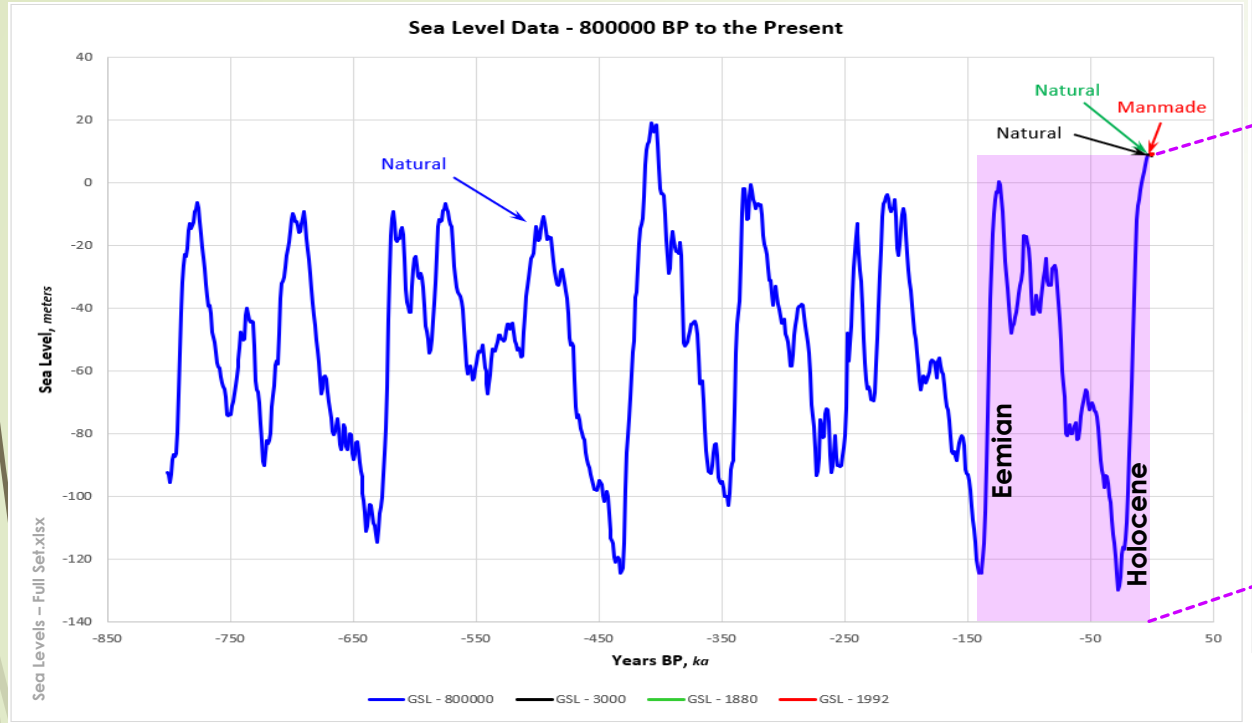
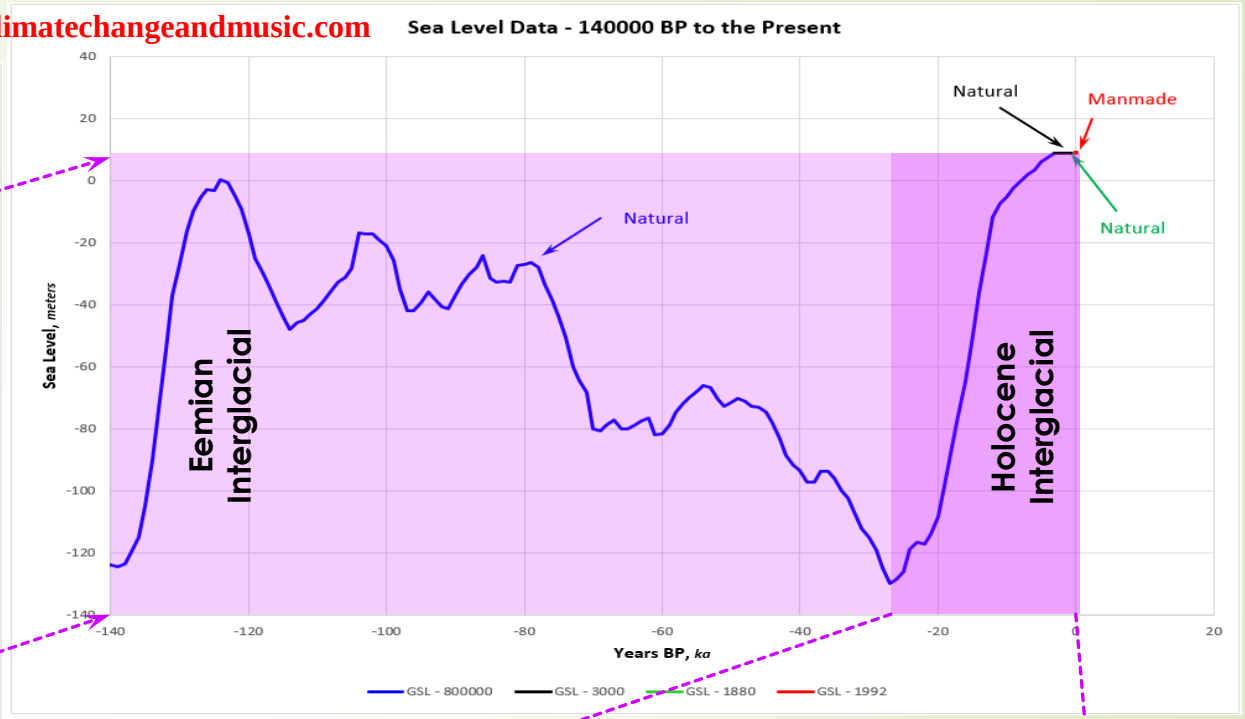
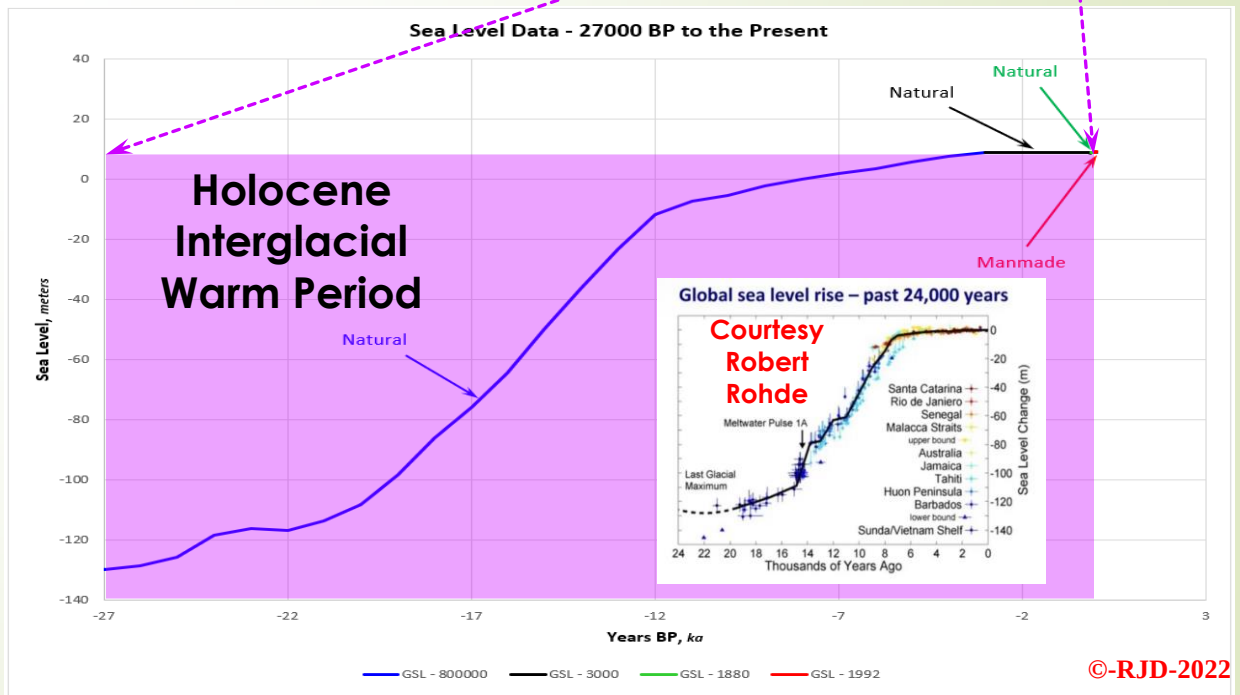
CSS-18a Sea Level - Global Temperatures

More detail? climatechangeandmusic.com







Historical Sea Level

Global Sea Levels: Current & Historic Global Sea Level Heights / and Temperature Graph & Widget

The above website has catalogued sea levels over a variety of time scales. Sea Levels have been moving up and down ever since the oceans were formed. That process will continue long after humans are long gone. On the longer time scales, sea level has generally (and logically) moved up and down with the global temperature (in accordance with the Milankovitch Cycles). And like the CO_2 concentration over those periods, the temperature is driving those changes. The first chart (above) covers the 800,000-year ice core record. The second chart (above, right) covers the Eemian and our current Holocene interglacial warm periods (140,000 years). The third curve (to the right) shows just the sea level rise out of the Last Glacial Maximum (LGM, 27,000 years). The common theme for the Catastrophic Anthropogenic Global Warming alarmist crowd, that small blip that you cannot see (on the right of each of these plots) is manmade and dangerous. Oh, scary indeed. Personally, I think I could outrun climate change induced sea level rise. More detail on the following plots.

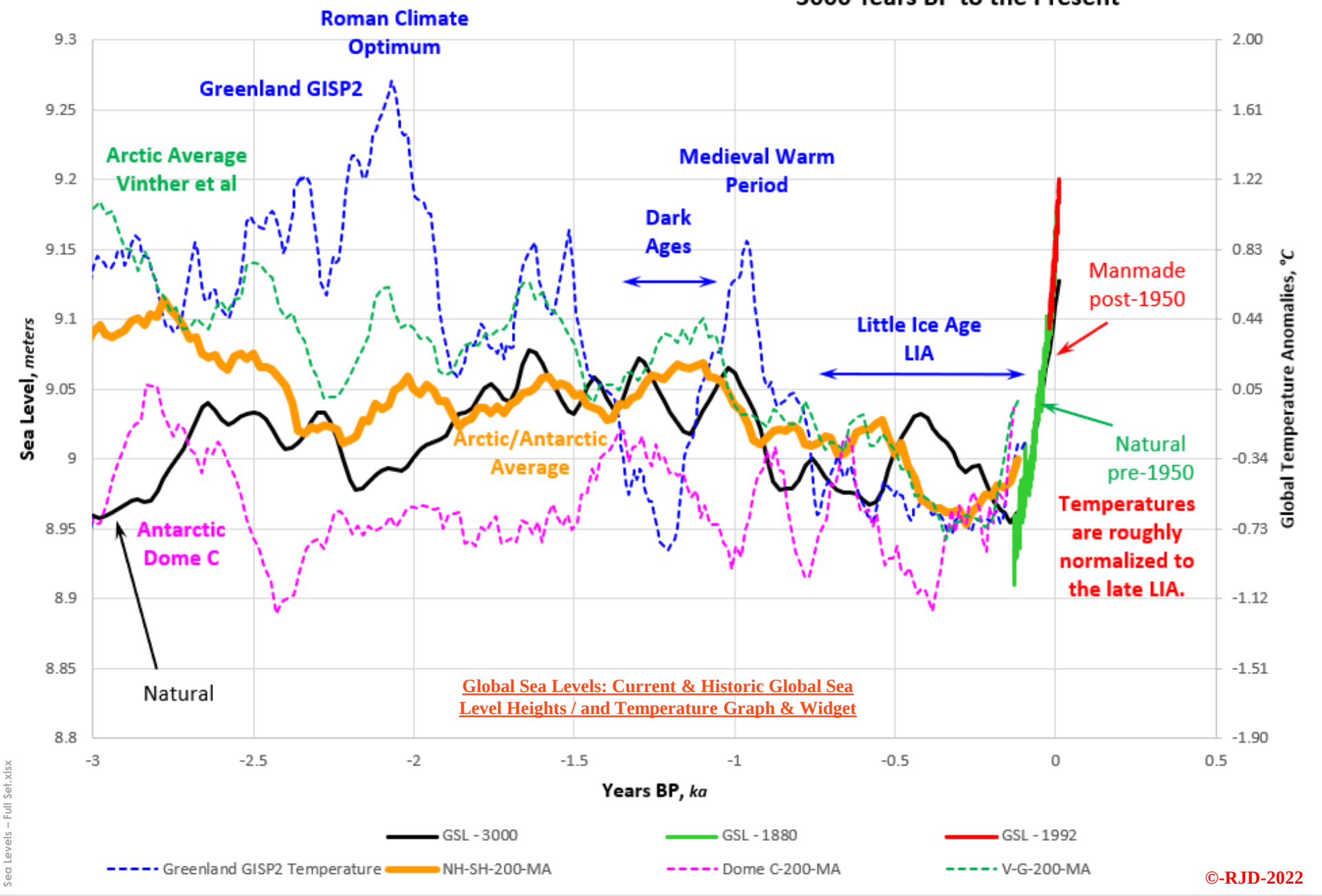
CSS-18b

Sea Level Global Temperatures

This Climate Short Story has a look at the global sea level and its relationship to Global Temperatures, atmospheric CO_2 concentrations and Solar Activity (TSI). This first plot shows a variety of global temperature sets over the last 3,000 years. Do not want to be accused of cherry picking the data, do we? The blue dashed curve comes from the Greenland GISP2 ice cores. This data is too localized for some, so I have included the Vinther et al Arctic Average (dashed green line) to represent the Northern Hemisphere. The Southern Hemisphere is taken from a representative Antarctic (Dome C) ice core (dashed magenta line). The final temperature curve (the solid gold line) is the average of the Vinther and Dome C curves. Each of the curves has been roughly normalized to the depths of the Little Ice Age (LIA) and will be plotted and discussed separately over the next three slides. Note that temperatures started rising centuries before human emissions could have been a significant factor. 86%+ of human emissions occurred post-1950.

Sea Level Global Temperatures

More detail? climatechangeandmusic.com

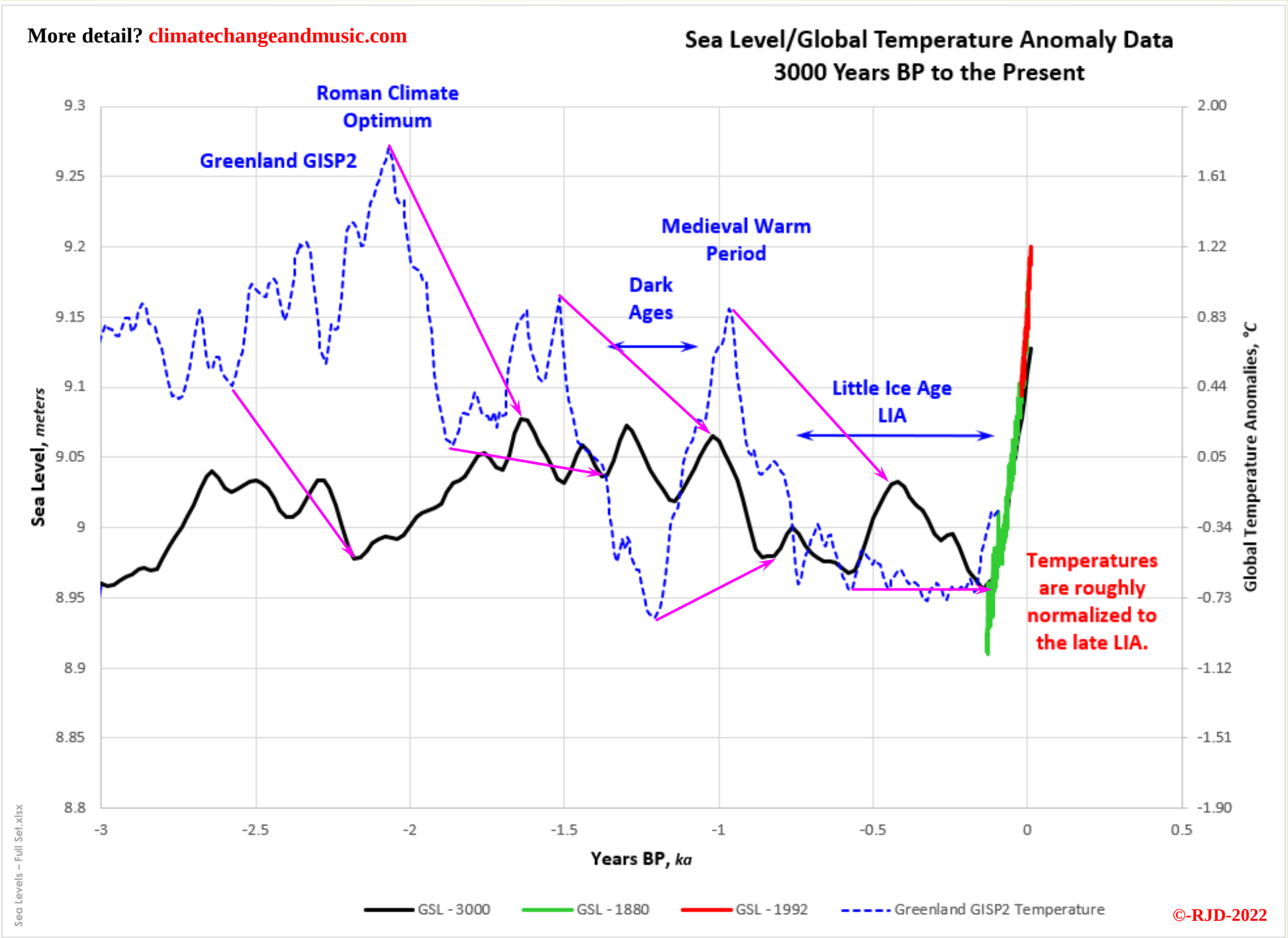


Sea Level GISP2 Temperatures

In general, sea level should respond directly to temperature changes. Those responses could be quick or delayed. Melting glaciers would be a relatively quick response (the time it takes to get from the glacier to the ocean). Thermal expansion can be quick near the surface of the ocean, but could take decades, centuries or millennia to work its way through the various depths and ocean cycles around the planet. Over the last 2,000+ years, the peak and low sea levels appear to follow the peaks in lows in the Greenland GISP2 temperatures by roughly 500 years. The Greenland GISP2 temperature data set is localized but is still important globally because the data reflects the solar activity cycles. Those cycles will affect the whole planet, but some areas react more strongly than others. Is the ±500 years a good correlation? No not really. But as I will show later it may well be a better correlation than that horrible, life sustaining CO_2 concentration that is apparently killing the planet. Is CO_2 responsible for the sea level fluctuations pre-MTR? NO!!!

Sea Level GISP2 Temperatures

More detail? climatechangeandmusic.com



CSS-18d

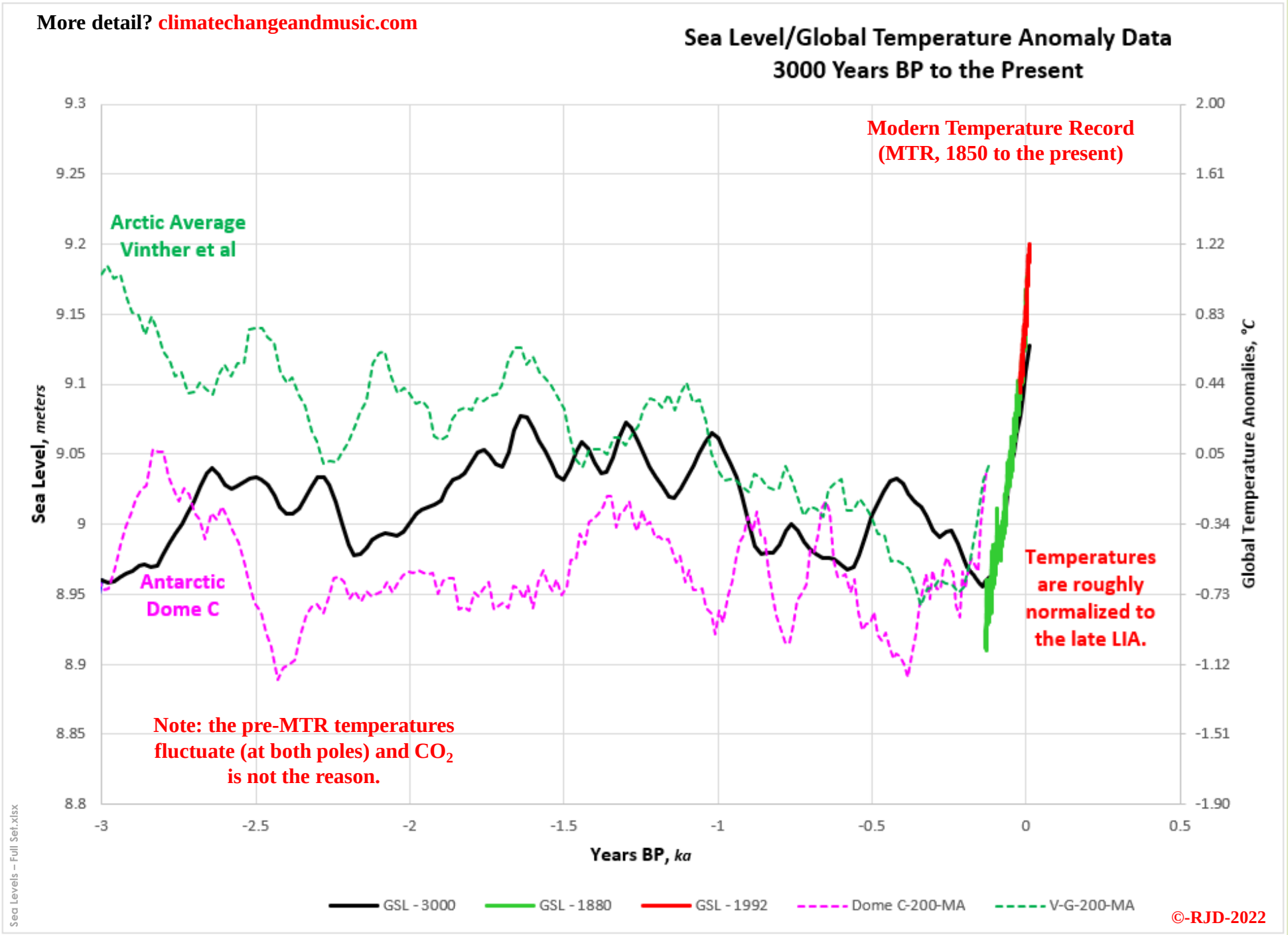
Sea Level Polar Temperatures

The polar regions will respond more to climate change than the lower latitudes. And they will also react differently to solar influences since the North Pole is in the Arctic Ocean, surrounded by land. The South Pole is located on the Antarctic Continent and is surrounded by ocean. Land and Ocean respond differently to the same solar input. There is a reason the Milankovitch cycles correlate to the solar insolation at 65° Latitude North. The Milankovitch Cycles are covered in more detail in my CSS-4 – Solar Forcing – Milankovitch Cycle post. The Obliquity cycle is the dominant cycle over the Holocene Interglacial period, but the Eccentricity, and Precession are all moving down and together are pushing us towards the next major ice age.

Sea Level Polar Temperatures

The Arctic temperatures dropped almost two degrees over the last 3,000 years with temperature fluctuations in line with the recent rise out of the LIA. Antarctic temperatures have dropped slightly overall. Keep the pre-MTR (Modern Temperature Record) Holocene temperature fluctuations in mind.

More detail? climatechangeandmusic.com

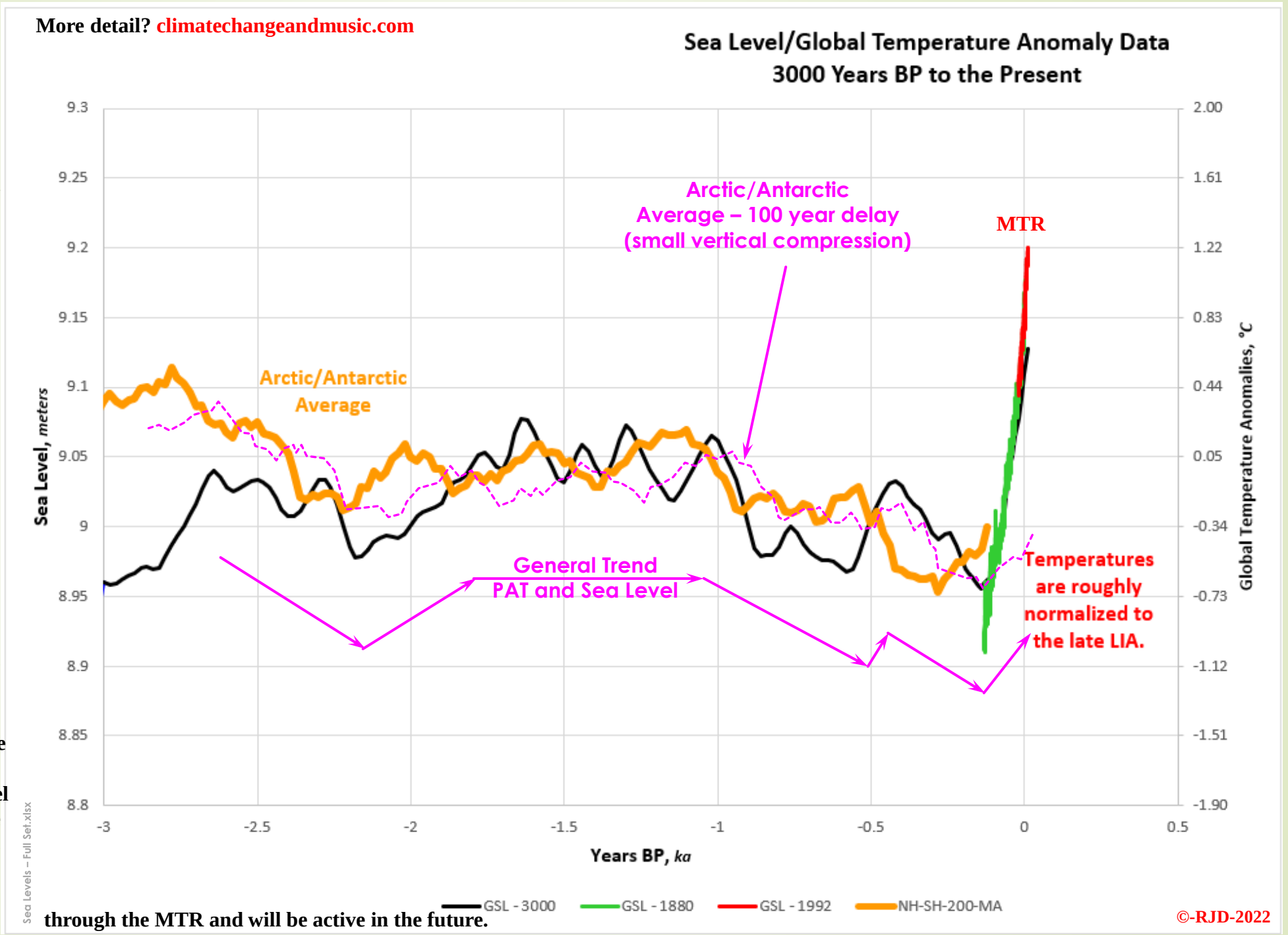


Sea Levels Polar Average Temperature

The Polar Average Temperature (PAT, solid gold line) is just the arithmetic average of the Vinther et al Arctic and Dome C Antarctic temperatures. The general ups and downs in the sea level curves are reflected in the PAT curve with roughly a 100-year delay (the dashed magenta line, slightly compressed). Again, not a perfect correlation but still a much better correlation than CO_2 (as will be shown later). The climate system is extremely complicated, with a variety of parameters affecting the overall climate. No single parameter can be used to forecast the climate (unless you take the simplistic, unscientific CAGW alarmist approach that focusses almost exclusively on one small, dilute molecule in our atmosphere). Pre-MTR, CO_2 is virtually flat. Temperatures and sea level fluctuate significantly pre-MTR. Those fluctuations are due to natural forcings (primarily solar and solar related forcings (ocean cycles, cosmic ray flux, etc.)). Those forcings were still active through the MTR and will be active in the future.

Sea Level Polar Average Temperatures

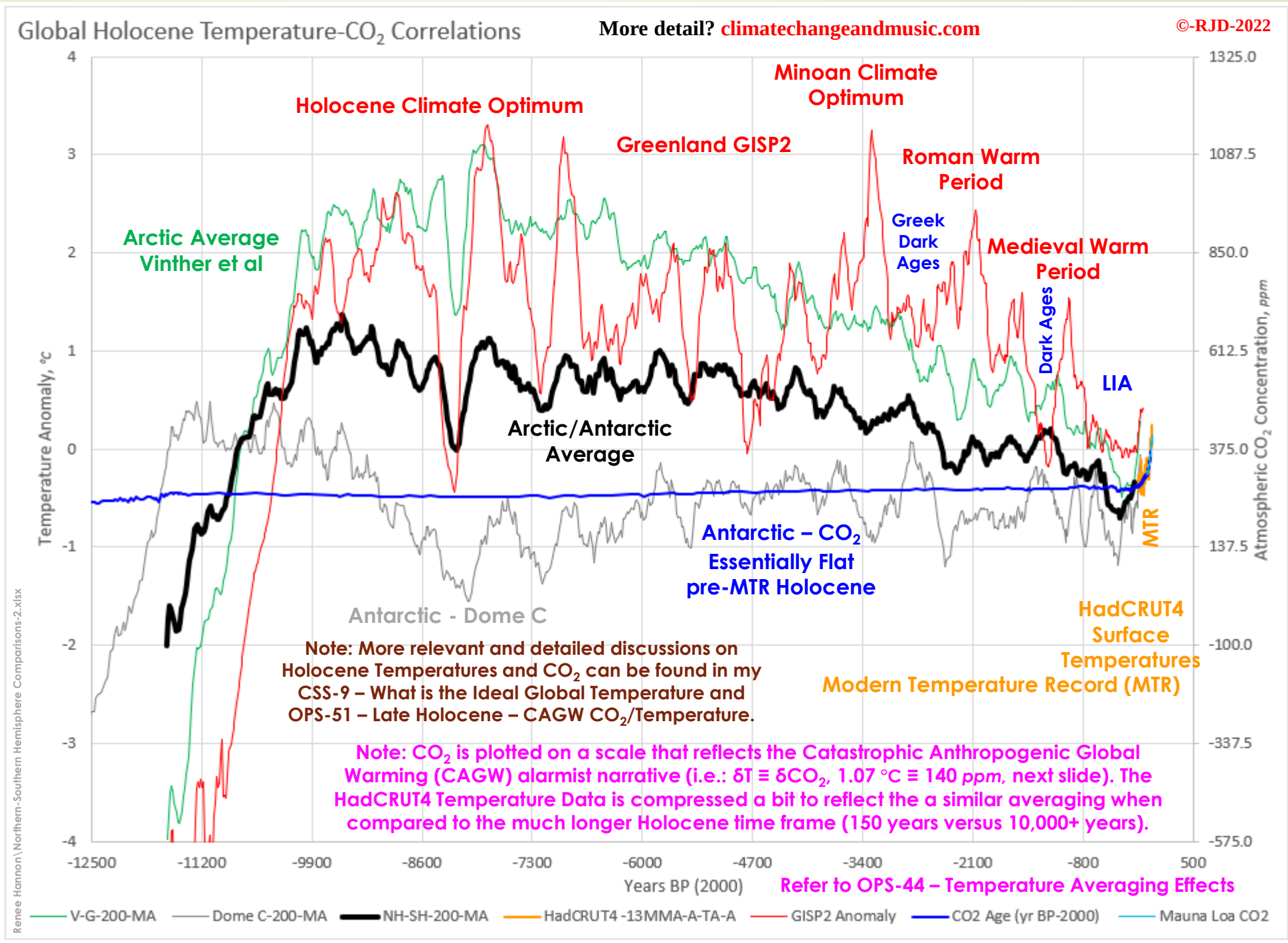
More detail? climatechangeandmusic.com



Sea Level Holocene Temperatures

The same (but full) Holocene temperature and CO_2 profiles discussed on the previous slides are shown here. This plot provides more perspective on the relationship between CO_2 and the various global temperatures. Strange how temperatures (regardless of source) all fluctuate significantly despite CO_2 remaining virtually flat (pre-MTR). Surely that is impossible given that the CAGW alarmist crowd has declared CO_2 the primary climate driver? Obviously, CO_2 is not the only climate driver. Natural forcings were active throughout the pre-MTR Holocene, they were active during the MTR and they will be active in the future (despite the CAGW alarmist decree that CO_2 is virtually responsible for all current and catastrophic future warming). The sharp increase in CO_2 over the MTR has significant human influence, but the magnitude of the overall CO_2 increase is not very significant if properly scaled to represent the CAGW alarmist narrative (1.07 °C ≡ 140 ppm). That assumes that the CAGW alarmist narrative is valid.

Holocene CO_2 and Temperatures

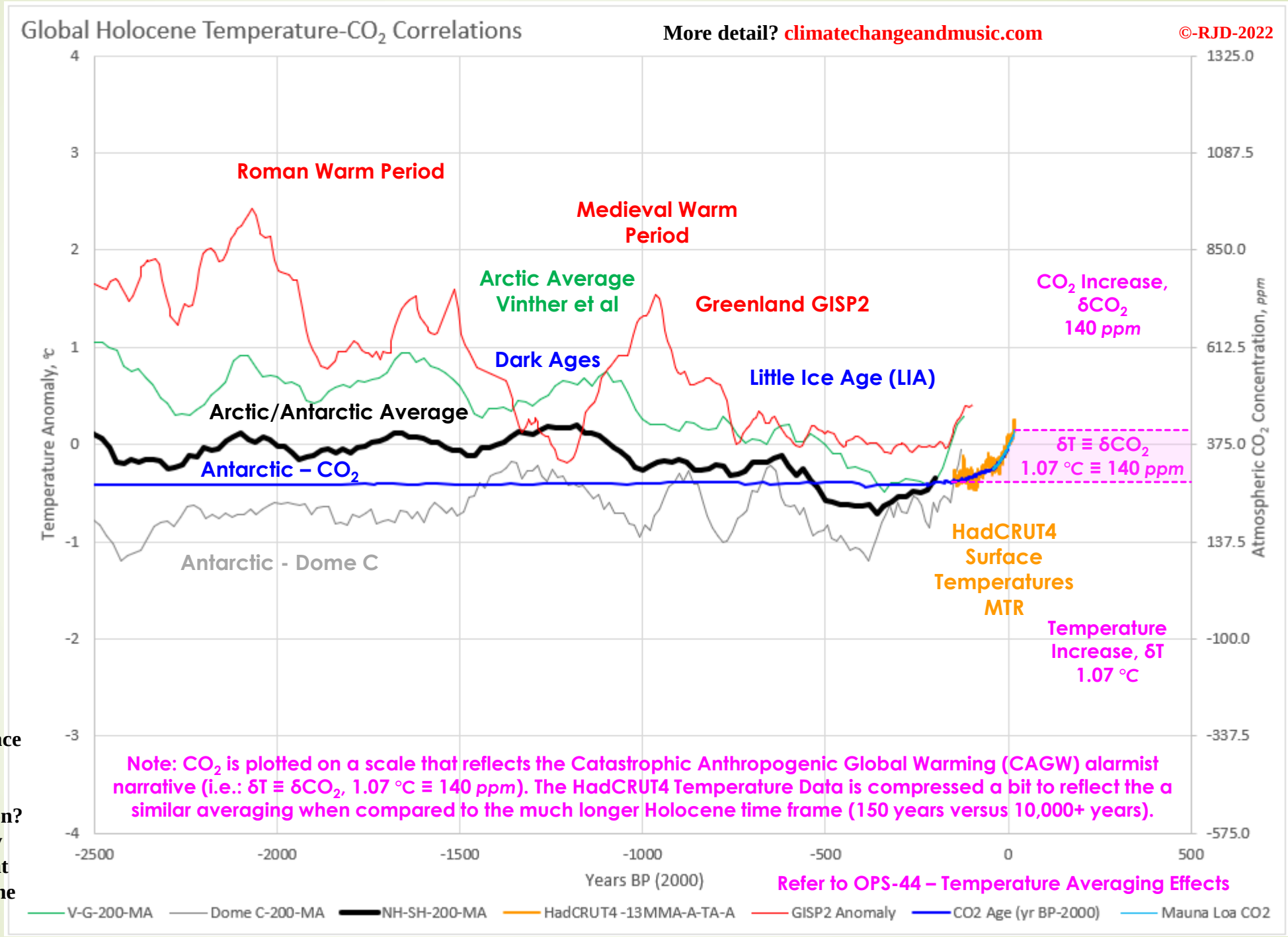


CSS-18g

Sea Level Late Holocene Temperatures

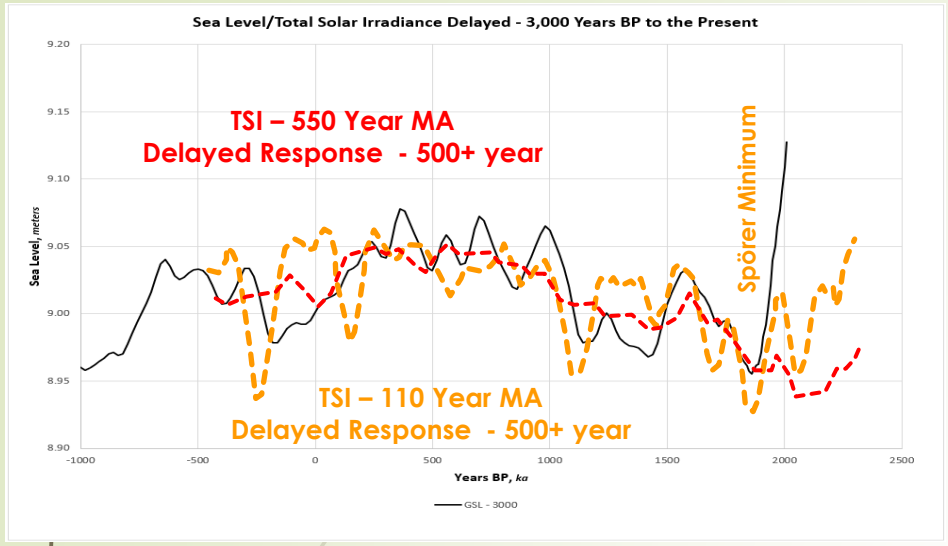
This slide focuses in on the Late Holocene (2,500 years BP to the Present). This period encompasses the Roman, Medieval and the current Modern Warm Periods (each one successively cooler). This plot shows the CAGW alarmist CO2/Temperature correlation over the MTR. The correlation is not that bad but even on this scale the other natural forcings (solar (TSI as a proxy) and solar related (ocean cycles) are visible in the HadCRUT4 temperature data. More discussion on those natural forcings have been included in my CSS-1 – Holocene Logic post. But realistically how much of the pre-1950 temperature change can be attributed to humanity when 86%+ of our emissions have occurred since 1950? Why did the temperatures start rising out of the Little Ice Age (LIA) centuries prior to the industrial revolution? Why was the LIA called the LIA? Why would the CAGW alarmists assume that natural forcings would disappear with the addition of CO_2 to the atmosphere?

Late Holocene CO_2 and Temperatures



CSS-18h Sea Level - Solar Activity CO_2 Levels – 3,000

Next step, introduce solar activity (Steinhilber et al 2012) into the Sea Level discussion (plotted with atmospheric CO_2 concentration). So, why would we introduce Solar Activity? Well to start with both the temperature and sea levels fluctuate significantly pre-MTR (as shown previously) and CO_2 is simply not a factor. Sea Level is very much a function of temperature (although that relationship is complicated). Pre-MTR, the temperatures and sea levels are changing, and they are not a function of the very minor CO_2 changes. Maybe an alternative climate driver should be considered? That is why solar activity has been introduced.

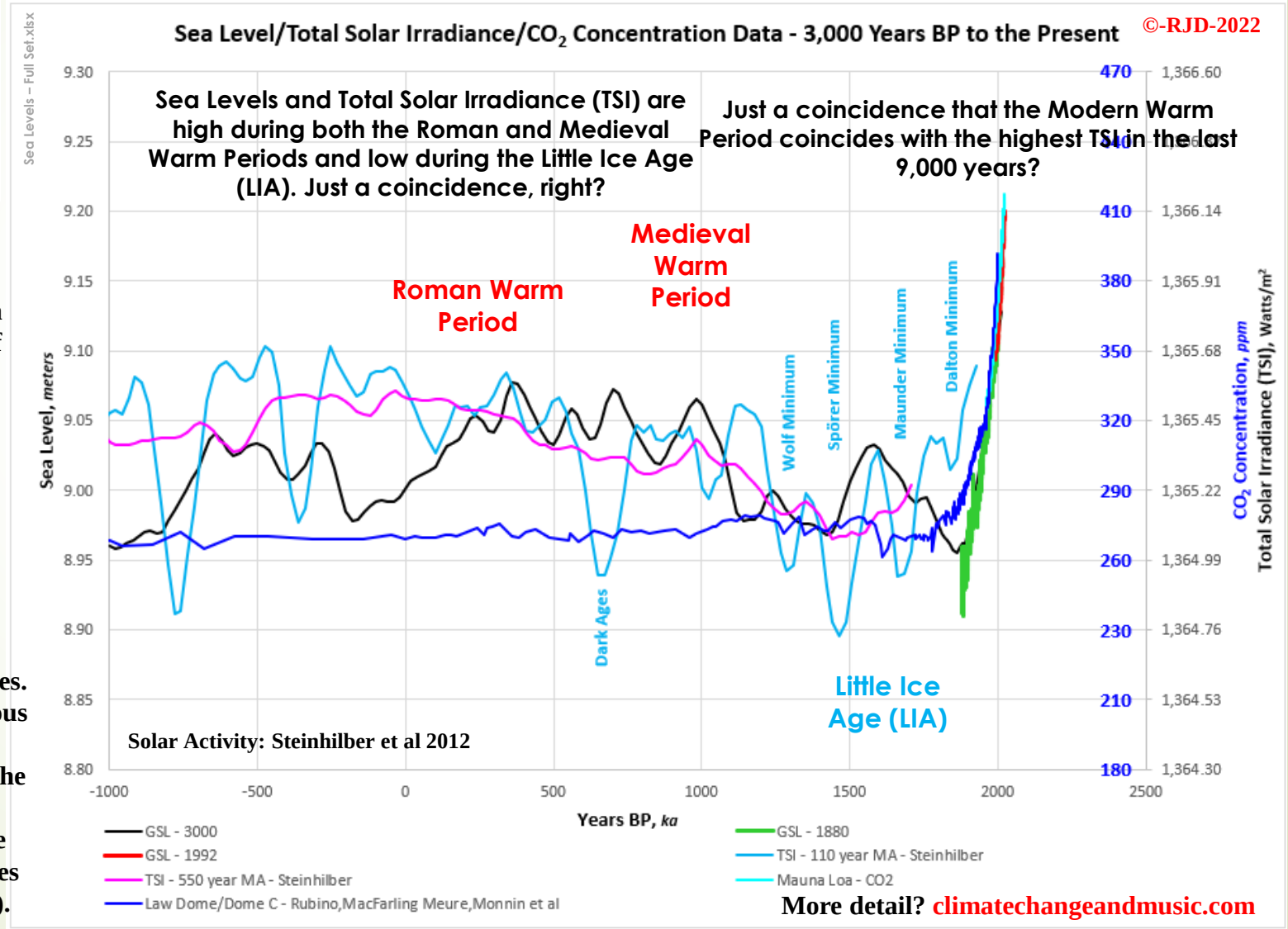


Is it just a coincidence that the Modern Warm Period coincides with the highest TSI in the last 7,000+ years? No it is not.

It is just a coincidence that the Little Ice Age (LIA) coincides with the lowest TSI in the last 7,000+ years (compounded by a series of deep solar minimums). No, it is not.

Solar Activity (and its related forcings (both directly and indirectly) are responsible for the significant climate fluctuations over the Holocene Interglacial period. Those natural forcings were active throughout the earth's history and will continue to be active in the future (despite the IPCC's protestations to the contrary). Just out of curiosity, I plotted the TSI curves with a 500+ year delay (and some compression). The delayed curves fit quite well with the sea level curves. Is the global sea level responding to solar activity changes from previous centuries. That is entirely possible. Oceans account for 71% of the planets surface. As mentioned earlier, ocean cycles are complicated. The heat absorbed by the oceans can be sequestered in the depths and emerge centuries later somewhere else on the planet. Much the same way atmospheric CO_2 concentrations follow temperatures by centuries (when temperatures rise) and millennia (when temperatures decline).

Sea Level TSI/CO_2 3000 Years



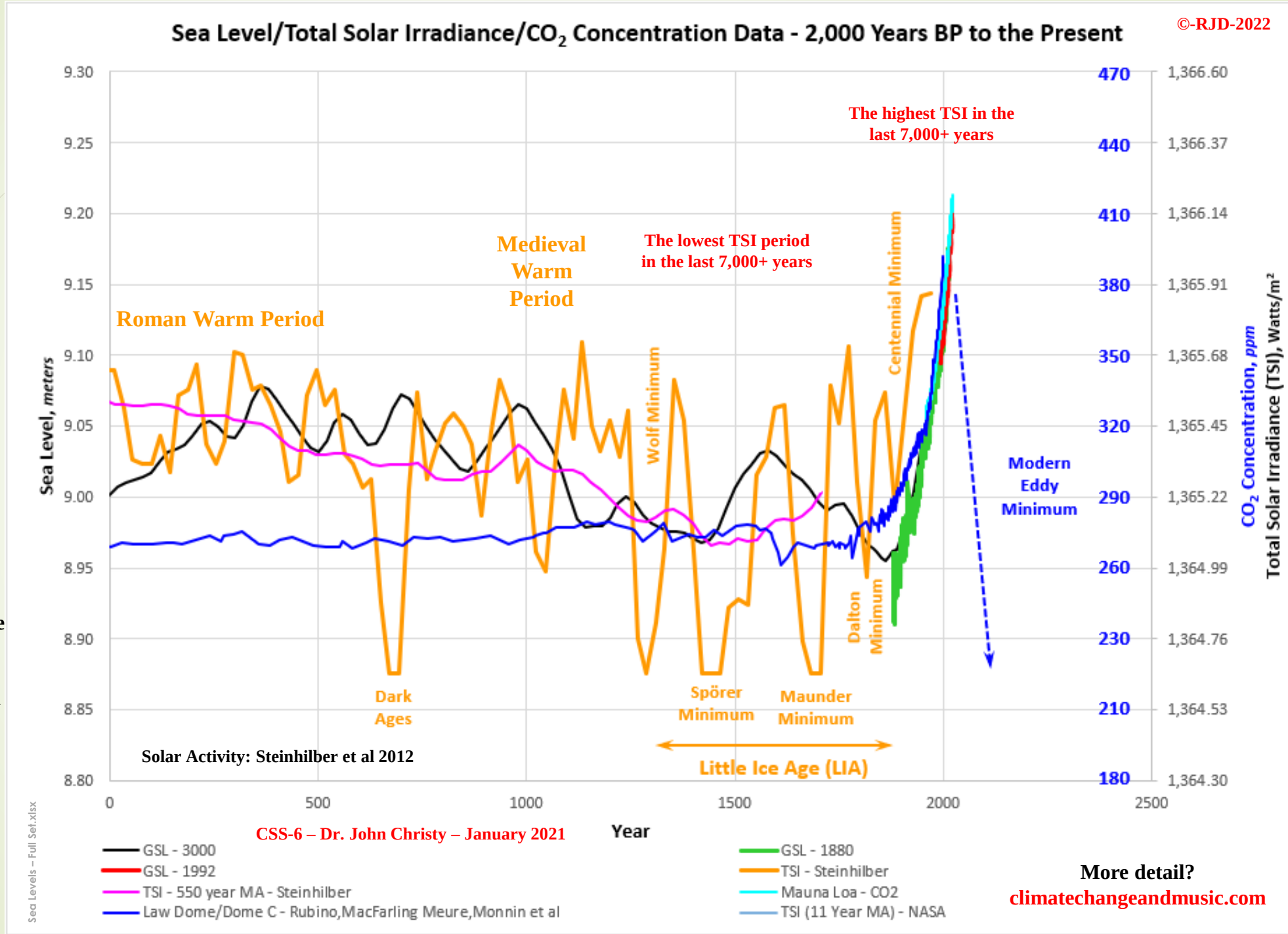
More detail? climatechangeandmusic.com

CSS-18i

Sea Level
Solar Activity
CO_2 Levels – 2,000

This plot shows the unadjusted Steinhilber et al TSI data. All the major minimums and maximums are present, but the magnitudes have not been dampened by the averaging process. The absolute TSI change (from the depths of the Maunder Solar Minimum to the Modern Solar Maximum) is small (1.22 Watts/m^2, 0.0894%). This small change is the only solar component that the IPCC computer programmers include in their models (CMIP5 protocol). The computer protocol has been updated to CMIP6 which includes additional solar forcings (cosmic ray flux and high energy particles specifically). The programmers were able to model the MTR using the new solar forcings (without any CO2 contribution) during beta testing. But not to worry, those pesky solar forcings can still be (and were) turned off (or way down) to keep that CAGW alarmist narrative going. Strange how the CMIP6 models are less accurate and more erratic than the CMIP5 models? CSS-6

Sea Level TSI/CO_2 2000 Years



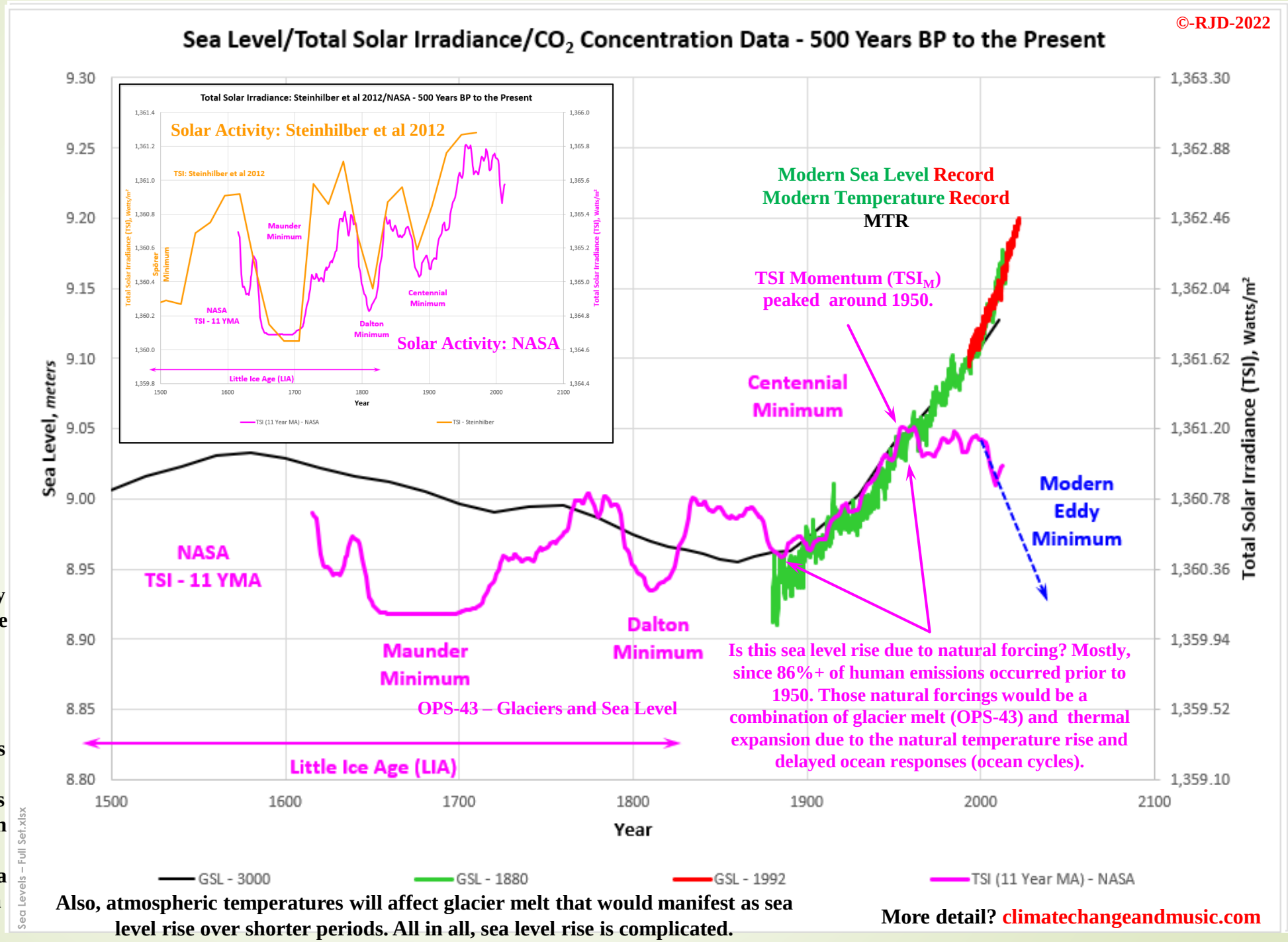
More detail?
climatechangeandmusic.com

GSM – Grand Solar Minimum. The real "Climate Change" existential threat is right around the corner. Do the Research!

Sea Level
NASA Solar Activity
500 Years

This slide is included to show a separate TSI dataset (source: NASA, 10 Year Moving Average). The NASA dataset only goes back to pre-Maunder Minimum times. As shown in the comparison plot to the immediate left, the NASA data is more detailed than the Steinhilber et al 2012 data. The overall magnitudes are a bit different, but the general trends are consistent over this time period. The NASA data does not change the story and is just a general confirmation of the Steinhilber data. The NASA data is plotted with the early MTR sea levels correlated to the TSI. Is that a representative correlation? As with the previous slide, the sea level may be reacting to the solar forcing from centuries ago. The temperature rise out of the Spörer Minimum may have been manifesting as sea level rise in the late 1800s. The sea level does change with short term events as well. The el Nino Southern Oscillation (ENSO) is an example. These ocean cycles can warm and cool the surface sea layer (and the atmosphere), resulting in some thermal expansion.

Sea Level NASA - TSI 500 Years



Also, atmospheric temperatures will affect glacier melt that would manifest as sea level rise over shorter periods. All in all, sea level rise is complicated.

More detail? climatechangeandmusic.com

CSS-18k

Sea Level and Glaciers

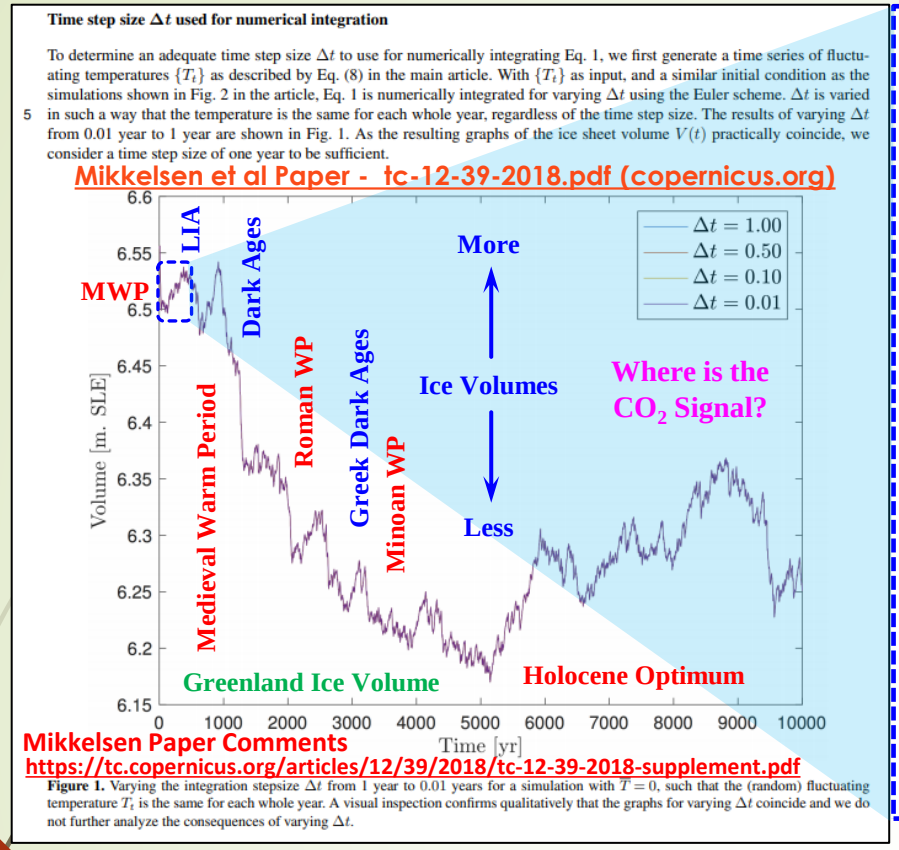
More detail? climatechangeandmusic.com

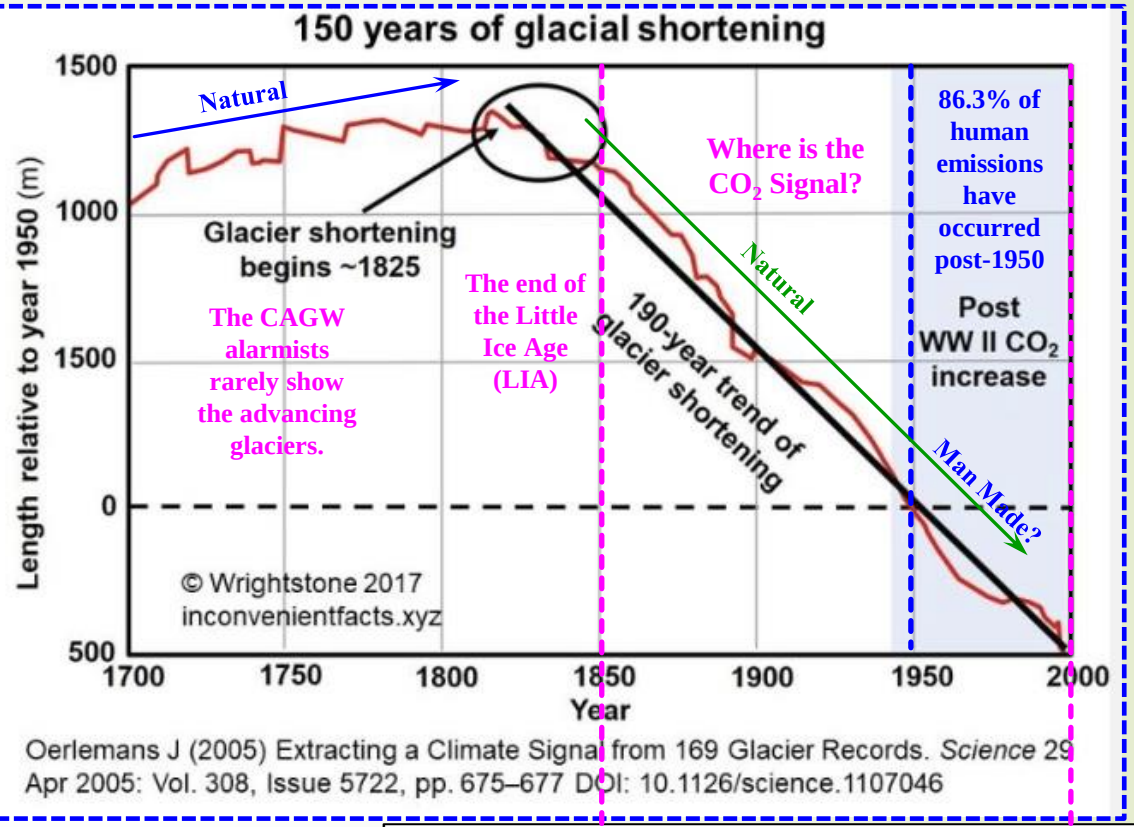
Contact - Prehistoric Britain (prehistoric-britain.co.uk)

GSM – Grand Solar Minimum. The real "Climate Change" existential threat is right around the corner. Do the Research!

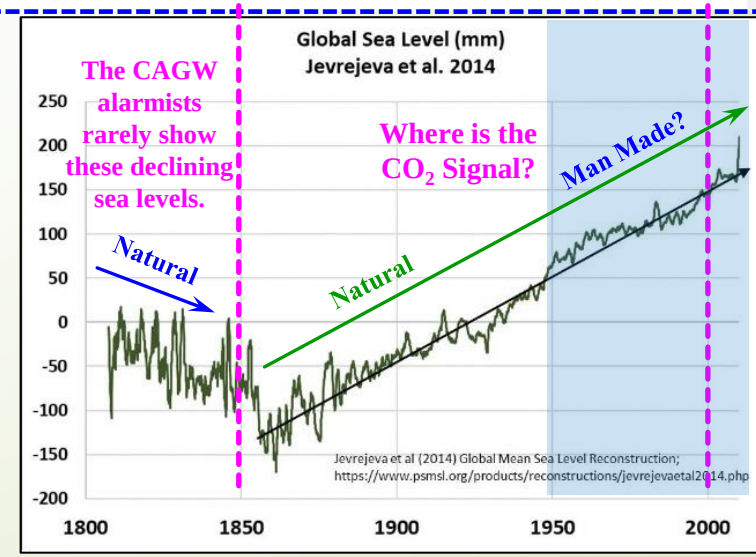
This slide presents the same graphs shown in my OPS-43 – Glaciers and Sea Level post. More detail is provided in that post. Just a few of the key points will be summarized here. The map directly to the right is a model of Greenland ice volume (Sea Level Equivalent (SLE)). The Greenland ice volumes (not surprisingly) are responding to the general Holocene temperature profile (shown previously on the CSS-18f slide). Temperatures were generally higher during the Holocene Climate Optimum and began declining after the Minoan Warm Period with fluctuations between cooler and warmer periods (the Greek Dark Ages, the Roman Warm Period, the Dark Ages, the Medieval Warm Period, the Little Ice Age (LIA) and finishing off in the Modern Warm Period (MWP)). The current warming/ice volume changes do not look all that scary when taken in a proper historical context. The Catastrophic Anthropogenic Global Warming (CAGW) alarmist crowd like to focus on the Modern Temperature Record (MTR, 1850 to the Present) and more recently just 1950 to the Present (since most (86+%) human emissions occurred after 1950). These plots highlight the major problem the CAGW alarmist narrative faces. A distinguishable anthropogenic (CO_2) signal does not show up in the data. Natural forcings dominated the pre-1950 data with temperature, ice volume and sea level rise trends all established well before human emissions played any significant role. Those natural forcings (responsible for all the pre-MTR fluctuations) did not just shut down (like they have been programmed to do in the computer models). They were still active during the MTR and will continue to be active in the future. The solar activity and temperatures will drop as we enter the GSM.

Sea Level Glaciers





Any chance that the old Roman ports in Britain (Lewes and Brading) were stranded (landlocked) because sea level dropped? From Prehistoric Britain, "there are 'raised beaches' 40 metres (Goodwood – Slindon) and eight metres (Brighton – Norton) above present sea level". Sea levels were higher during the Roman Warm Period.



330 mm Estwing Rock Pick
H/T to David Middleton for Estwing use

CSS-18l

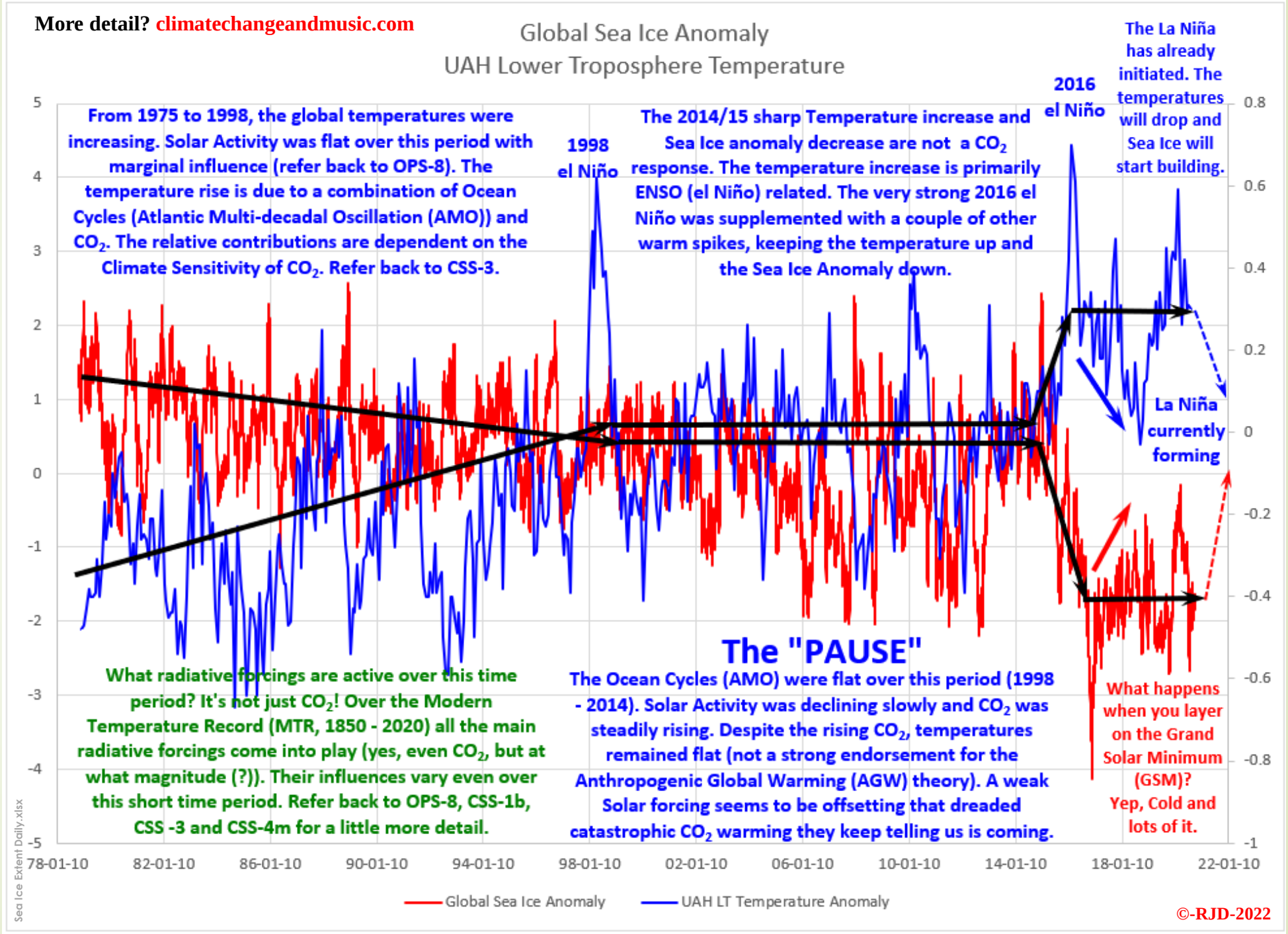
Sea Ice Extent UAH Satellite Temperatures

This plot was included in previous posts (CSS-5 – Snow and Ice – September 2020 and CSS-11 – Snow and Ice – July 2021 Update). The plot shows the University of Alabama, Huntsville (UAH) Lower Troposphere Satellite Temperature Anomaly and the NOAA satellite Sea Extent data. The general trends are roughly mirror images of one another. As global temperatures rise, the global sea ice extent decreases and vice-versa. The CO_2 concentrations over this period (not shown) rose steadily with only a small seasonal fluctuation. Both sea ice extent and temperature fluctuate wildly and without the overall steady increase in CO_2 data. More than CO_2 is in play. The step changes in 2014 have nothing to do with CO_2. Ocean cycles (AMO and ENSO primarily) are playing major roles in the temperature profiles and by extension the sea ice extent profile. Only the original "PAUSE" is shown here. A series of pauses exist as shown in OPS-56 – The PAUSE and CSS-16 – CET Model.

Sea Ice Extent UAH Temperatures

GSM – Grand Solar Minimum. The real "Climate Change" existential threat is right around the corner. Do the Research!

More detail? climatechangeandmusic.com



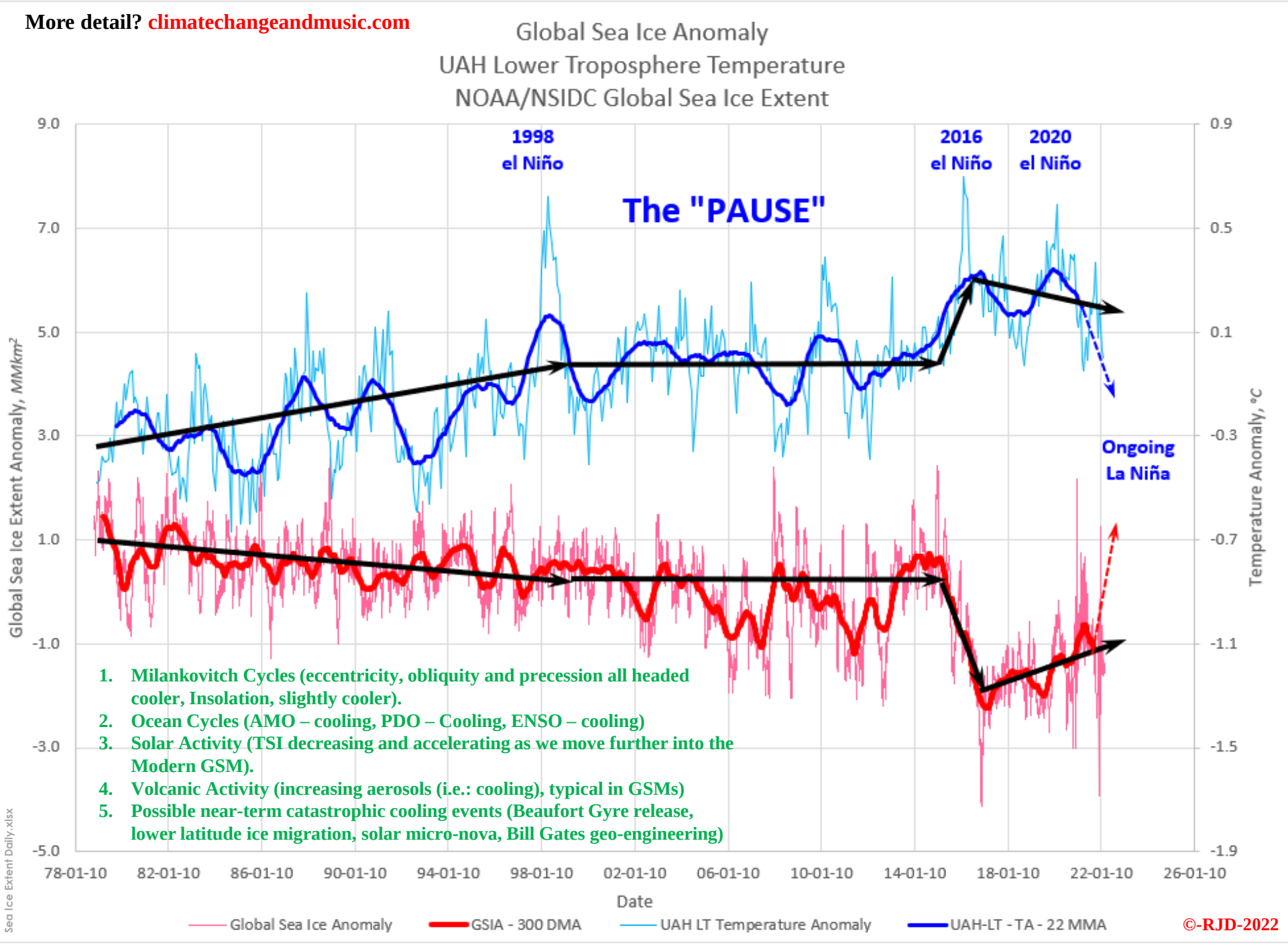
CSS-18m

Sea Ice Extent Updated UAH Satellite Temperatures

This slide updates the previous Sea Ice Extent/UAH Temperature Anomaly plot, separating the curves and highlighting the less erratic moving averages. The same general trends are present. The major difference, the current trends are no longer flat. The Temperature Anomaly trend is down and the Sea Ice Extent trend is up (as predicted in the previous plot). For the short term, La Nina is still expected to dominate the ENSO cycle (cooling). Over the next couple of decades, the Modern Grand Solar Minimum (GSM, we are just entering) will further reduce global temperatures (potentially to dangerous levels as with previous GSMs). All the significant climate drivers (summarized to the right) are suggesting cooling. The only climate driver that will contribute to warming is CO_2 (A FECKLESS GreenHouse Gas – CSS-7). CO_2 warming is not going to save us. CO_2, through unnecessary, uneconomic green initiatives will further devastate our way of life and pile on to the already existential problems associated with GSMs.

Sea Ice Extent Updated UAH Temperatures

More detail? climatechangeandmusic.com



GSM – Grand Solar Minimum. The real "Climate Change" existential threat is right around the corner. Do the Research!

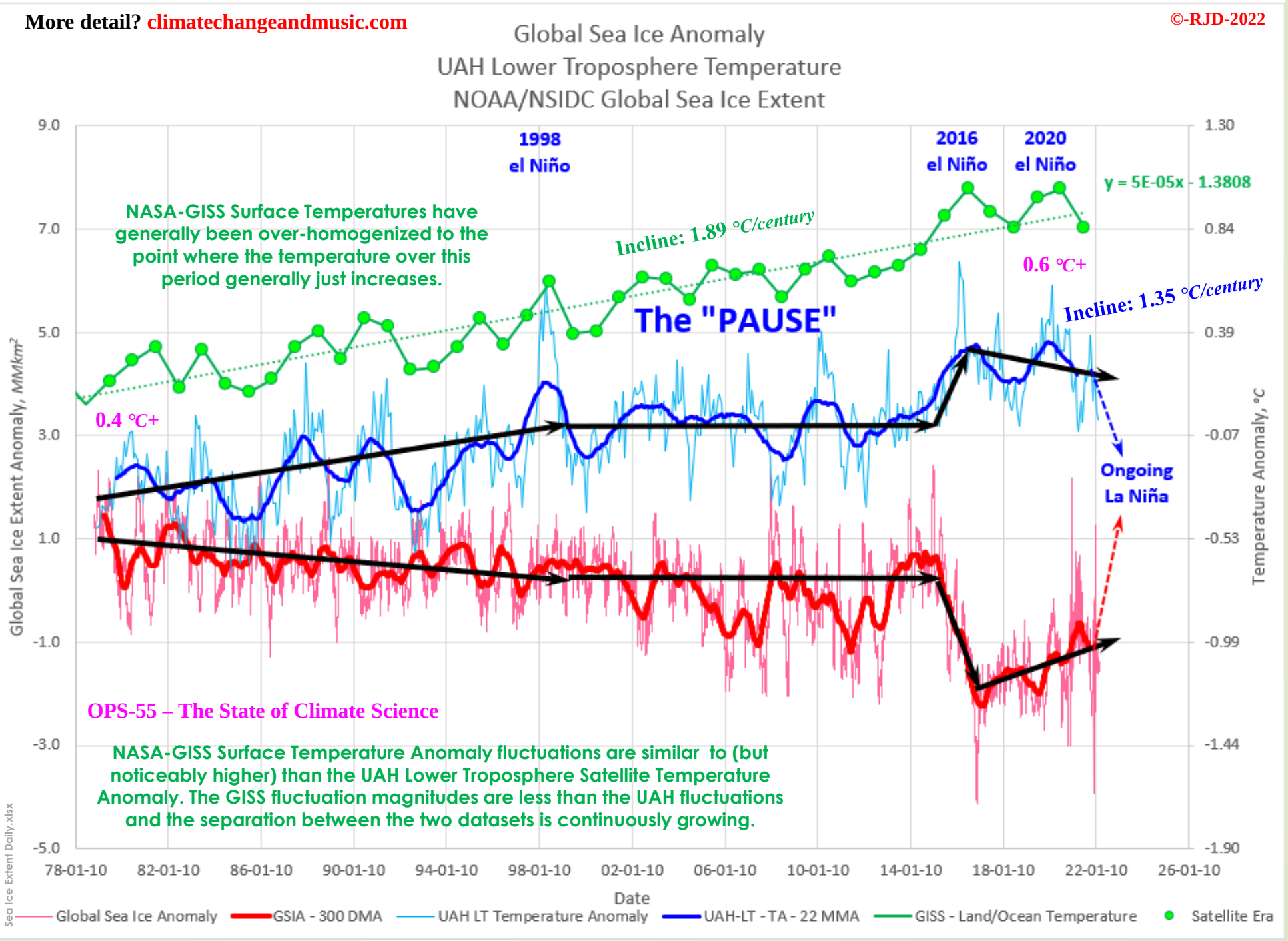
Sea Ice Extent Updated UAH Satellite Temperatures

This slide adds the NASA-GISS surface Temperature Anomaly TA yearly data to the previous plot. The highs and lows in the UAH Lower Troposphere satellite data are reflected in the NASA-GISS data. However, the NASA-GISS over-homogenization process has smoothed out the incline (increasing the magnitude (1.89 versus 1.35 °C/century) and created a significant and growing difference (0.4 to 0.6 °C+) with respect to the UAH data. Personally, I trust the satellite data (which has been corroborated by radiosonde (i.e.: balloon) data. And as shown here conforms better to a real world parameter (sea ice extent) than the NASA-GISS surface TA data.

Sea Ice Extent UAH/GISS Temperatures

NASA-GISS has essentially homogenized the measured data so that the "official" temperature dataset matches the average IPCC computer model outputs. Given that the programmers themselves have admitted that the models run too hot and the scientific method is being ignored, NASA-GISS must rethink their procedures. OPS-55

More detail? climatechangeandmusic.com



CSS-18o

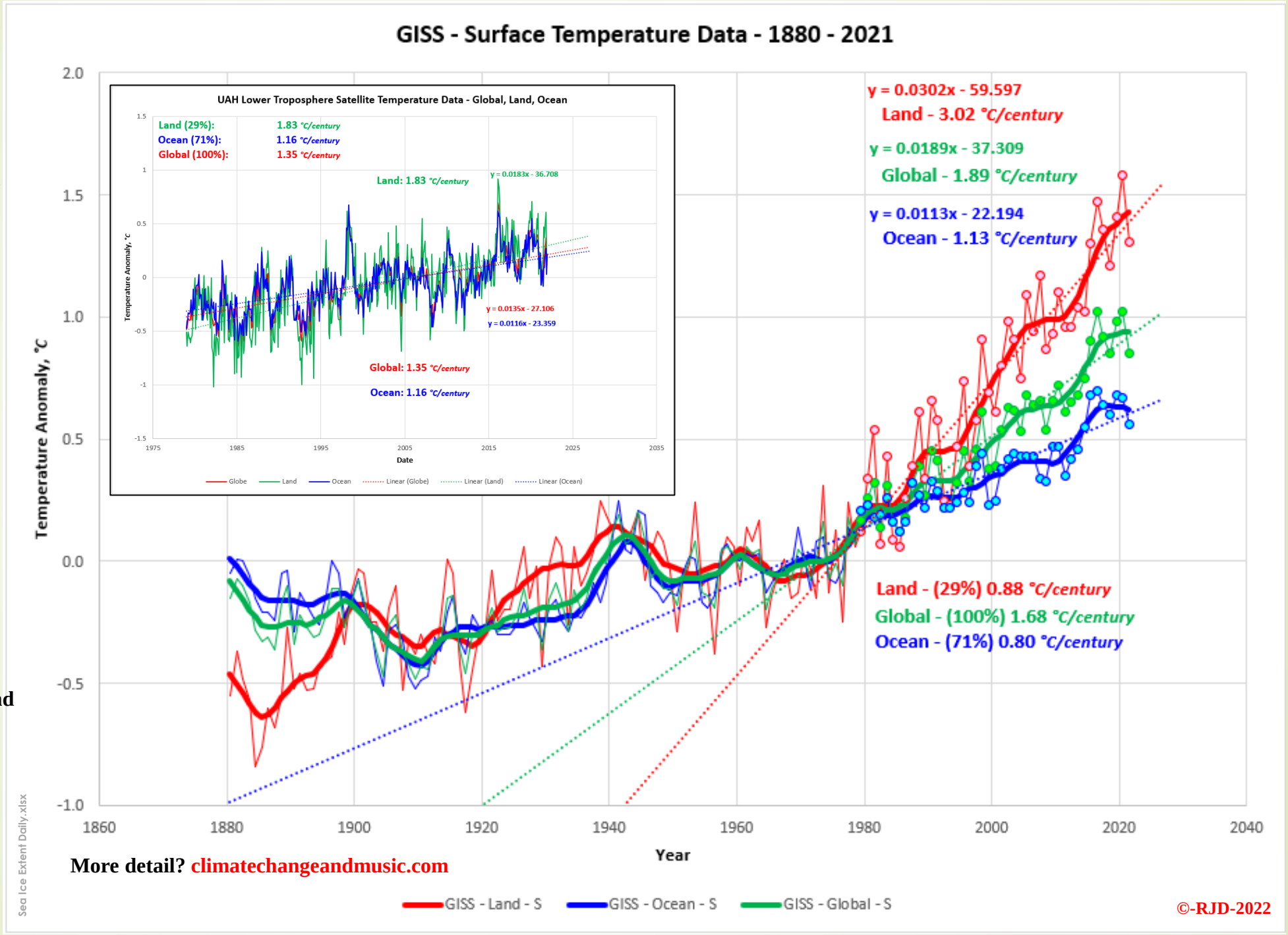
Sea Ice Extent UAH Satellite-GISS Surface Temperatures

This slide dives into the NASA-GISS Surface Temperature Anomaly TA detail. The NASA-GISS Global TA has been increasing at a pace of 1.89 °C/century since 1979. That Global TA consists of a Land Component (3.02 °C/century) and an Ocean Component (1.13 °C/century). Given that oceans cover 71% of the earth, I would have expected that the global average would be 1.68 °C/century. But that is just me. The real problem is the homogenization process which is applied to the land data (conveniently increasing the TA in the recent data and reducing the TA for the oldest data). The UAH graph (inset) is much more consistent with the data honoring the 71/29% ocean/land split. Only one of the six curves shown here is homogenized (i.e.: manipulated). The NASA/GISS Land Estimates. Some homogenization is necessary. But over homogenization to adjust the measured data so that "official data" corresponds to the narrative is ideology not science.

NASA/GISS Temperatures

It is time to WAKE UP!!

GSM – Grand Solar Minimum. The real "Climate Change" existential threat is right around the corner. Do the Research!



More detail? climatechangeandmusic.com