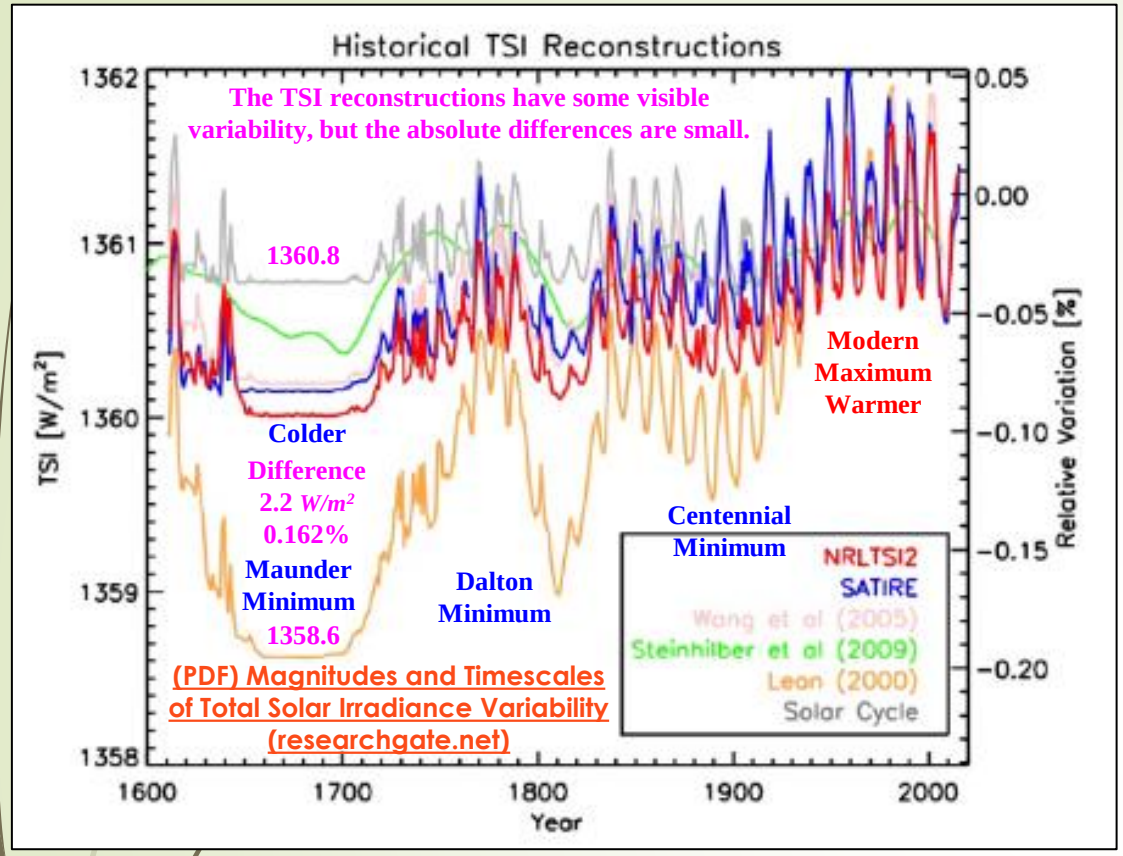
CSS-42a

# The Role of the Sun - Scafetta 2023




**Scafetta 2023 The Role of the Sun**

Nicola Scafetta (Department of Earth Sciences, Environment and Georesources, University of Naples Federico II, Complesso Universitario di Monte S. Angelo, via Cinthia, 21, Naples 80126, Italy) released a new paper (links to the right) on June 14th, 2023. The paper will not be received well by the CAGW alarmist community. A few points from the Abstract.

"The role of the Sun in climate change is hotly debated. Some studies suggest its impact is significant, while others suggest it is minimal. The Intergovernmental Panel on Climate Change (IPCC) supports the latter view and suggests that nearly 100% of the observed surface warming from 1850–1900 to 2020 is due to anthropogenic emissions. However, the IPCC's conclusions are based solely on computer simulations made with global climate models (GCMs) forced with a total solar irradiance (TSI) record showing a low multi-decadal and secular variability. The same models also assume that the Sun affects the climate system only through radiative forcing – such as TSI – even though the climate could also be affected by other solar processes." What was left unsaid? The models run too hot (as self-acknowledged by the modelers themselves). And the modelers still use high emission scenarios (ssp3-7.0 and 5-8.5) that they consider low likelihood. Note, even a reasonable emission scenarios (ssp2-4.5) runs too hot in these models. This post is focused on the Solar forcing/TSI curves. The paper links are on the plots.

More detail? climatechangeandmusic.com

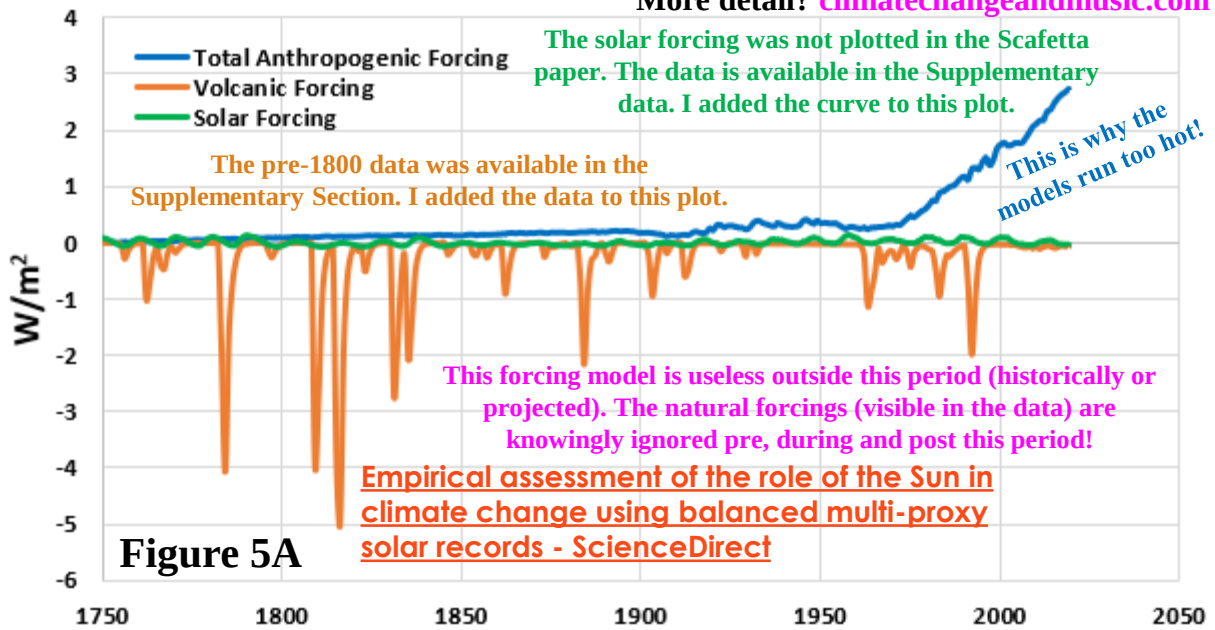



Figure 5A

https://www.sciencedirect.com/science/article/pii/S1674987123001172?via%3Dihub

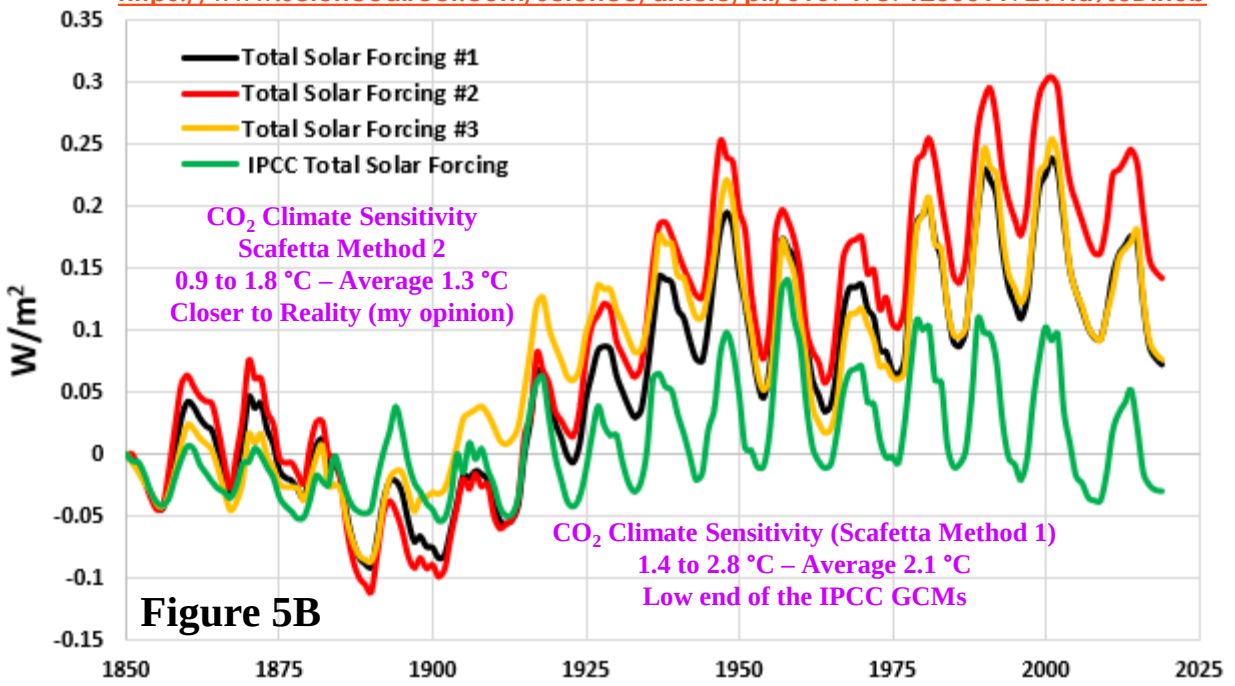
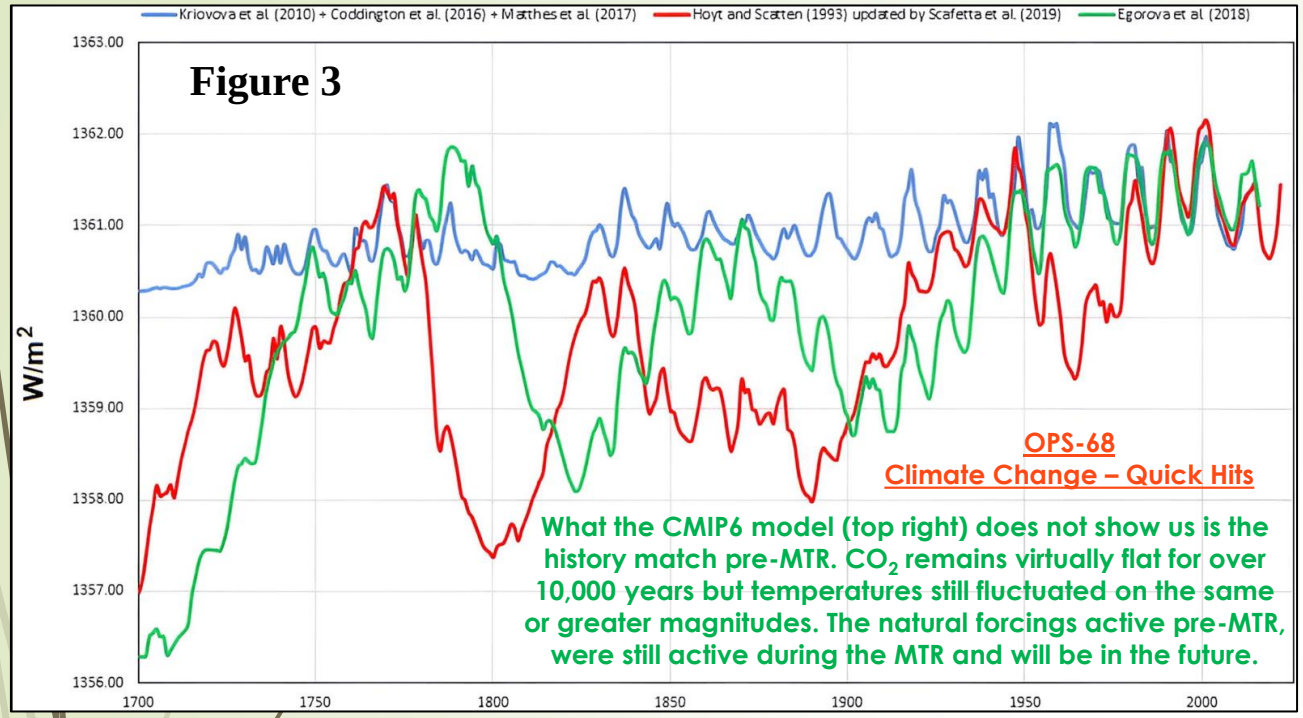



Figure 5B

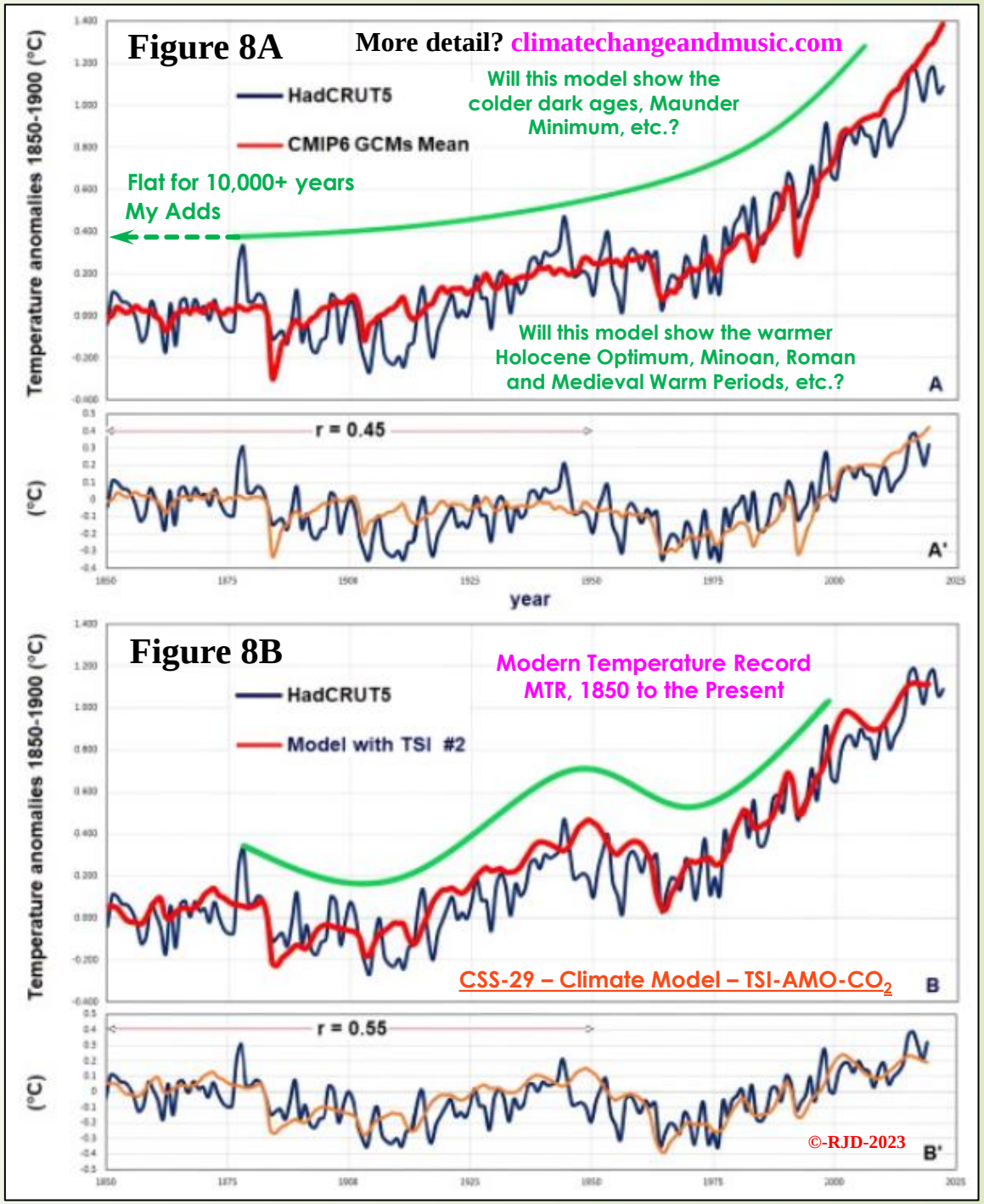
CSS-42b

# The Role of the Sun - Scafetta 2023
# Total Solar Irradiance (TSI) Base Reconstructions




## Scafetta 2023 TSI and Model Comparison

The three composite curves used by Scafetta (TSF #1, TSF #2 and TSF #3) are based on different averages of the three TSI reconstructions from the plot above. Ultimately, the various TSI plots on these two slides, underlines the complexity of just this one small component of Climate Science. That complexity just gets exaggerated when applied to the whole Climate Science realm. Despite the variety, the general profiles all show the various solar minimums and maximums. In the IPCC/alarmist models, only the absolute TSI value is used to represent the solar forcings. Given that the absolute TSI value only changes by ±3 W/m2 (0.2%), unscientifically limiting the solar influence to just TSI will result in very minor forcings (in the models). There are many documented solar forcings (Cosmic Ray Flux (CRF), High Energy Particles (HEP), our weakening electromagnetic field, etc.) that have more prominent effects on our climate than TSI alone. One simple way to incorporate those other solar forcings into the model is to use TSI as a proxy. Under that scenario, any of the TSI reconstructions can be used to get somewhat similar results (as laid out over the next few slides). The slide to the right comes from the Scafetta paper (Figure 8) and shows a comparison between the current, primarily $CO_2$ driven CMIP6 history match and Scafetta's TSI #2 solar forcing driven history match. In my opinion, incorporating solar forcings (all of them) produces a better history match. In reality, climate is much more complicated than just TSI and $CO_2$. I have built a simple spreadsheet model (CSS-29) that uses TSI (as a proxy), $CO_2$ and the Atlantic Multi-decadal Oscillation (AMO, related to solar activity)) and produces similar results to Scafetta. There are other forcings (PDO, ENSO, Beaufort Gyre, etc.) that also have influence.



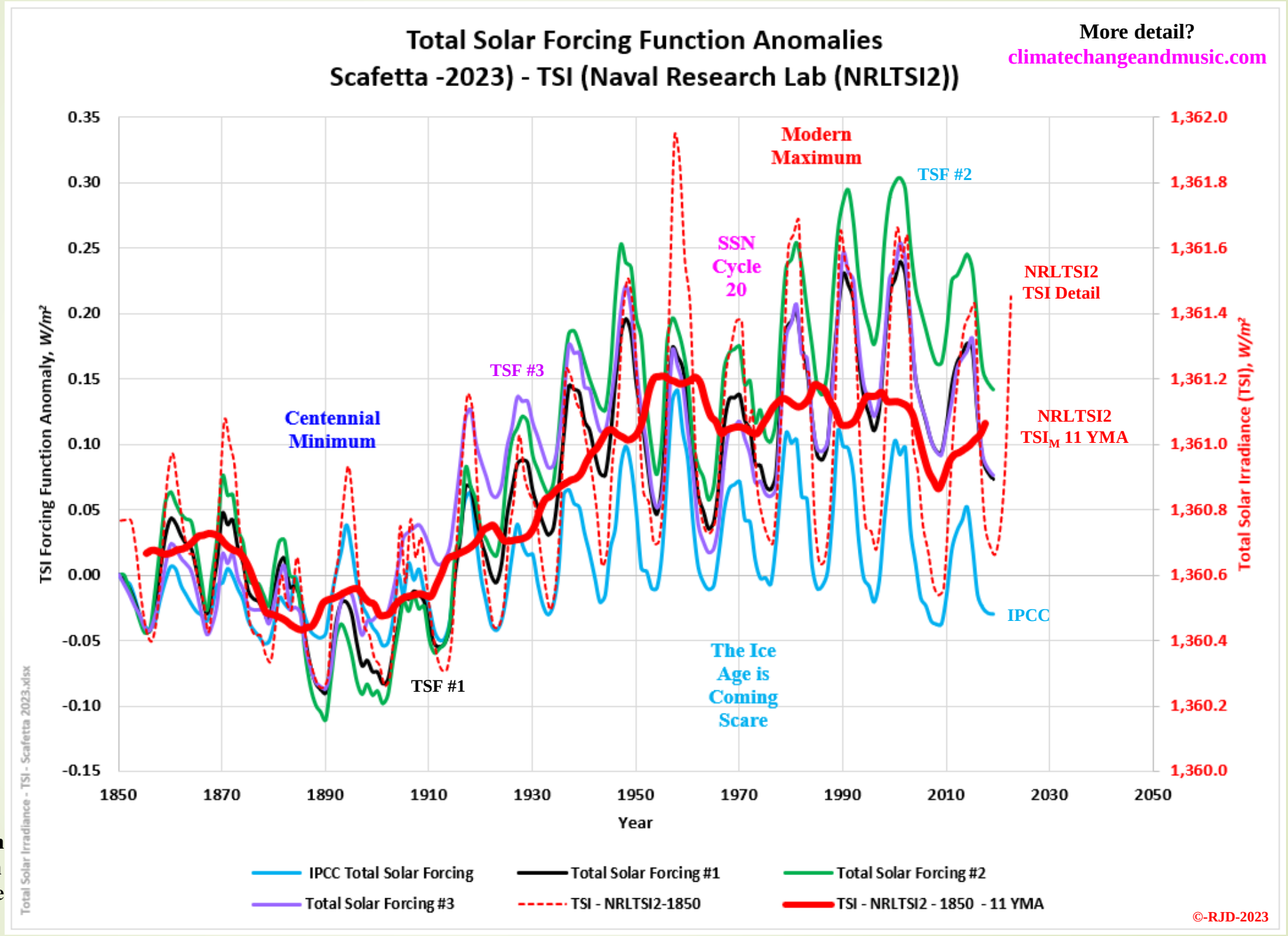

GSM – Grand Solar Minimum. The real "Climate Change" existential threat is right around the corner. Do the Research!

CSS-42c

# The Role of the Sun Scafetta 2023 Solar Forcing Function Detail

**The TSI Forcing Function Anomalies used in the Scafetta paper have been reproduced here. I have laid over the Naval Research Lab's NRLTSI2 TSI reconstruction and its 11 Year Moving Average. From the Abstract, "In this paper I propose three "balanced" multi-proxy models of total solar activity (TSA) that consider all main solar proxies proposed in scientific literature. This period is referred to as the Modern Temperature Record (MTR, 1850 to the Present). Based on a quick look, the NRLTSI2 dataset approximates the average of the other curves. There are some exceptions that will be discussed later. The three noticeable features on this plot are the mild Centennial Minimum (late 19th Century/early 20th Century), the Modern Solar Maximum (the highest TSI/TSA in the last 7,000+ years, and 1960s/70s "The Ice Age Is Coming Scare"/SSN 20.**

**Scafetta 2023 Solar FF Detail**



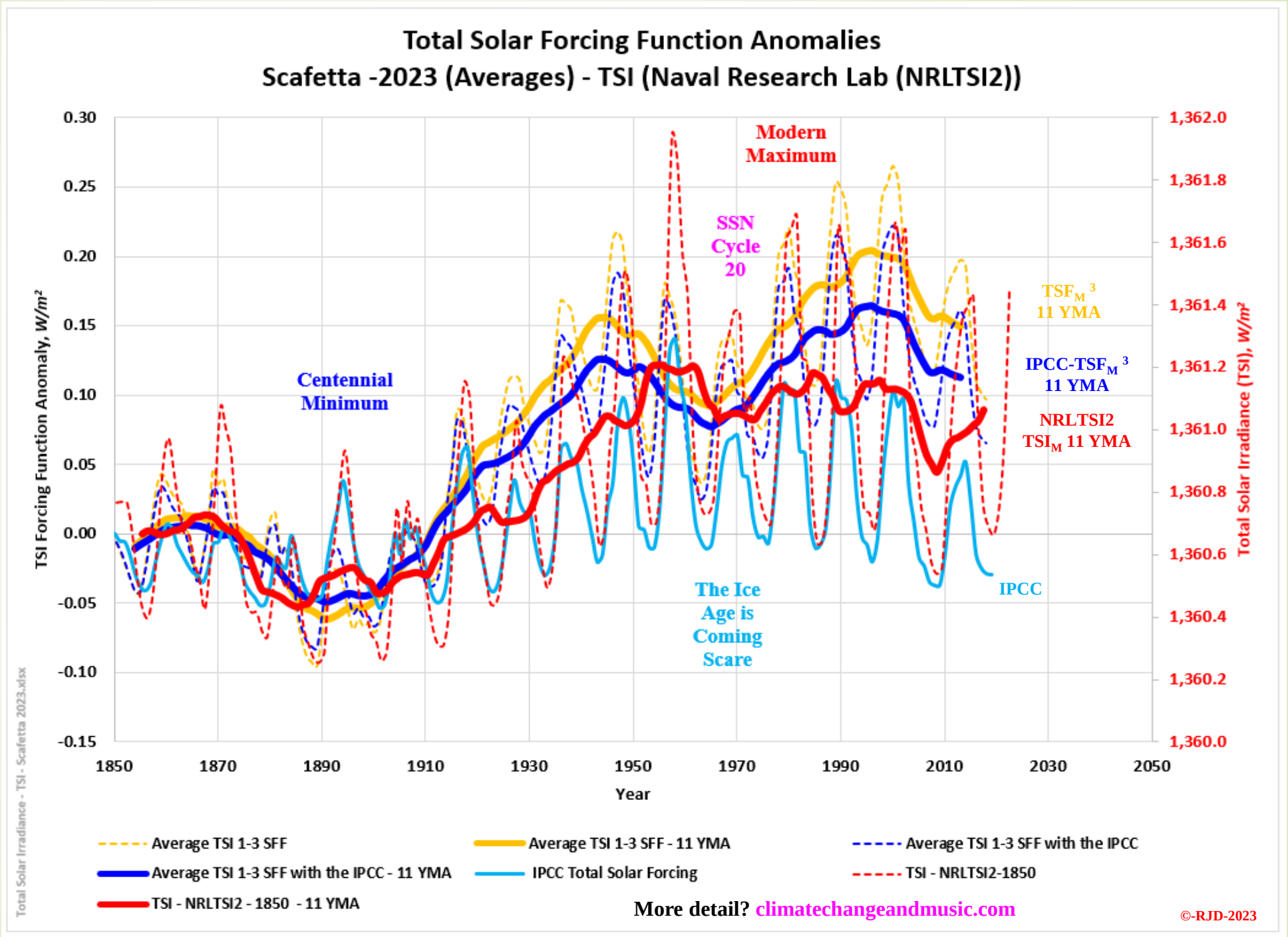

GSM – Grand Solar Minimum. The real "Climate Change" existential threat is right around the corner. Do the Research!

# The Role of the Sun
# Scafetta 2023
# Solar Forcing Function Averages

These curves are based on the data shown on the previous slide. The gold curves represent the averages of the three individual Total Solar Forcing (TSF) curves (#1, #2, and #3). The blue curves include the IPCC TSF. So, although the general profile of all three Momentum Curves are similar, There are some potentially important differences. The solar forcings rise more aggressively from 1910 to 1945 (which happens to correspond to the steep temperature rise) and 1970 to 2000 (again corresponding to a steep temperature rise).

**Scafetta 2023 Solar FF Averages**

The dip in solar forcing during "The Ice Age Is Coming Scare" is also more pronounced in the Scafetta forcing averages than the NRL data. The Scafetta forcings show a longer temperature decline from 1940 to 1970 (which again lines up closely with the estimated surface temperature data, HadCRUT5). Time to use a new TSI?

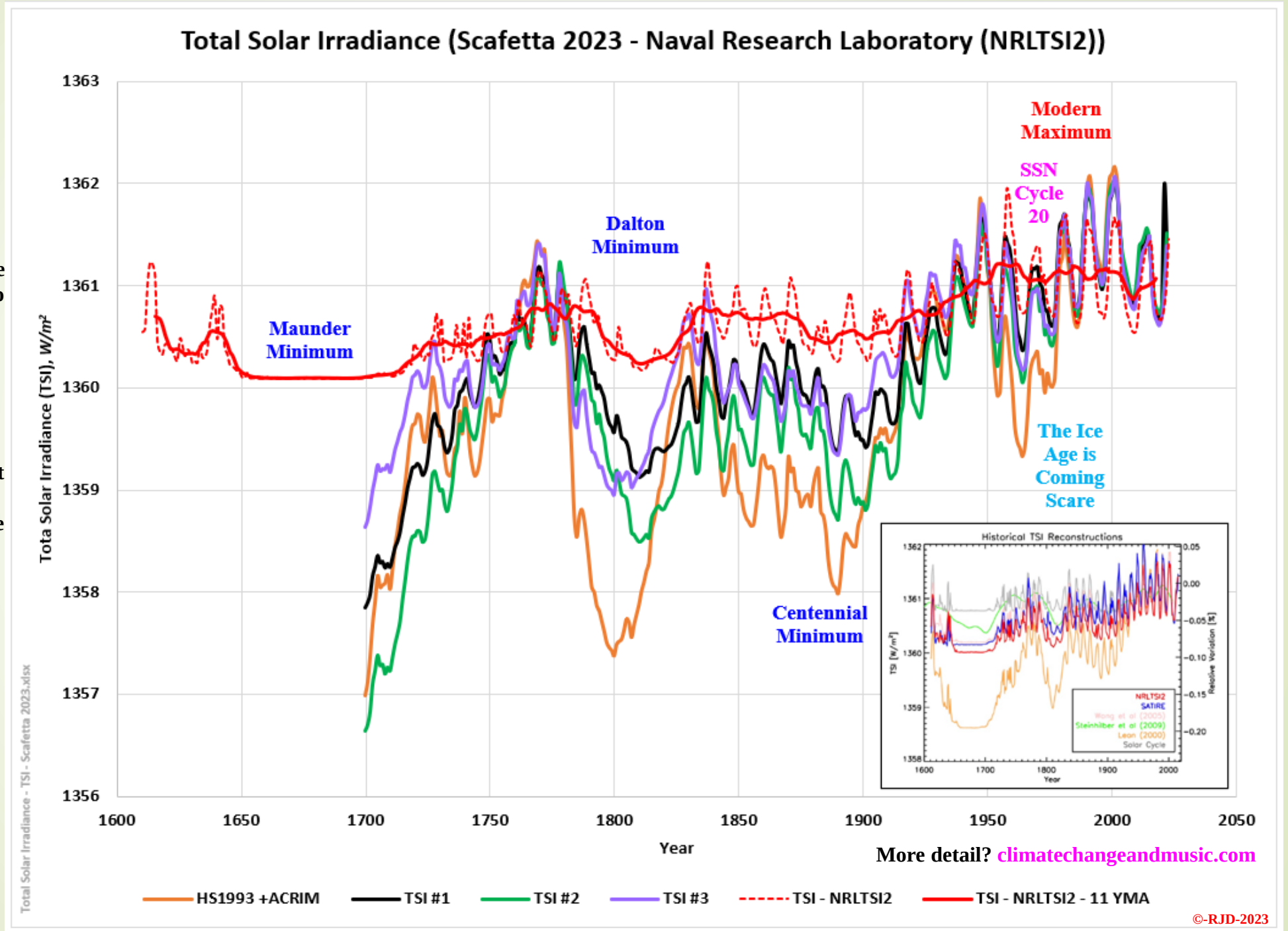



More detail? climatechangeandmusic.com

# The Role of the Sun
# Scafetta 2023
# Total Solar Irradiance Absolute

**The last two slides compared the NRL TSI reconstruction with the solar forcing function anomalies. The next three slides compare the NRL to the three TSI reconstructions referenced in the Scafetta paper. When the data is plotted on an absolute basis, the NRL data is obviously much more compressed with less range. Not unlike the TSI chart that was referenced on the first slide (and shown on the inset). The NRL curve may still have merit since its position appears to be in the middle of the pack when all the curves are grouped (qualitatively). Note, the time frame has been extended back to the early 1600s. The Scafetta TSI data only goes back to the 1700s (the tail end of the Maunder Minimum). The Scafetta data curves have more pronounced Solar Minimums.**

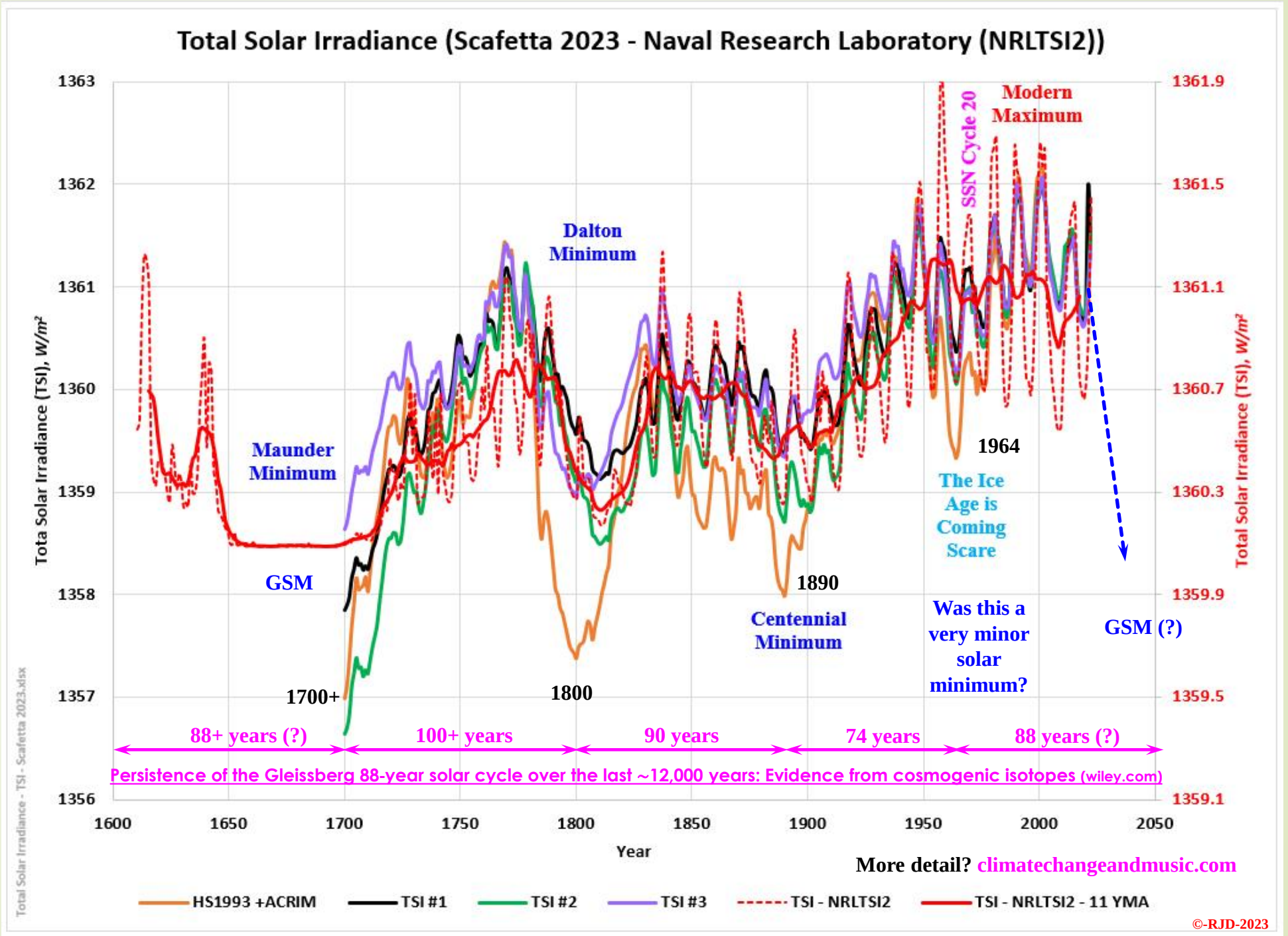
**Scafetta 2023 TSI Absolute**



# The Role of the Sun
# Scafetta 2023
# Total Solar Irradiance Normalized

This is the same data that was presented in the previous slide (CSS-42d). The NRL solar forcing data has just been scaled to generally correlate with the Scafetta data sets. Again, there are some significant differences between the NRL and Scafetta data sets. Those will be discussed in the next (averaged) data slide where the profiles have been smoothed. There are three (maybe four) solar minimums that roughly correspond to the 88-year Gleissberg Cycle. The link to the 2003 Gleissberg paper by A.N. Peristykh1 and P.E. Damon is shown to the right. These intervals are not exactly 88 years, but they are showing a bit of a pattern. That pattern continues with a forecasted GSM (NOAA, Zharkova, Cionco/Soon, Abdussamotov) just around the corner. Those Solar Activity forecasts were reviewed in my CSS-29 – Climate Model – TSI-AMO-$CO_2$ post.

**Scafetta 2023 TSI Normalized**



CSS-42g

# The Role of the Sun
# Scafetta 2023
# Total Solar Irradiance Normalized - Average

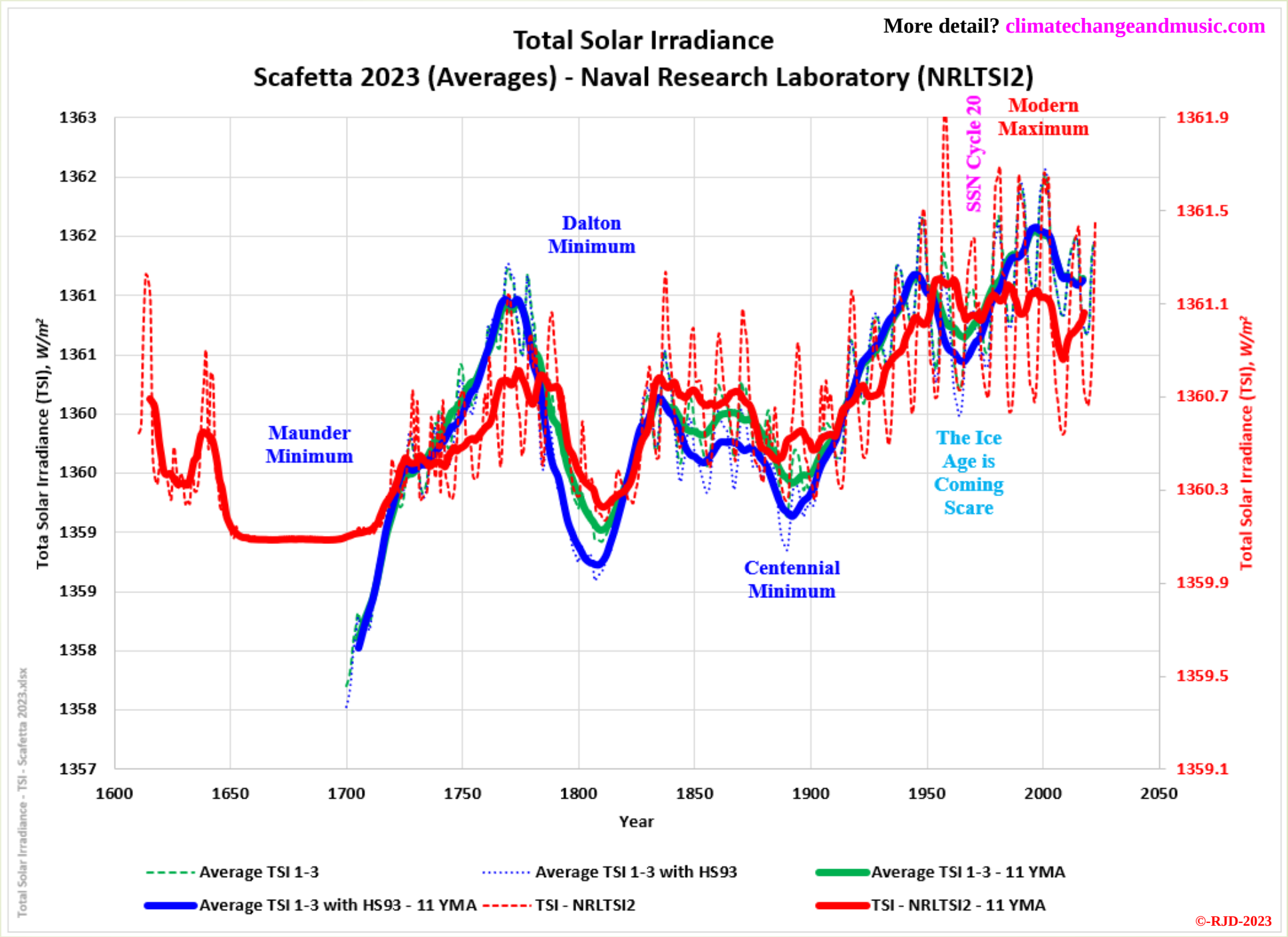
**As I did with the Solar Forcing Function Anomalies, I have used an 11 Yearly Moving Average (YMA) to take some of the noise out of the Scafetta TSI data sets. There are two averages. The green curve is the average of the three Scafetta TSI curves (#1, #2, #3). The blue curve adds in the Hoyt and Schatten 1993 model combined with the ACRIM satellite data to bring their TSI curves up to date. The Scafetta curves tend to have more pronounced peaks and valleys.**

**Scafetta 2023 TSI - Average Normalized**

**The MTR (1850+) TSI discussion is like the previous SFF discussion.**

**So, is the NRLTSI2 dataset a reasonable alternative? In general, NRLTSI2 appears to be representative. Would one of the other solar forcing options be a better alternative? That is possible since some of the discrepancies in my TSI-AMO-$CO_2$ model could tighten up the 20th century temperature rises.**

More detail? climatechangeandmusic.com

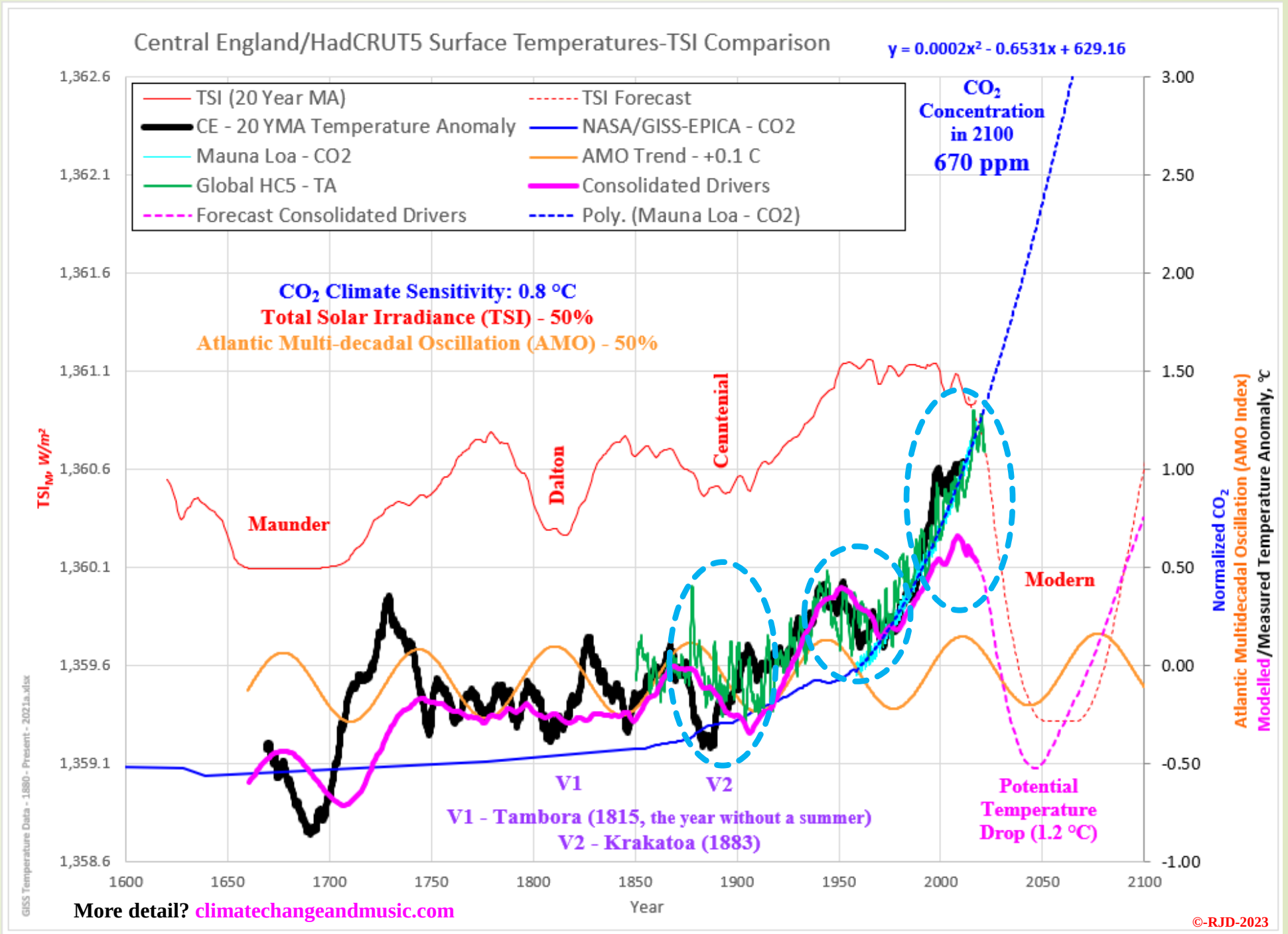


CSS-42h

# The Role of the Sun Scafetta 2023 Central England Temperature Model

**This is one of the model outputs shown in my CSS-29 – Climate Model – TSI-AMO-$CO_2$ post. The NRLTSI2 TSI curves (as a proxy) were used in that post. I have highlighted a few areas where the Scafetta TSI curves might help tighten up the temperature fit. There are two temperature sets plotted here (i.e.: the Central England Temperature (CET) and the HadCRUT5 Surface Temperature dataset. This is a simple model, but the results are more representative than $CO_2$ on its own. Throw in some ENSO, PDO, etc. and some of the discrepancies might be minimized. The forecast here uses a TSI drop to 1359.3 W/m². Based on the other TSI curves shown earlier, that could be conservative. I will look at how some of these other TSI curves fit into the model, look at some sensitvities and report back in a future post.**

**Scafetta 2023 CET Model**

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