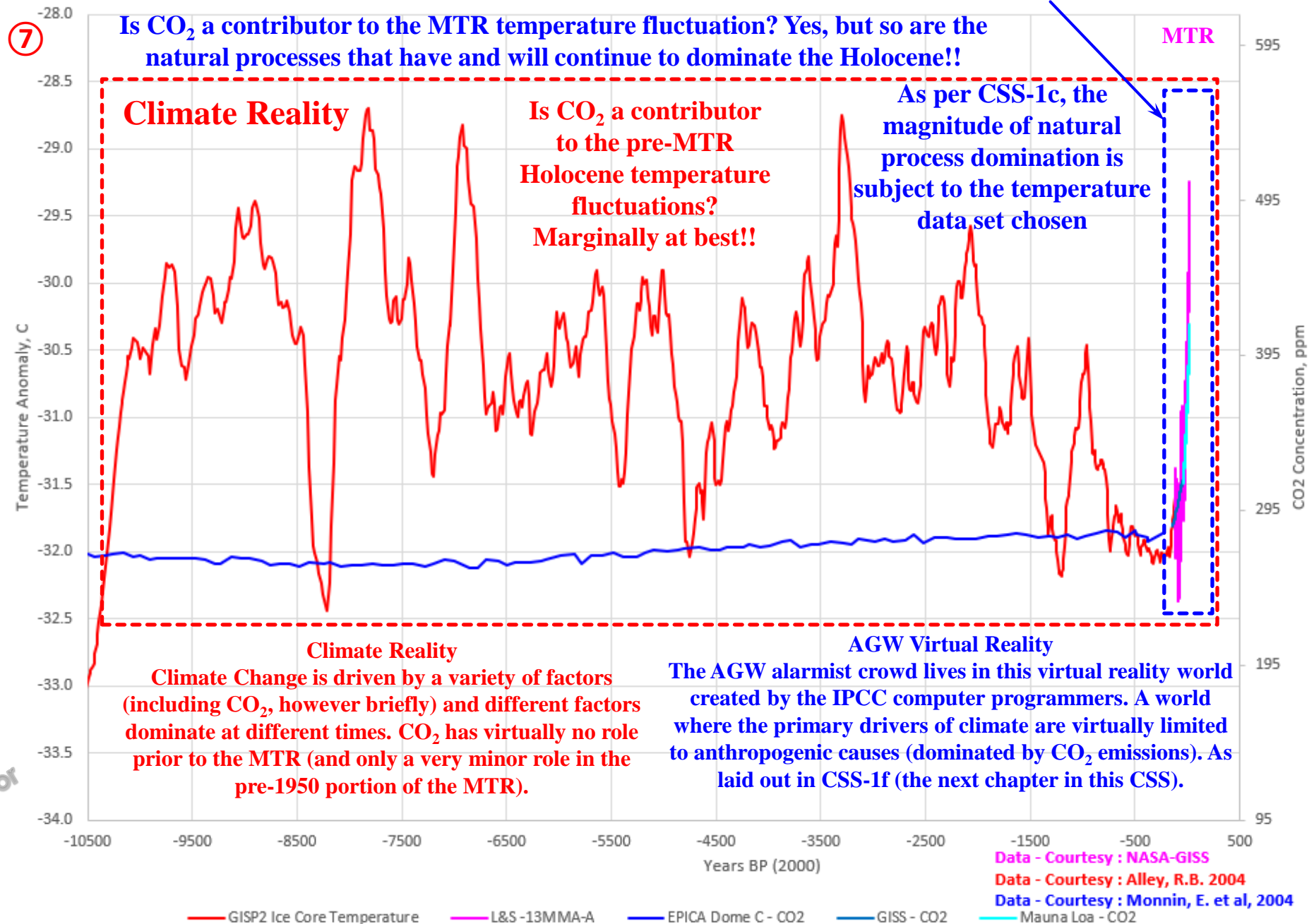# Holocene - Temperature-CO$_2$ Logic – Radiative Forcings

Figure (⑧) lays out the radiative forcings used in the IPCC computer models. The AGW bias couldn't be more blatant.

The IPCC models just do not account for the natural processes that have obviously played a very significant role in the Holocene temperature fluctuations (refer back to CSS-1d).

With respect to computer simulations, if you can't history match the past, you can't effectively predict the future!!! Yet our political elite are making policy decisions based on these unvalidated (disproved) models

The IPCC model has more than just CO$_2$ as a driver, but they could just as easily run the model with just CO$_2$ and CH$_4$ and got the same result. All the other drivers magically cancel out or were just programmed to be ineffectual.
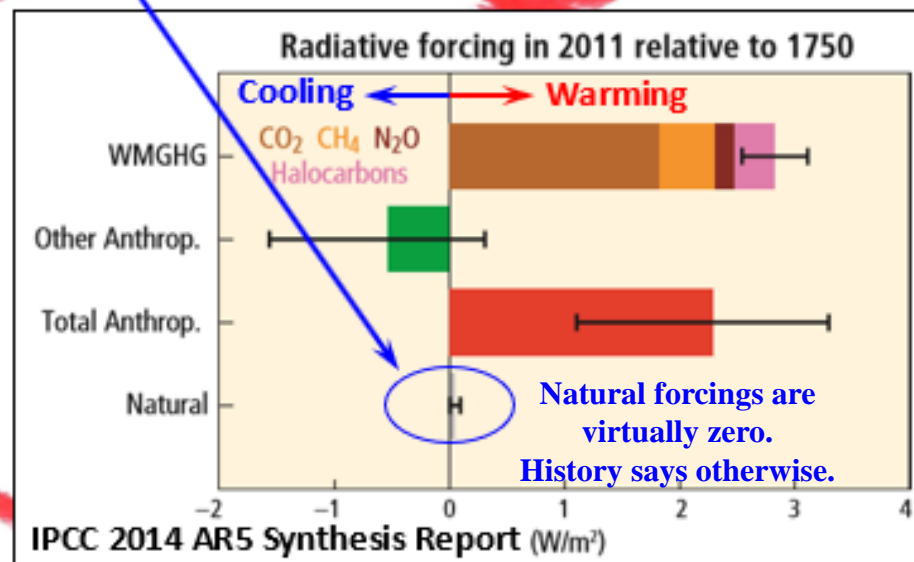
Holocene MTR - Forcings

More detail? Search "Ronald Davison climate"

The sun (not CO$_2$) is the primary climate driver!

Better to adapt to Climate Change (hot or COLD)!

⑧

The computer models have literally been programmed to respond to only Anthropogenic forcings. Not likely!!!

Radiative forcing in 2011 relative to 1750

Cooling ← → Warming

WMGHG — CO$_2$ CH$_4$ N$_2$O Halocarbons

Other Anthrop.

Total Anthrop.

Natural

Natural forcings are virtually zero. History says otherwise.

−2   −1   0   1   2   3   4

IPCC 2014 AR5 Synthesis Report (W/m²)

History began prior to 1750. A fact that many AGW alarmists tend to forget and/or ignore.

This is the heart of the IPCC computer models!

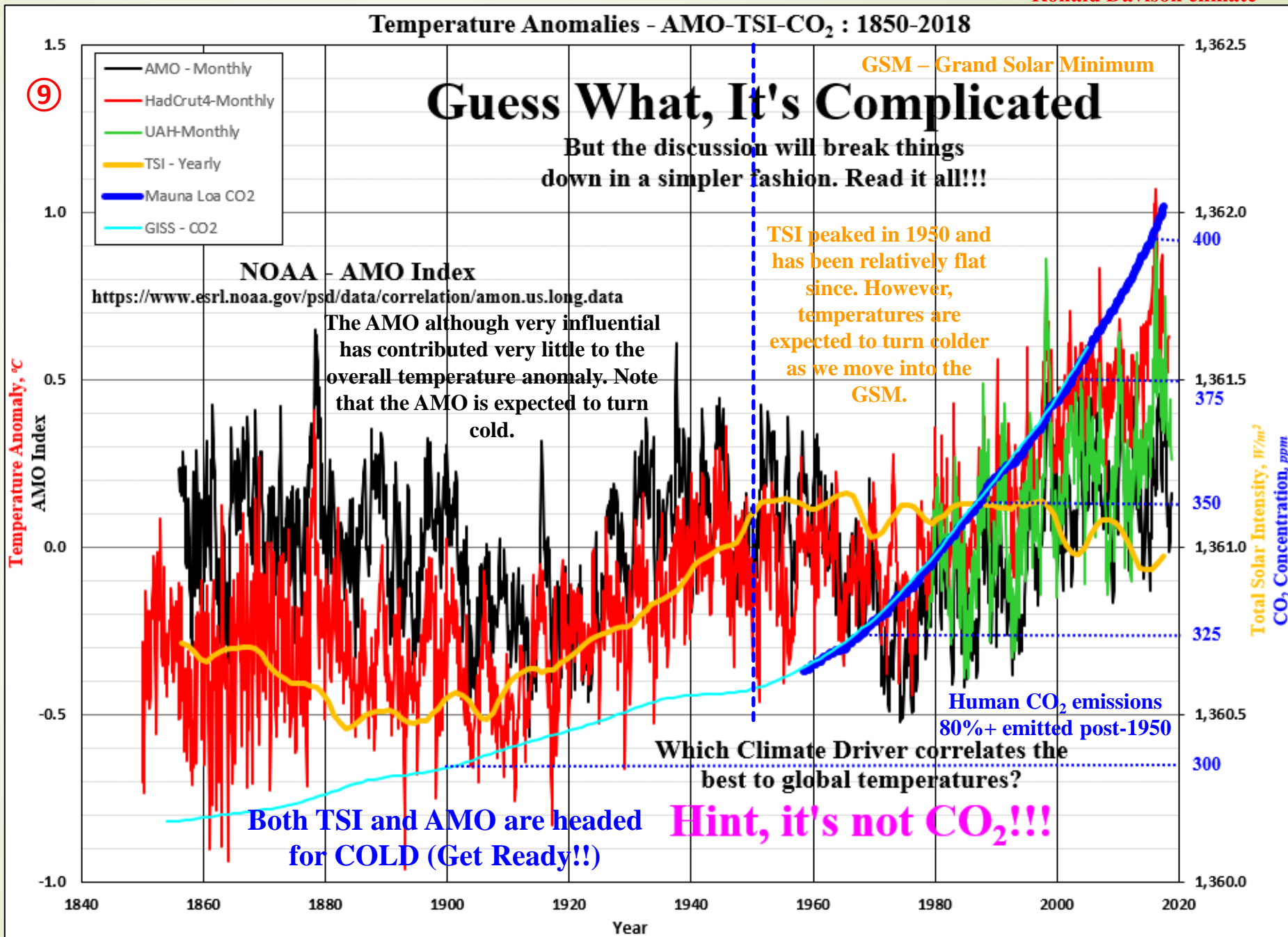For 4 billion years, natural forces (primarily the sun (directly and indirectly)) have driven the climate.

And now suddenly CO$_2$ is the only parameter driving the global climate. Nature just doesn't work that way!!

CSS-1g

Figure (⑨) focusses in on the MTR again. The global temperatures have been plotted together with a few key drivers to show just how complicated the climate system is (even over a short period like the MTR).

NASA-GISS surface temperatures have been replaced by HadCRUT4 surface temperatures (less manipulated) and supplemented with the UAH satellite Lower Troposphere temperature data (for comparison).

The AMO (Atlantic Multi-decadal Oscillation) appears to be very influential over the MTR (especially if the UAH satellite data is substituted for the HadCRUT4 data post-1978). Half of the MTR temperature increase occurred pre-1950. Given that 80%+ of mankind's CO$_2$ emissions were post-1950, solar activity (using TSI as a proxy) is the most likely pre-1950 driver. Post-1950, CO$_2$ could play a more significant role (but not a dangerous one and is dependent on the temperature data set used).

Holocene MTR - Data

Figure (⑨) was used in my Open Letter Addendum and OPS-8.

The sun (not CO$_2$) is the primary climate driver!

Better to adapt to Climate Change (hot or COLD)!

⑨

Temperature Anomalies - AMO-TSI-CO$_2$: 1850-2018

Legend:
- AMO - Monthly
- HadCrut4-Monthly
- UAH-Monthly
- TSI - Yearly
- Mauna Loa CO2
- GISS - CO2

GSM – Grand Solar Minimum

Guess What, It's Complicated

But the discussion will break things down in a simpler fashion. Read it all!!!

NOAA - AMO Index
https://www.esrl.noaa.gov/psd/data/correlation/amon.us.long.data

The AMO although very influential has contributed very little to the overall temperature anomaly. Note that the AMO is expected to turn cold.

TSI peaked in 1950 and has been relatively flat since. However, temperatures are expected to turn colder as we move into the GSM.

Human CO$_2$ emissions 80%+ emitted post-1950

Which Climate Driver correlates the best to global temperatures?

Hint, it's not CO$_2$!!!

Both TSI and AMO are headed for COLD (Get Ready!!)

Temperature Anomaly, $^\circ c$ / AMO Index

Total Solar Intensity, W/m^2 / CO$_2$ Concentration, ppm
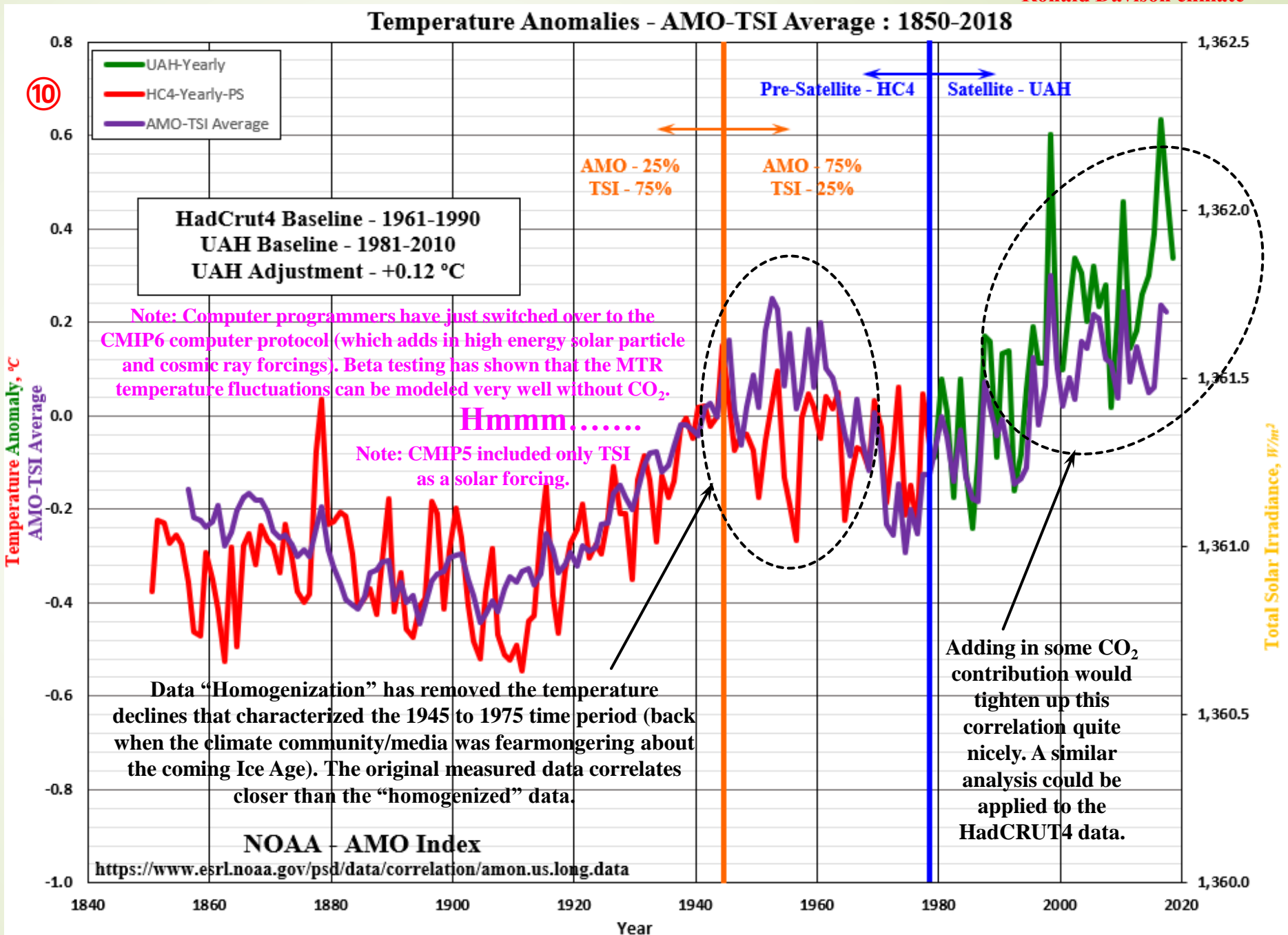
Year

Holocene - Temperature-CO₂ Logic – MTR-Key Data

Figure (⑩) uses the data from Figure (⑨) to develop a simple model that can be used to describe the temperature changes over the MTR. The first point to highlight is that no CO_2 contribution was required to come up with this result. Is this the final answer, no. As I've said many times, I believe that CO_2 has played a significant role over the MTR. The magnitude of that contribution is subject to a variety of assumptions. As shown here, using the UAH satellite temperature data requires very little CO_2 contribution. The same analysis could be used for the HadCRUT4 surface temperature data with a higher CO_2 contribution (but not at a level that would ever lead to dangerous global temperatures).

The AMO-TSI combination has been plotted here against the temperature data (HadCRUT4 – pre-1979 and UAH, post-1978). The AMO-TSI weightings are as laid out on the graph. Solar activity peaked in 1950 and leveled out (i.e.: solar activity was more influential pre-1950).

Holocene MTR - Data

Figure (⑩) was used in my Open Letter Addendum and OPS-8.

The sun, (not CO₂) is the primary climate driver!

Better to adapt to Climate Change (hot or COLD)!

Temperature Anomalies - AMO-TSI Average : 1850-2018

⑩

Legend:
- UAH-Yearly (green)
- HC4-Yearly-PS (red)
- AMO-TSI Average (purple)

Pre-Satellite - HC4 | Satellite - UAH

AMO - 25% / TSI - 75%

AMO - 75% / TSI - 25%

HadCrut4 Baseline - 1961-1990
UAH Baseline - 1981-2010
UAH Adjustment - +0.12 °C

Note: Computer programmers have just switched over to the CMIP6 computer protocol (which adds in high energy solar particle and cosmic ray forcings). Beta testing has shown that the MTR temperature fluctuations can be modeled very well without CO_2.

Hmmm.......

Note: CMIP5 included only TSI as a solar forcing.

Adding in some CO_2 contribution would tighten up this correlation quite nicely. A similar analysis could be applied to the HadCRUT4 data.

Data "Homogenization" has removed the temperature declines that characterized the 1945 to 1975 time period (back when the climate community/media was fearmongering about the coming Ice Age). The original measured data correlates closer than the "homogenized" data.

NOAA - AMO Index
https://www.esrl.noaa.gov/psd/data/correlation/amon.us.long.data

Y-axis (left): Temperature Anomaly, °C / AMO-TSI Average

Y-axis (right): Total Solar Irradiance, W/m²

X-axis: Year

Holocene - Temperature-CO_2 Logic – Key Thoughts

Is "Climate Change" (the CAGW alarmist version) really an existential threat to humanity or might that designation be reserved for something like a pandemic (COVID-19 comes to mind) or the human devastation that historically occurs during Grand Solar Minimums (like the GSM were descending into)?

Better to adapt to Climate Change (hot or COLD)!

Holocene Key Thoughts

The sun (not CO_2) is the primary climate driver!

1. CO_2 correlates (loosely) to the MTR temperature record, but AMO/TSI (as a proxy) and CO_2 correlates a whole lot better together (note: the three parameters are listed in influential importance). CO_2's importance is dependent on the chosen MTR data set. If UAH data is chosen, very little CO_2 contribution is required ($\pm$10%). If NASA-GISS's over homogenized data is chosen, the contribution might be around $\pm$65%. Doesn't appear to be all that settled! As usual, the answer is probably somewhere between those two estimates. Ultimately, you can choose whatever temperature data set you desire since none of them will lead to catastrophically warmer temperatures.

2. The CO_2 correlation over the MTR (the last $\pm$170 years of the Holocene) is somewhat irrelevant since the correlation is virtually non-existent pre-MTR Holocene. If your computer model cannot simulate the historical data, the model is worthless as a predictive tool. Regardless, computer models are not proof of anything **(Garbage In, Garbage Out (GIGO))**. Yet these models are the sole rationale for current climate policy.

3. The models have been proven wrong repeatedly, yet our political elites still use their output for Climate Policy (sounds like the traditional definition of insanity). As an aside the only model that comes close to predicting the Lower Tropospheric Temperatures is the Russian INM-CM5 model. What's their secret? They use a low CO_2 Climate Sensitivity and use a negative cloud feedback (i.e. most cloud cover cools the planet and more clouds leads to more cooling). Maybe it's time to start with the best model (the Russian one) and refine the climate forcings from there. And maybe use the new solar forcings added to the new CMIP6 computer protocol. Just a thought!

4. Focusing on CO_2 emissions is detrimental to the environment, the economy and society. There are real pollution problems (CO_2 is not a pollutant) and poverty situations (denying third world countries access to cheap energy kills millions each year), etc. that are being ignored with the singular focus on CO_2 emissions. Ultimately, widespread renewable energy is not green, environmentally sound or safe.

5. Focusing on an unproven theory like Catastrophic Anthropogenic Global Warming (CAGW), ignores the real and present danger that the widely predicted Grand Solar Minimum presents. The colder temperatures over the next decade nor two will be a lot more dangerous than the mild warming that CO_2 hopefully provides us.

Still waiting for someone (climate scientist or not) to present a CO_2-Temperature data set that shows CO_2 driving the climate on any statistically significant historical time scale! Without that data (which doesn't exist), CAGW theory remains just that, a theory (and not a good one).

Holocene – Temperature-CO₂ Logic (Temperature-CO₂ Profile) - Simplified

More detail? Search "Ronald Davison climate"

Figure (⑪) makes one last attempt to simplify the Holocene temperature discussion as much as possible but still emphasize the futility of the current state of climate modelling and recognizes the real and near-term threat associated with "Climate Change" (i.e.: GSM cooling).
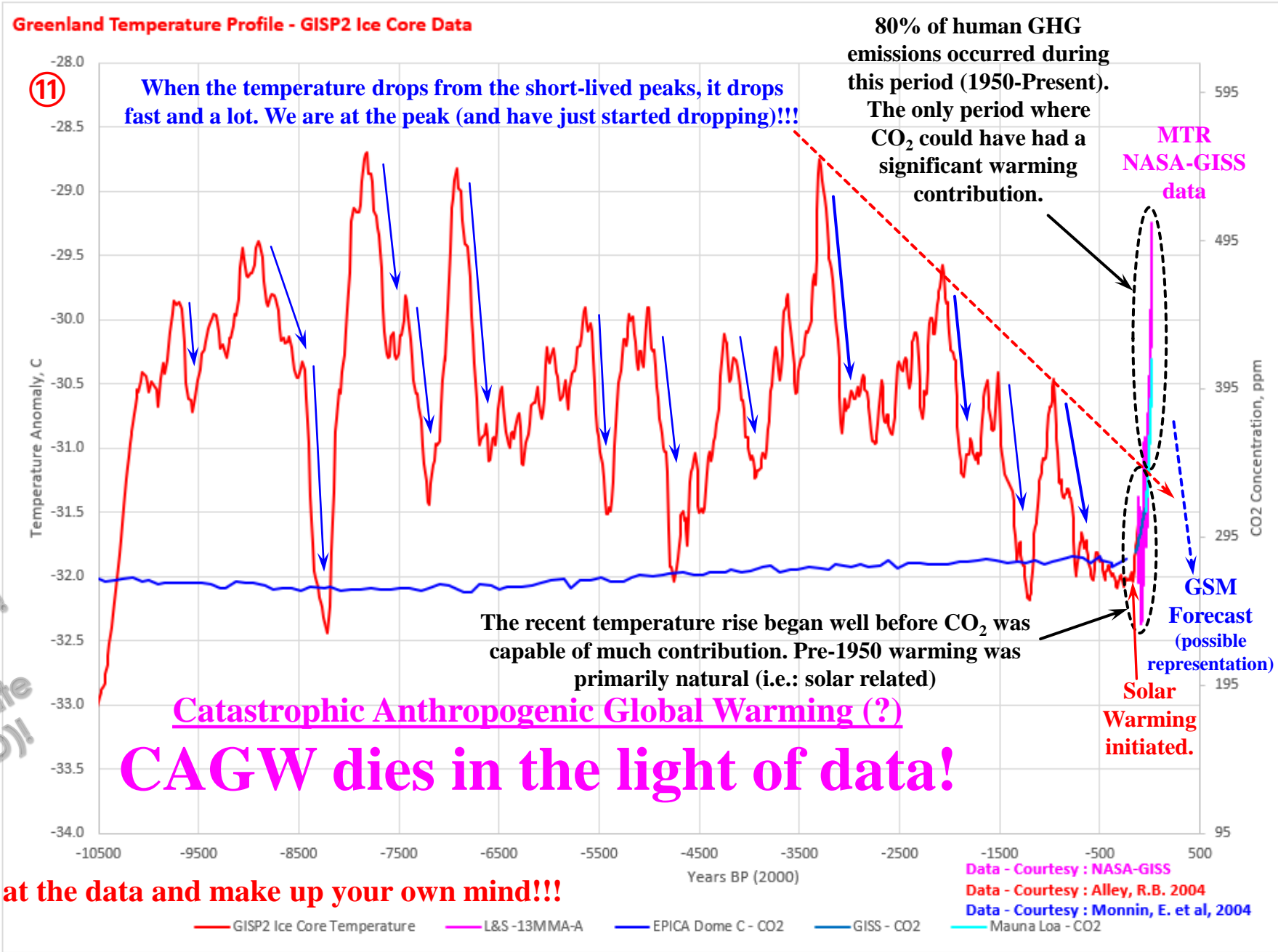
A CO₂ focused computer model based on the MTR (as all IPCC models are) can simply not be used to hindcast (and therefore forecast) temperatures over the Holocene.

The opportunity to update the IPCC modelling mindset is available with the new CMIP6 protocol. Will the "climate scientists" take that opportunity before the GSM proves how wrong they have been over the next decade or two? We'll see!

The solar warming began as expected based on the roughly 1200-year solar cycle. CO₂ may have added to the warming (how much is dependent on which MTR temperature data set is chosen).

Holocene - T-CO₂ Simplified

The sun, (not CO₂) is the primary climate driver!

Better to adapt to Climate Change (hot or COLD)!

Greenland Temperature Profile - GISP2 Ice Core Data

⑪ **When the temperature drops from the short-lived peaks, it drops fast and a lot. We are at the peak (and have just started dropping)!!!**

80% of human GHG emissions occurred during this period (1950-Present). The only period where CO₂ could have had a significant warming contribution.

MTR NASA-GISS data

GSM Forecast (possible representation)

The recent temperature rise began well before CO₂ was capable of much contribution. Pre-1950 warming was primarily natural (i.e.: solar related)

Solar Warming initiated.

Catastrophic Anthropogenic Global Warming (?)

CAGW dies in the light of data!

Look at the data and make up your own mind!!!

Data - Courtesy : NASA-GISS
Data - Courtesy : Alley, R.B. 2004
Data - Courtesy : Monnin, E. et al, 2004

GISP2 Ice Core Temperature — L&S -13MMA-A — EPICA Dome C - CO2 — GISS - CO2 — Mauna Loa - CO2