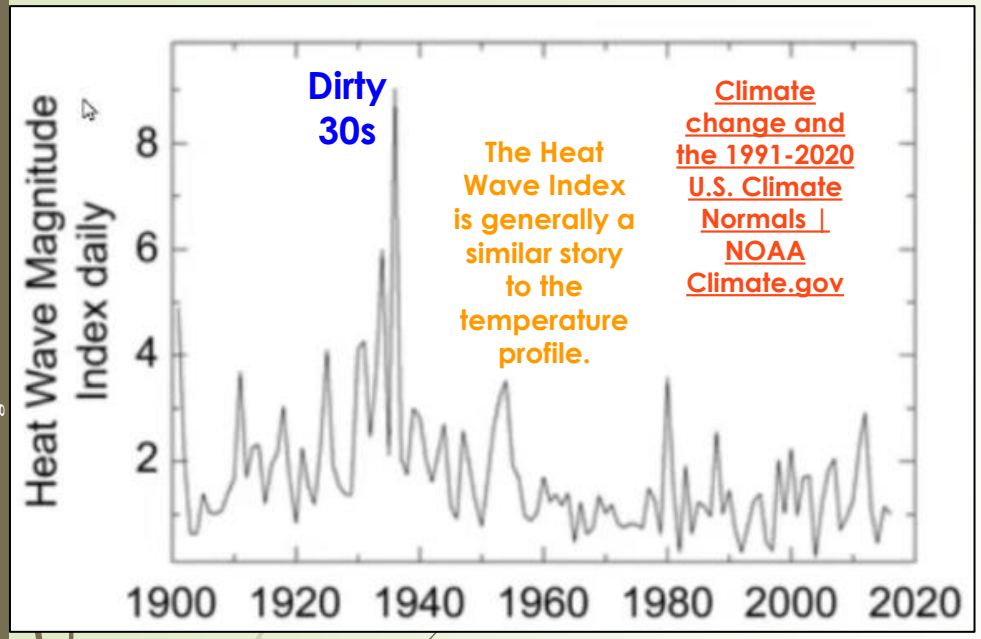
Solar Flares and CMEs: USA Maximum Temperatures and Heat Waves

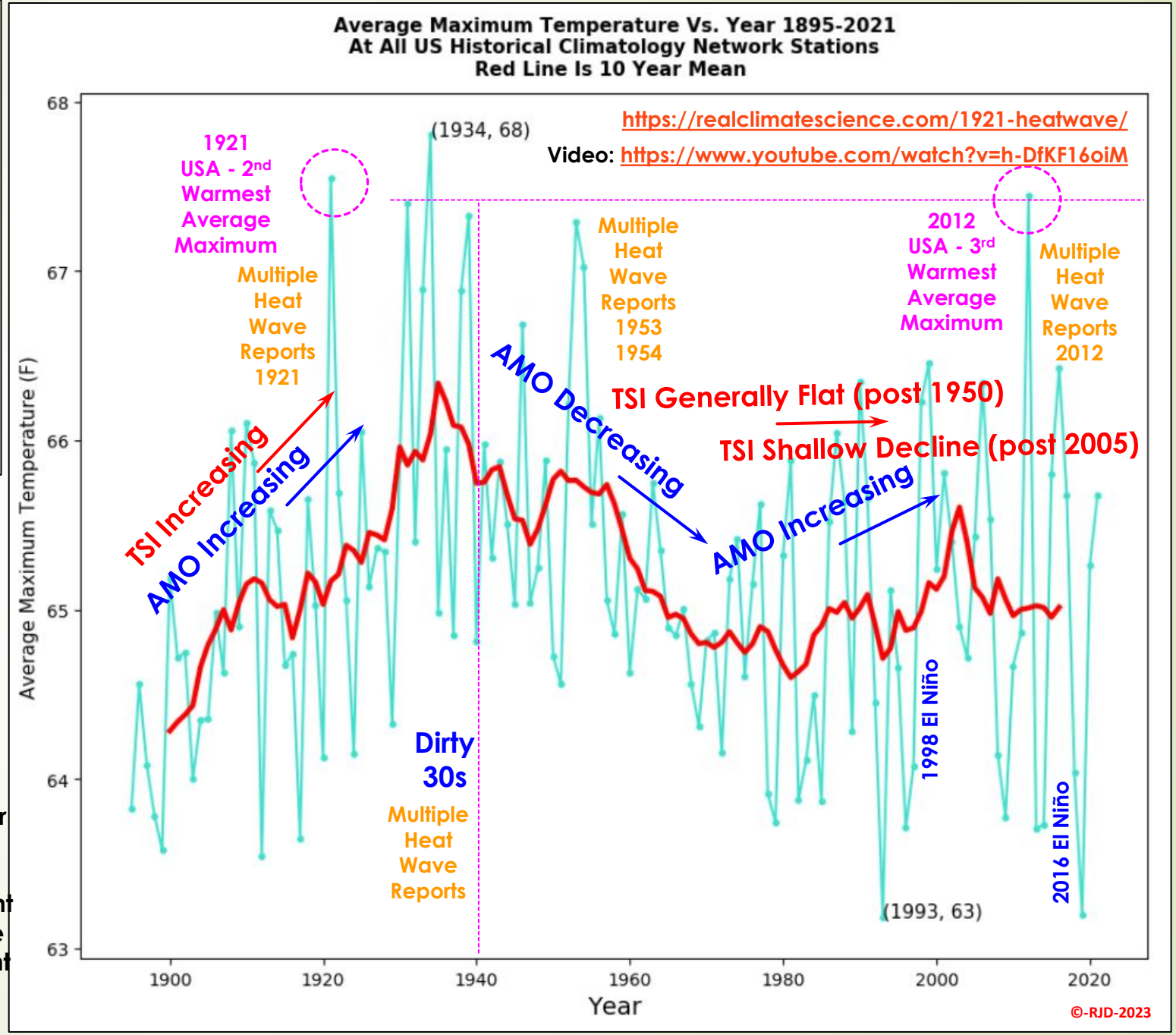
More detail? climatechangeandmusic.com



Tony Heller – Real Climate Science
https://realclimatescience.com/

To find old news clippings of temperature and climate extremes for the years highlighted in the plot to the right, go to the website shown above and put the year in the search box. There are many parameters acting on the global temperature (i.e.: the slow, small, steady increase in atmospheric CO_2 concentration is just, at best one minor component). The two more anomalous temperature spikes in 1921 and 2012 are of special interest. The other major spikes occurred during the AMO high in the 1930s and early 1950s (TSI_M/SA peak) or were strong El Niño years. In both of those years the sun threw off large solar flares (with a significant Coronal Mass Ejection (CME)). A similar temperature response occurred back in 1859 in conjunction with the Carrington Event (the largest CME to hit earth in our recent history). Tony Heller has summarized the 1859 extreme weather.

SF & CMEs Maximum Temps



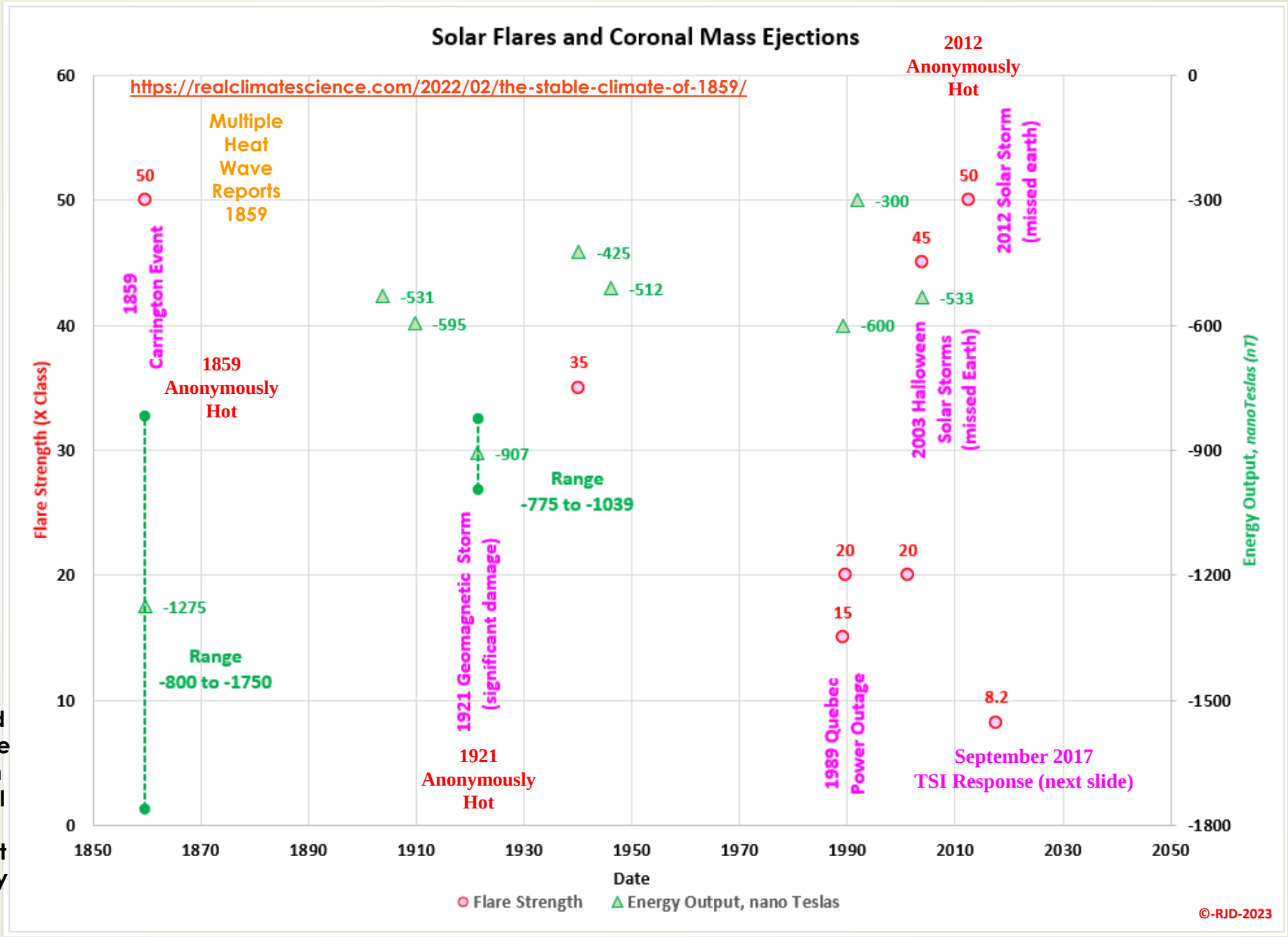
Data Source: https://en.wikipedia.org/wiki/List_of_solar_storms

More detail? climatechangeandmusic.com

Solar Flares and CME History

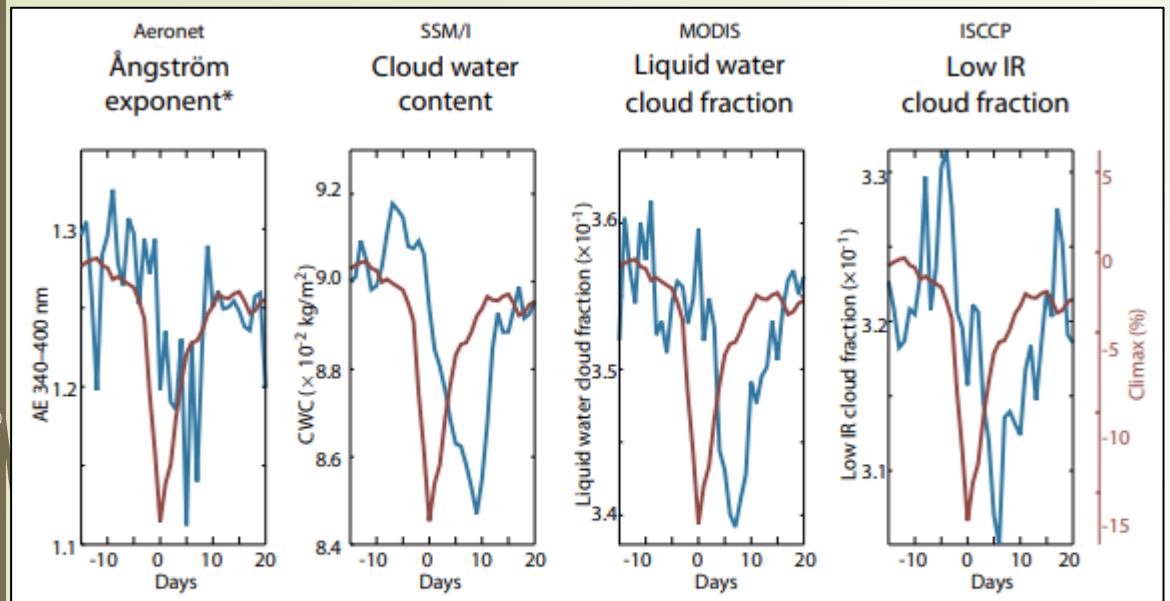
This chart was prepared with the larger Solar Flare and Coronal Mass Ejection (CME) data available on Wikipedia. We (humanity) have (in general) been extremely lucky with respect to our sun's ability to throw off energy and material in our direction (at least over the last century and a half). The Carrington Event and the 1921 Geomagnetic Storm caused damage but they occurred before we had developed any really significant electrical infrastructure. The two large flares (2003 (X45) and 2012 (X50)) would have been potentially devastating if they had been directed at earth. So, when will the next large flare hit and will we be ready for it? The answer to the first question is simple, anytime now. The answer to the second question, I doubt it. We are wasting huge amounts of capital on a future problem that does not exist and ignoring the real threats to our society to chase idiotological visions of saving the planet from a trace gas (CO_2) that is absolutely essential to life on this planet.
In My Opinion!

Solar Flare & CME History



Solar Flares and CMEs: Forbush Events

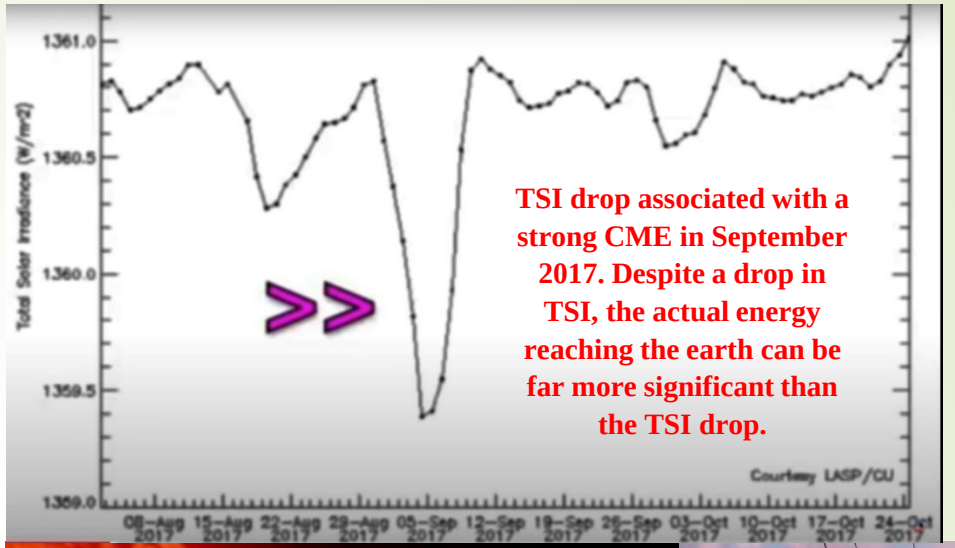
More detail? climatechangeandmusic.com



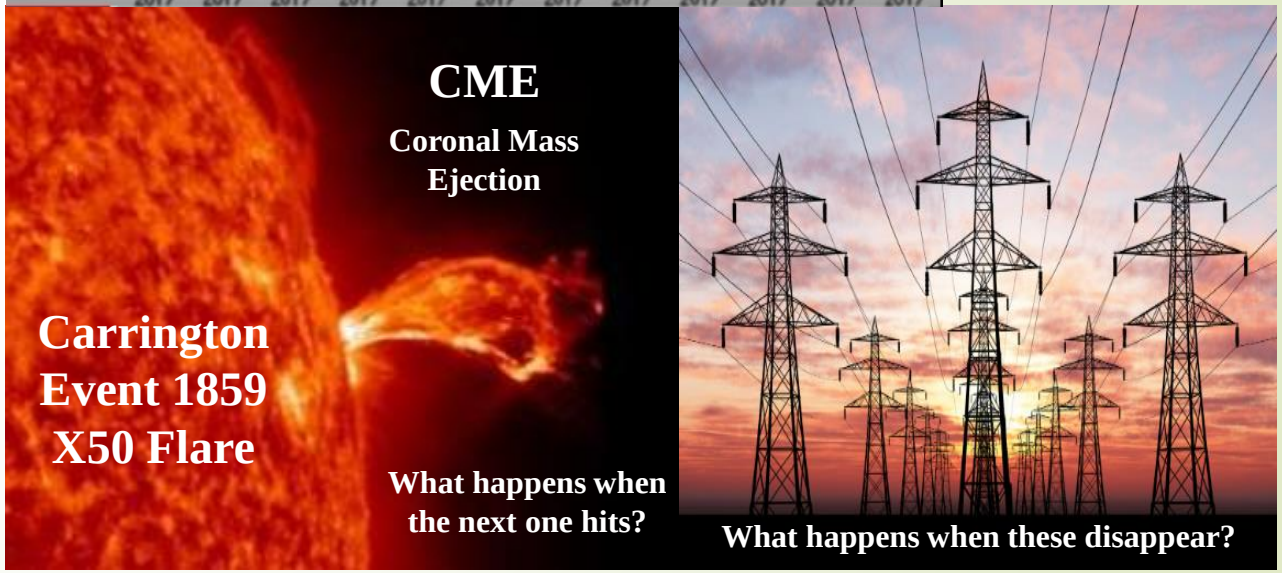
SvensmarkSolar2019-1.pdf (thegwpf.org)

Figure 14: Changes in cloud parameters before and after Forbush decreases.

Changes in daily averages, averaged over the five strongest events between 1990 and 2005.[59] The data shows that reductions in the cosmic ray flux translate into changes in cloud properties.
*The Ångström exponent measures the density of aerosols in the atmosphere.



The CAGW alarmist crowd has a very primitive understanding of solar activity. Their models (which they acknowledge run too hot) limit their solar input to changes in Total Solar Irradiance (TSI). When the TSI drops, the amount of heat energy (W/m^2) reaching the earth is lower (but that is not the whole story).



SF & CMEs Forbush Events

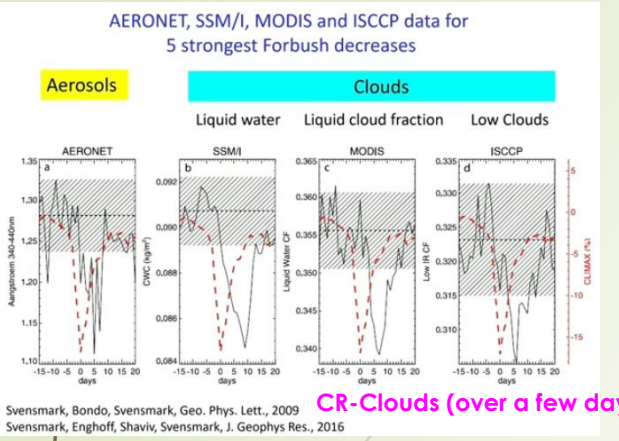
On a short time period (i.e.: solar flares), the amount of other energy (UV, X-ray, High Energy Particles (HEP), etc.) can increase dramatically. With large flares/CMEs that influx of energy can noticeably warm the planet. A secondary, brief warming related To the drop in Cosmic Ray Flux (CRF) leading to less cloud cover is also active as shown by the Forbush Event analysis shown above. Real world data that shows CRF does have an effect on cloud cover. On longer terms, the absolute TSI acts more as a climate driver proxy. TSI changes are very small and on their own are not a strong climate driver. But they are a strength indicator for the many other solar forcings (CRF (cloud cover), HEP, solar winds, electromagnetic fields, etc.) that do affect and ultimately dominate our climate. When TSI is high, solar wind strength is also high, leading to lower CRF and less cloud nucleation/cover and lower atmospheric HEP penetrations and ultimately higher temperatures. Conversely, when TSI is low, the temperatures are lower. And unfortunately, our weakening electromagnetic fields will accentuate that process (i.e.: even higher CRF, more cloud cover and cooler temperatures than the forecasted GSM (lower TSI) would normally produce). And just for good measure the AMO is also moving into its 30 year cold phase. These forcings (laid out by Svensmark on the next slide) are available in the CMIP6 models. They just are not used. I wonder if that might fix their models run too hot problem?

CSS-36d Solar Flares and CMEs: Cosmic rays, Clouds and Climate

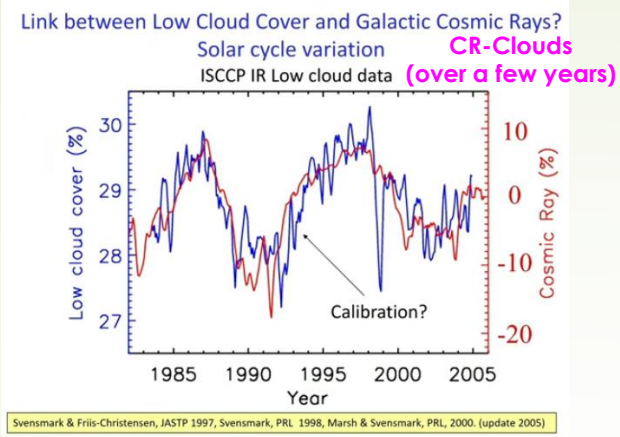
More detail? climatechangeandmusic.com

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

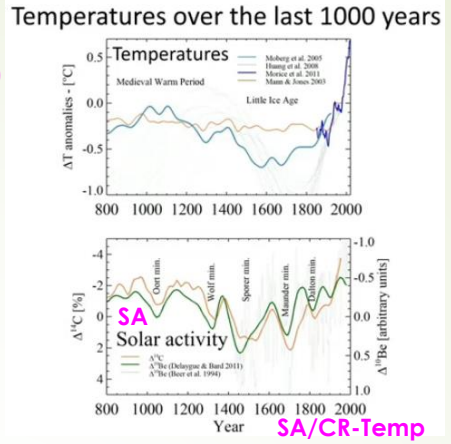
Cosmic Rays Clouds & Climate



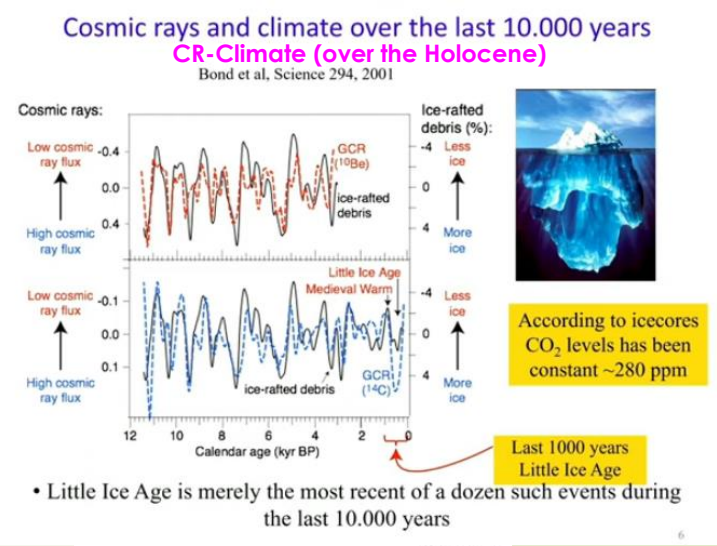
CR-Clouds (over a few days)



CR-Clouds (over a few years)



SA/CR-Temp (over a milennia)



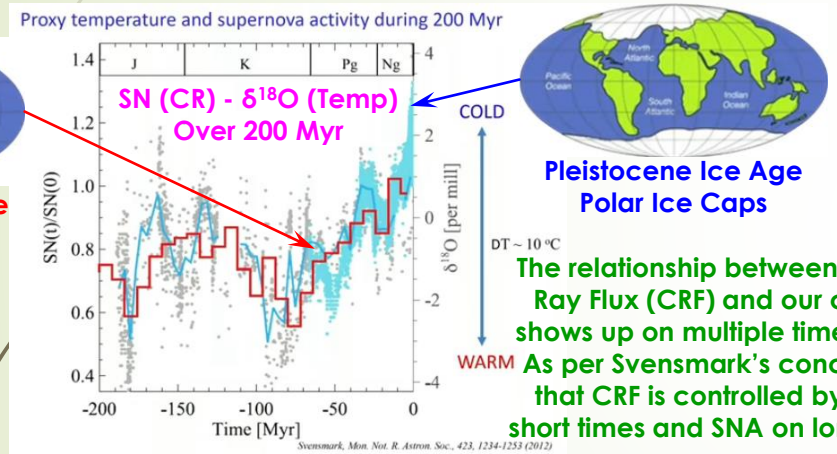
According to icecores CO_2 levels has been constant ~280 ppm

Last 1000 years Little Ice Age

• Little Ice Age is merely the most recent of a dozen such events during the last 10.000 years

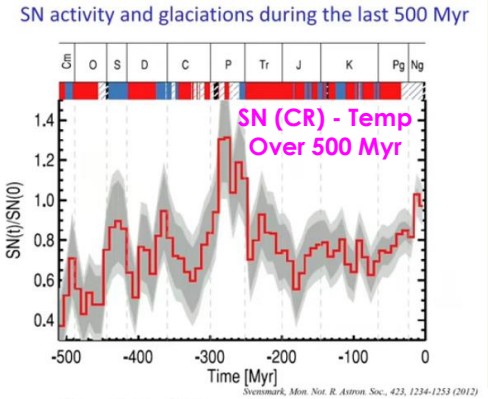
Early Eocene
No Ice

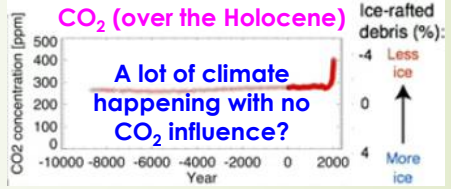
SN
Super Nova
(i.e.: Cosmic Rays)



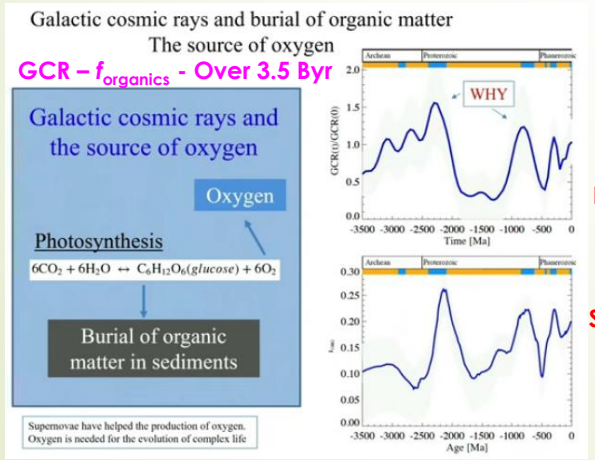
Pleistocene Ice Age
Polar Ice Caps

The relationship between Cosmic Ray Flux (CRF) and our climate shows up on multiple time scales. As per Svensmark's conclusions, that CRF is controlled by SA on short times and SNA on long times.





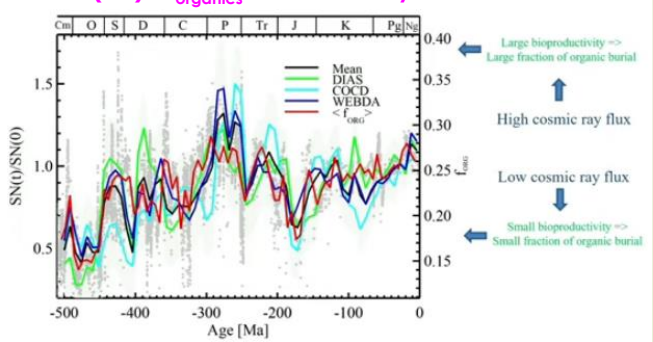
These images come from a recent presentation (Global Warming and Solar Flares) by Henrik Svensmark. With all due respect to the CAGW alarmist community, CO_2 is not the primary climate driver and dismissing solar activity and cosmic ray influence on the climate is a childish, idiotological, unscientific and dangerous approach to the subject.

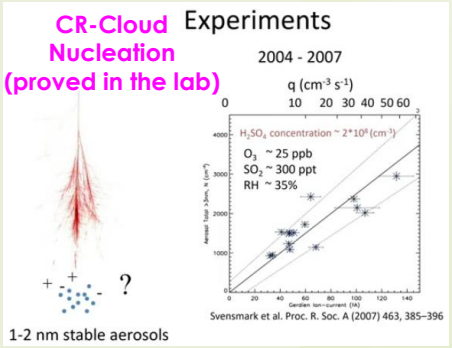


GCR – $f_{organics}$ - Over 3.5 Byr

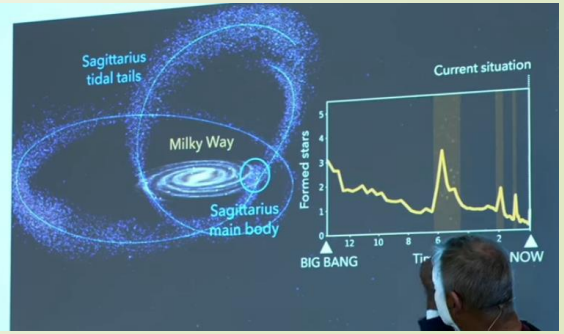
Milky Way Star Formation

Sediment Organic Matter Fraction



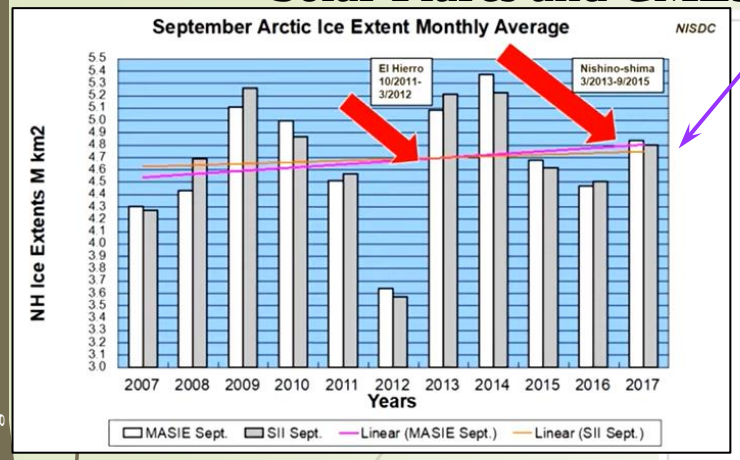


Star Formation- Over 13.5 Byr



This slide is busy. But you can watch Svensmark's video or wait for my more detailed Climate Short Story (CSS).

Solar Flares and CMEs: Northern Hemisphere Sea Ice Extent



Atmospheric CO_2 concentrations are rising but Arctic Sea Ice Extent Minimums are rising? Not very good for the CAGW alarmist narrative!

Northern Hemisphere Sea Ice Extent
UAH Lower Troposphere Temperature Anomaly

Current Arctic Sea Ice Extent Minimums are still above 2017 levels.

Decent Correlation

2017 - Low Winter High Sea Ice Extent

Sea Ice Extent 4 Year Rise

Sea Ice Extent 14 years flat

Good Correlation up until 2007.

2012 Solar Storm Influence?

2012 - Summer Low Sea Ice Extent

Remember this is the Inverse UAH Temperature Anomaly (i.e.: if the IUAHTA is rising the temperature is decreasing).

Sea Ice - Areal Extent, *mmkilometers²*

Temperature Anomaly, °C

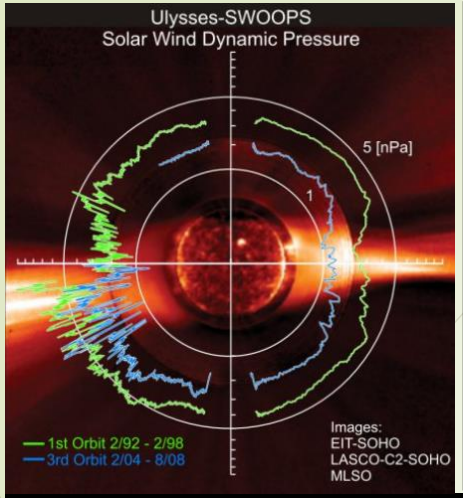
Date

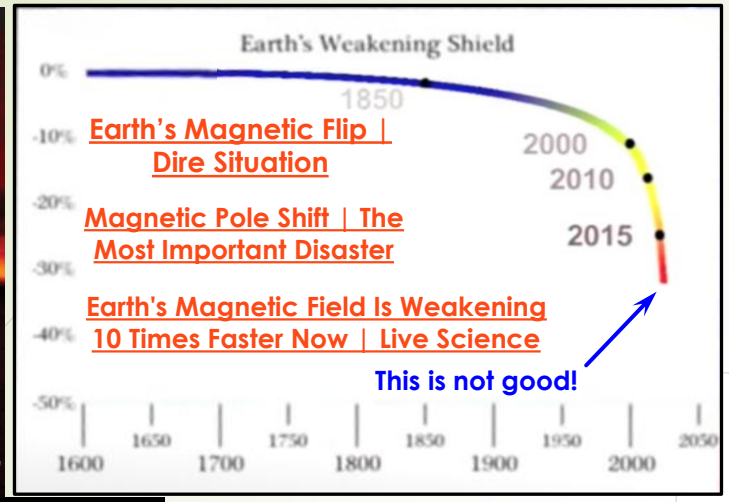
Northern Hemisphere Sea Ice | Inverse UAH TA - High Ice | Inverse UAH TA - Low Ice

SF & CMEs NH Sea Ice Extent

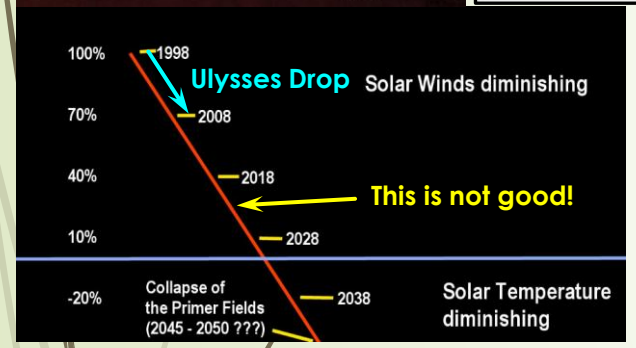
The 2012 Northern Hemisphere Sea Ice Extent, like the 2012 US temperature (Slide CSS-36a) are anomalous readings (but ultimately, they are related). The energy infusion due to the flare could have played a role in both parameters (despite being aimed away from earth). Another (potentially larger contributing factor) is very likely the volcanic eruption of El Hierro in 2011/12 (discussed in a little more detail in my CSS-31 – Volcanic Activity post). Arctic Sea Ice Extent is, not surprisingly, closely related to temperature and correlates reasonably well with the global UAH Lower Troposphere satellite data. But something changed in 2007 (based on the summer lows). Artic Sea Ice Extent Minimum since the step drop in 2007 (which was not due to CO_2) has been growing. Again, showing that there is a lot more to "Climate Change" than just CO_2.

Solar Flares and CMEs: Weakening Electromagnetic Fields





This is where things get interesting. Our planet's electromagnetic field is weakening and those losses are accelerating. We are heading into a Grand Solar Minimum. That means solar activity is very likely to drop significantly over the next few decades. When solar activity drops, the solar wind strength drops as well. With weaker solar winds, the Cosmic Ray Flux increases, increasing cloud nucleation/formation and ultimately lower global temperatures (as per the chart below). Note, this chart has an aggressive (but possible) TSI_M projection. The weakening electromagnetic field (like lower solar activity) leads to weaker solar winds and a higher CRF and cooler temperatures, making the projection below very likely and probably optimistic. How low can it go? A lot lower, devastatingly lower given that we are well into a magnetic reversal already. And our problems do not stop there. A weaker magnetic field means we are more vulnerable to weaker space weather. When our electromagnetic field is at full strength, a Carrington sized event will cause apocalyptic damage. The same damage is now possible with smaller solar flares and CMEs (and our electromagnetic fields continue to weaken). The intensity level of all types of space energy (X-ray/ Gamma/UV rays, High Energy Particles (HEP), etc.) will also increase as our protection drops (all of which have their own complications). We have some real existential threats (not CO_2 emissions) to worry about over the next few decades (and they are not all listed here). We can easily survive any minor warming that rising CO_2 produces. What we cannot survive is the continued fiscal suicide these ideological, unscientific "green" initiatives are imposing on our society. We should be preparing for cold and hardening our electrical grids and supply chains!



Weakening Magnetic Fields