

GSM – Grand Solar Minimum. You really should do the Research!

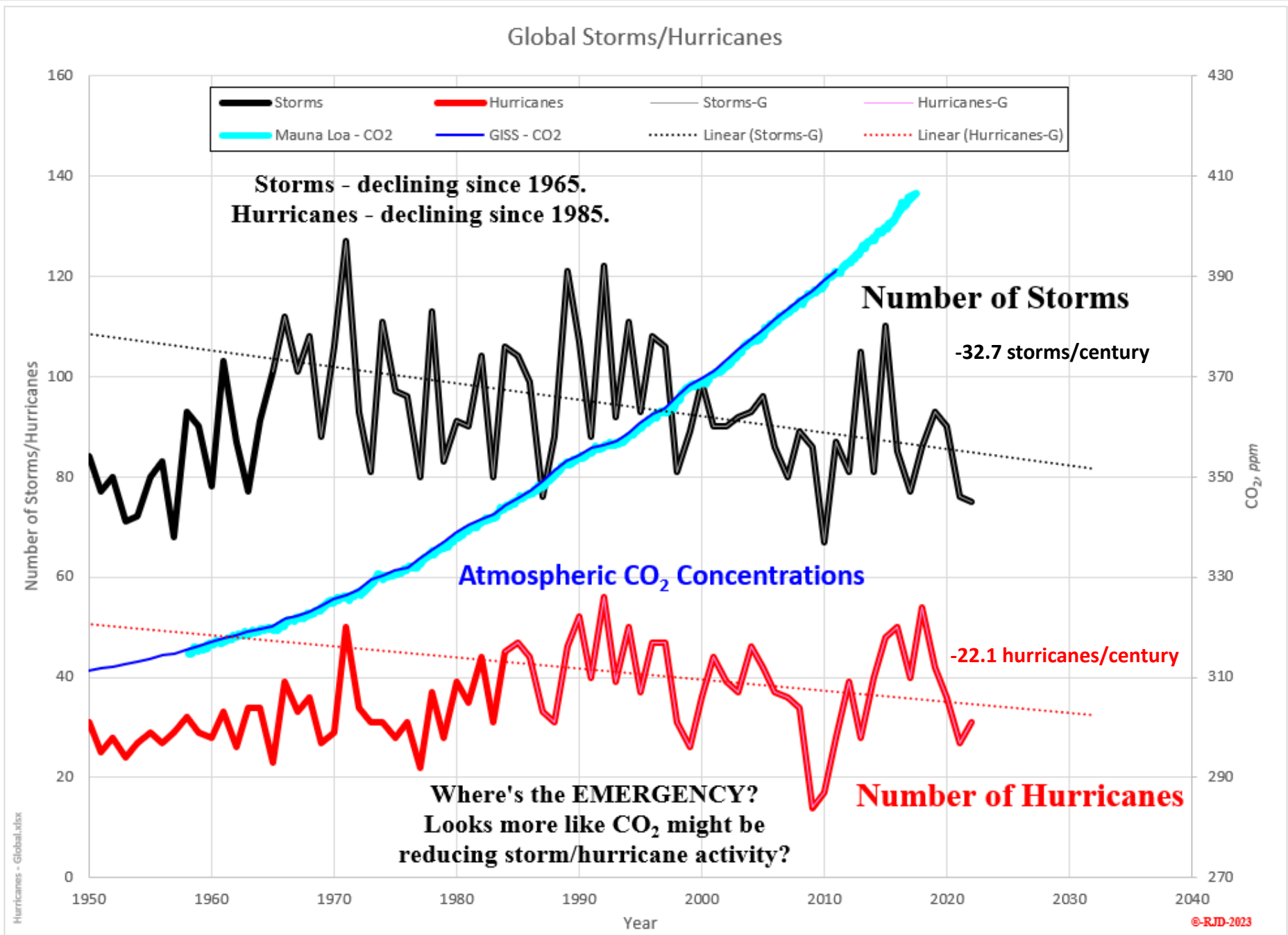
One of the standard lies that you find in the mainstream media says that tropical storms/hurricanes are getting more frequent. The corollary says that they are also getting more intense. We have very good data post-1950 and no, the number of tropical storms and hurricanes is not increasing. Globally, tropical storms have been declining (since 1965) at a rate of 32.7 storms/century and hurricanes have declined (since 1985) at a 22.1 hurricane/century clip. All despite a steady rise in atmospheric CO<sub>2</sub> concentrations. Hmmm...., that does not fit the narrative very well. To be fair, Atlantic storm and hurricane activity has generally been increasing and the alarmist community shamelessly promotes that small dataset while routinely ignoring the

much larger global story. I update the hurricane data yearly. You can look at earlier posts to

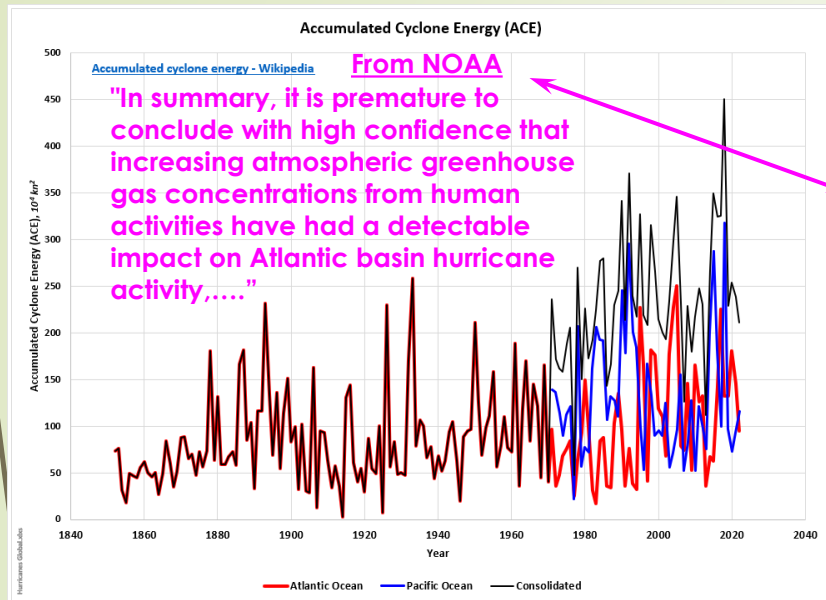
**ACE  
Hurricanes  
Numbers**

access more data/discussion ([OPS-57 – Hurricane Update – 2021 Season](#) and [OPS-63 – Hurricane Update - 2022](#) as a starter).

This post will introduce Wikipedia’s Accumulated Cyclonic Energy (ACE) data and review some of the relationships with other climate data. I led off this slide calling the mainstream media liars and hold fast to that statement. These trends are not new!

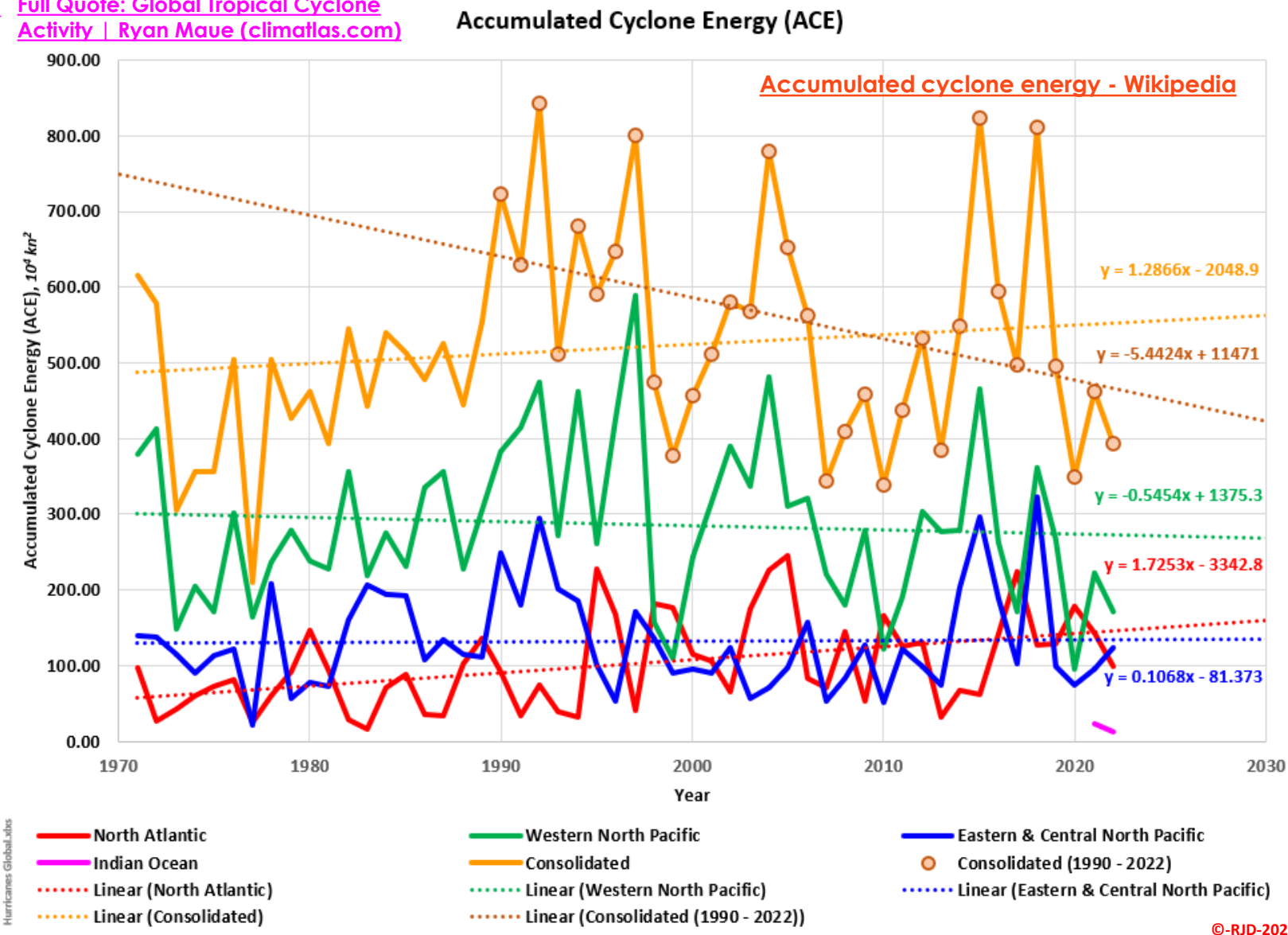


# CSS-37b Hurricanes - Accumulated Cyclone Energy (ACE) - ACE Trends



The Accumulated Cyclone Energy (ACE) provides a measure of the overall intensity of the tropical storm/hurricane activity around the globe. This data set comes from Wikipedia (for whatever that is worth). The North Atlantic dataset goes back to 1852. The remaining global data begins in 1971. Over the 1971 to 2022 period the global trend is generally up but there is a significant downward trend beginning in 1990. The North Atlantic trends up, the Pacific trend is down.

Full Quote: [Global Tropical Cyclone Activity | Ryan Maue \(climatlas.com\)](http://climatlas.com)



So, are hurricanes increasing in intensity? The answer is a bit of a mixed bag and appears to be somewhat cyclical. The 1971 to 2022 period is a relatively short period for a climate discussion. The North Atlantic data covers 1852 to 2022, but that data alone is not globally representative. As shown in

Previous posts the North Atlantic storm/hurricane counts have been increasing. So, an increase in the North Atlantic ACE is not unexpected. The combined Pacific

data (which accounts for a significant portion of the Global storm/hurricane data) is trending down. Regardless, Global ACE has been trending down dramatically since 1990 (for 32 years and counting), despite a steadily rising, slowly accelerating atmospheric CO<sub>2</sub> concentration. Once again (and not surprisingly), the CAGW alarmist narrative appears to be at odds with the real world data. The remaining slides focus in on the North Atlantic ACE data and its relationship to other climate data.

## ACE Hurricanes Trends

GSM - Grand Solar Minimum. You really should do the Research!

# CSS-37c Hurricanes - Accumulated Cyclone Energy (ACE) - Ryan N. Maue

More info ? [climatechangeandmusic.com](http://climatechangeandmusic.com)

The plots to the right are pulled from [Ryan N. Maue's website](#). This data was originally published in 2011 (Maue 2011, [Recent historically low global tropical cyclone activity](#)) and has been updated to 2023. As with the data/analysis I have put forward, there is no evidence that hurricanes/storms are getting any more frequent or intense. So when you hear someone say that hurricanes and/or storms are getting worse, call that someone out. They are either lying or they are completely uninformed.

## ACE Hurricanes Ryan N. Maue

Another source for real data on the general unsubstantiated concept of extreme weather enhancement or attribution is Dr. Roger Pielke Jr.

[No, Hurricanes Are Not Bigger, Stronger and More Dangerous \(forbes.com\)](#)

[A Remarkable Decline in Landfalling Hurricanes \(substack.com\)](#)

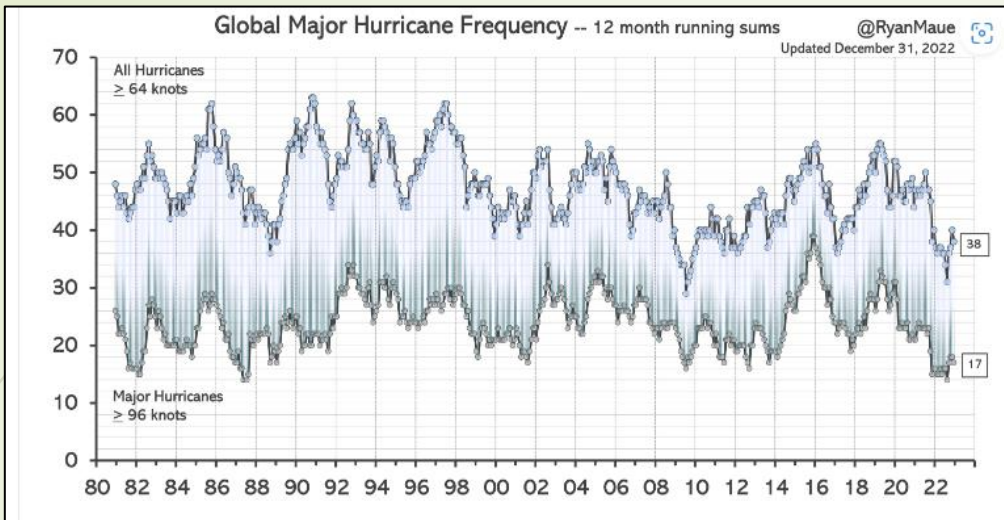


Figure: Global Hurricane Frequency (all & major) -- 12-month running sums. The top time series is the number of global tropical cyclones that reached at least hurricane-force (maximum lifetime wind speed exceeds 64-knots). The bottom time series is the number of global tropical cyclones that reached major hurricane strength (96-knots+). Adapted from Maue (2011) GRL.

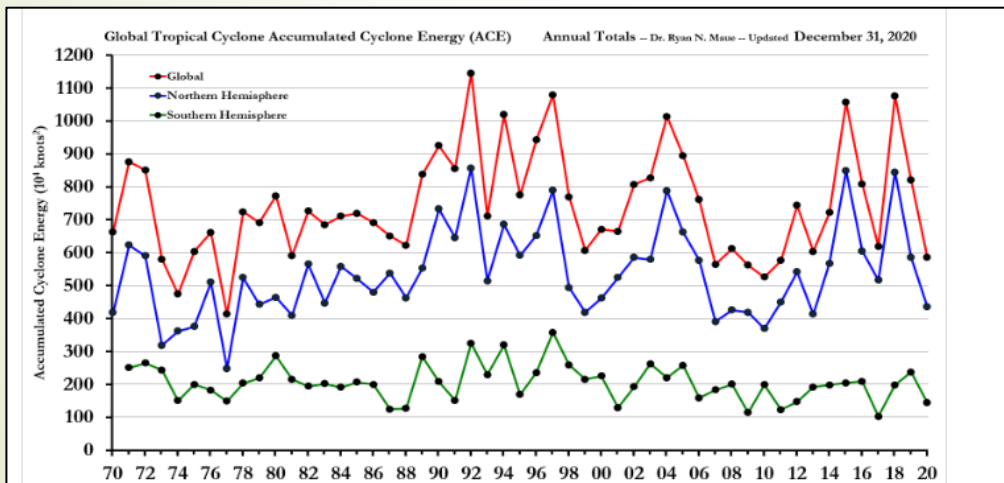


Figure: Last 4-decades of Global Tropical Storm and Hurricane Accumulated Cyclone Energy -- Annual totals. The Southern Hemisphere tropical cyclone season occurs from July-June each calendar year. The graph is constructed such that SH annual value for July 2014 - July 2015 is positioned in 2015.

[Global Tropical Cyclone Activity | Ryan Maue \(climatlas.com\)](http://climatlas.com/tropical/)?  
[https://climatlas.com/tropical/](http://climatlas.com/tropical/)

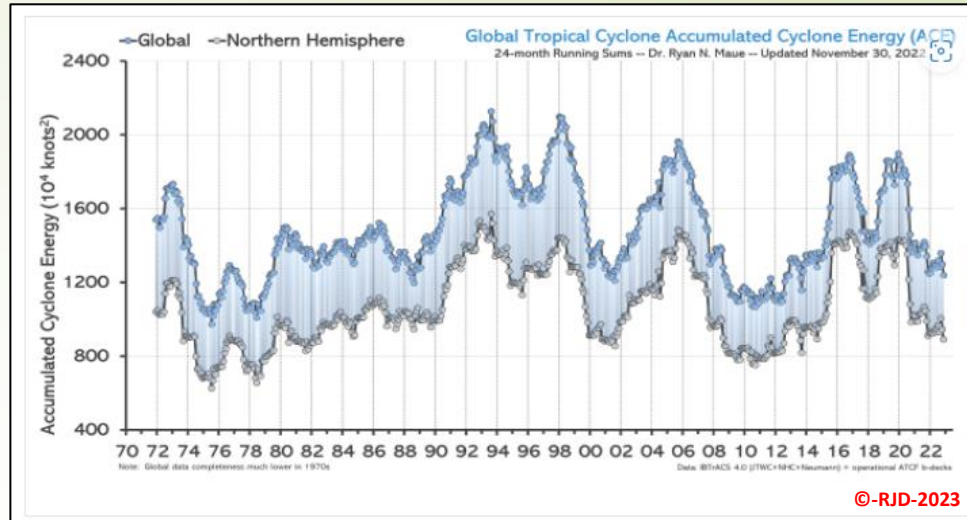


Figure: Last 50-years+ of Global and Northern Hemisphere Accumulated Cyclone Energy: 24 month running sums. Note that the year indicated represents the value of ACE through the previous 24-months for the Northern Hemisphere (bottom line/gray boxes) and the entire global (top line/blue boxes). The area in between represents the Southern Hemisphere total ACE.

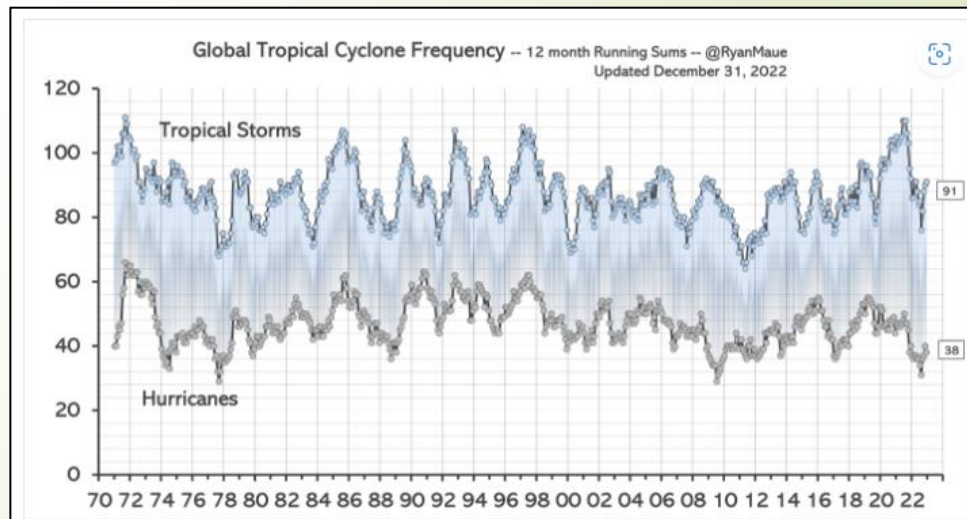


Figure: Last 50-years+ of Global Tropical Storm and Hurricane frequency -- 12-month running sums. The top time series is the number of TCs that reach at least tropical storm strength (maximum lifetime wind speed exceeds 34-knots). The bottom time series is the number of hurricane strength (64-knots+) TCs.

# CSS-37d Hurricanes – Accumulated Cyclone Energy (ACE) – North Atlantic

More info ? [climatechangeandmusic.com](http://climatechangeandmusic.com)

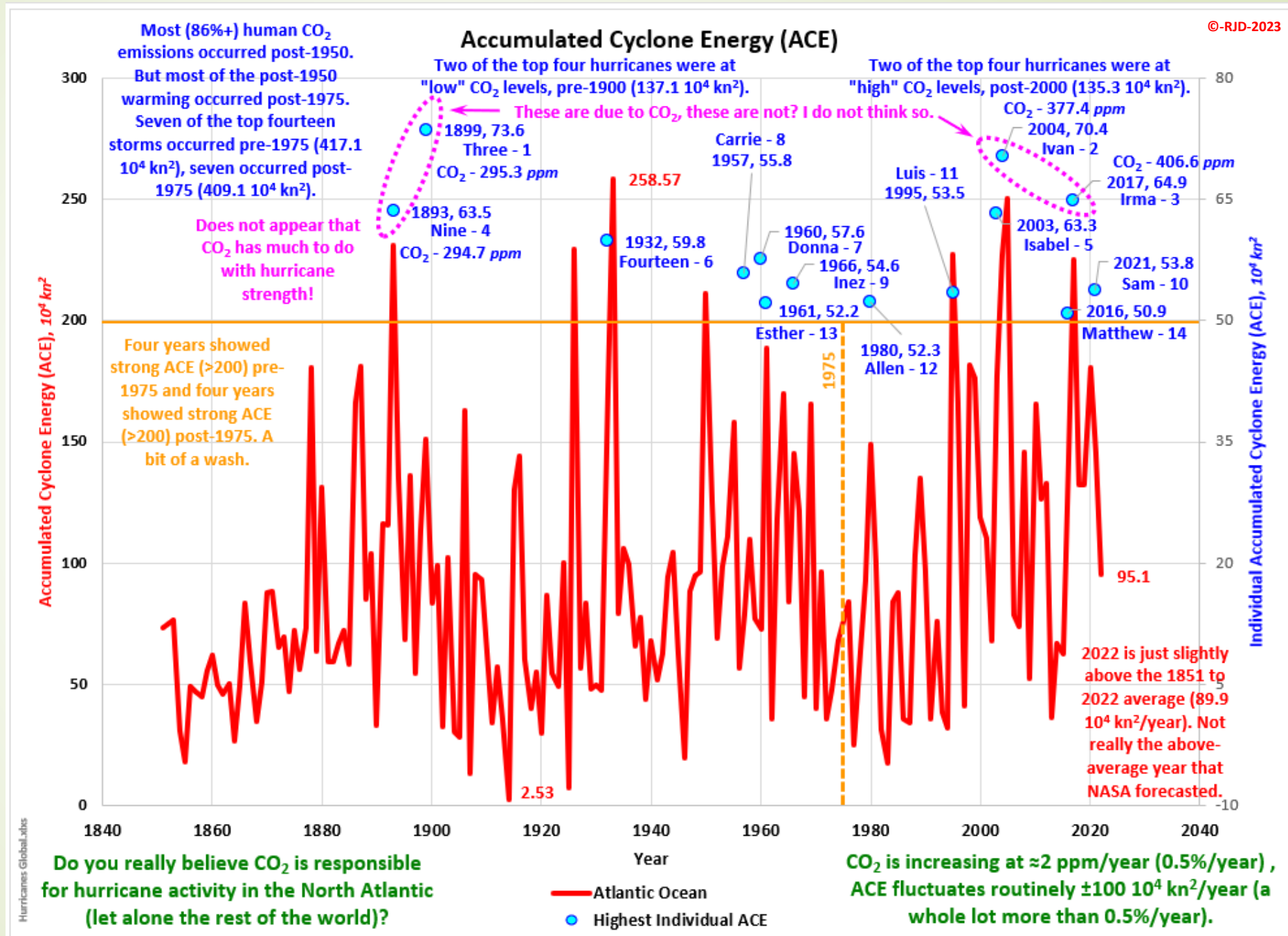
[Accumulated cyclone energy - Wikipedia](https://en.wikipedia.org/wiki/Accumulated_cyclone_energy)

The media takes every new hurricane and blames this unprecedented “extreme weather” on “climate change”. Well, every hurricane can be considered extreme weather. But based on the data, hurricanes are not a new phenomena. The North Atlantic (NA) ACE has been increasing, but the strongest recorded single NA hurricane occurred in 1899 (73.6) and the highest yearly ACE occurred in 1933 (258.57). How is that possible when CO<sub>2</sub> was significantly lower than current levels and 86%+ of human emissions have occurred post-1950? Obviously, a lot more is going on than just CO<sub>2</sub>. The multi-decadal ocean cycles (specifically the Atlantic Multi-decadal Oscillation (AMO)) are likely contributing to the high ACE

experienced in the late 1800s, the 1930s, 1950s and early 21<sup>st</sup> century. Likewise for the lows

experienced in the mid 1800s, the early 1900s, and the 1970s (the Ice Age is Coming Scare). On shorter time scales, there are huge fluctuations that have absolutely nothing to do with atmospheric CO<sub>2</sub> concentrations. Why was the ACE only 2.53 in 1914 and soared to the all time high of 258.57 by 1933? CO<sub>2</sub> is obviously not the only significant climate driver in play.

GSM – Grand Solar Minimum. You really should do the Research!



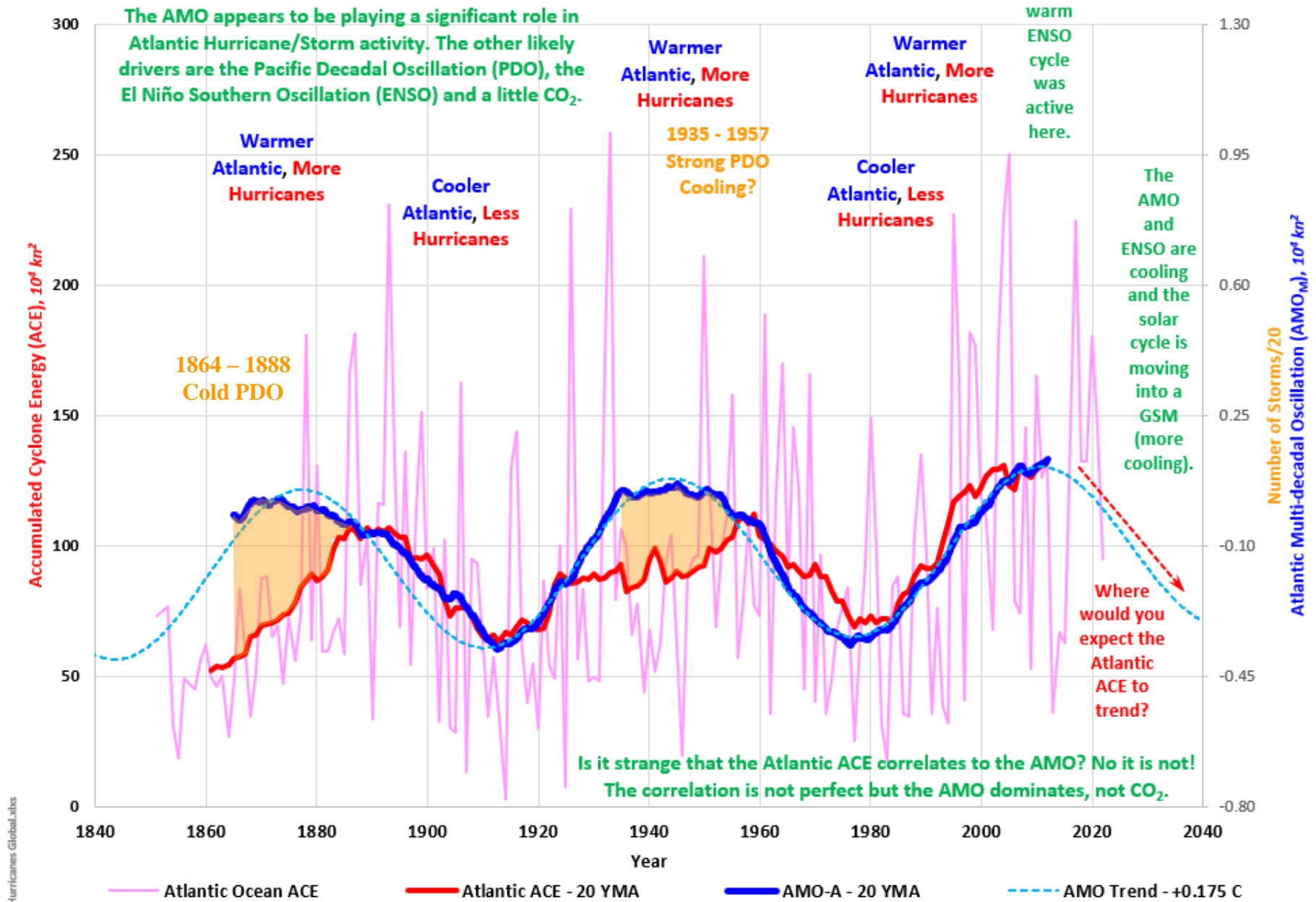
GSM – Grand Solar Minimum. You really should do the Research!

The North Atlantic ACE is plotted against the Atlantic Multi-decadal Oscillation (AMO<sub>M</sub>) to the right. Not surprisingly, there does appear to be some correlation between the two parameters. The ACE momentum (ACE<sub>M</sub>, the red curve showing the 20 Year Moving Average) lays over the AMO<sub>M</sub> quite well. The deviations in 1935 to 1957 and 1864 to 1888 may be due to strong Pacific Decadal Oscillation (PDO) cold phases. In general, a higher AMO<sub>M</sub> means that that Atlantic (and Global) temperatures are also higher (and vice versa). The data suggests that the Atlantic ACE runs parallel to the AMO<sub>M</sub> and therefore Atlantic temperatures. So higher temperatures, more ACE. This runs contrary to the general position that hurricane activity should decline as our planet warms since the equatorial-pole temperature differentials (the main driver) are declining. On a global basis, that scenario is playing out with strong ACE declines since 1990. Why are the ACE/hurricane interactions in the North Atlantic reacting differently than their global counterparts? The answer likely lies within the unique, complex ocean and atmospheric interactions that play out constantly on the planet. Or we can blame just blame CO<sub>2</sub>!

**ACE  
Hurricanes  
AMO<sub>M</sub>**

On a global basis, that scenario is playing out with strong ACE declines since 1990. Why are the ACE/hurricane interactions in the North Atlantic reacting differently than their global counterparts? The answer likely lies within the unique, complex ocean and atmospheric interactions that play out constantly on the planet. Or we can blame just blame CO<sub>2</sub>!

**Accumulated Cyclone Energy (ACE) - Atlantic Multi-decadal Oscillation (AMO)**



©-RJD-2023

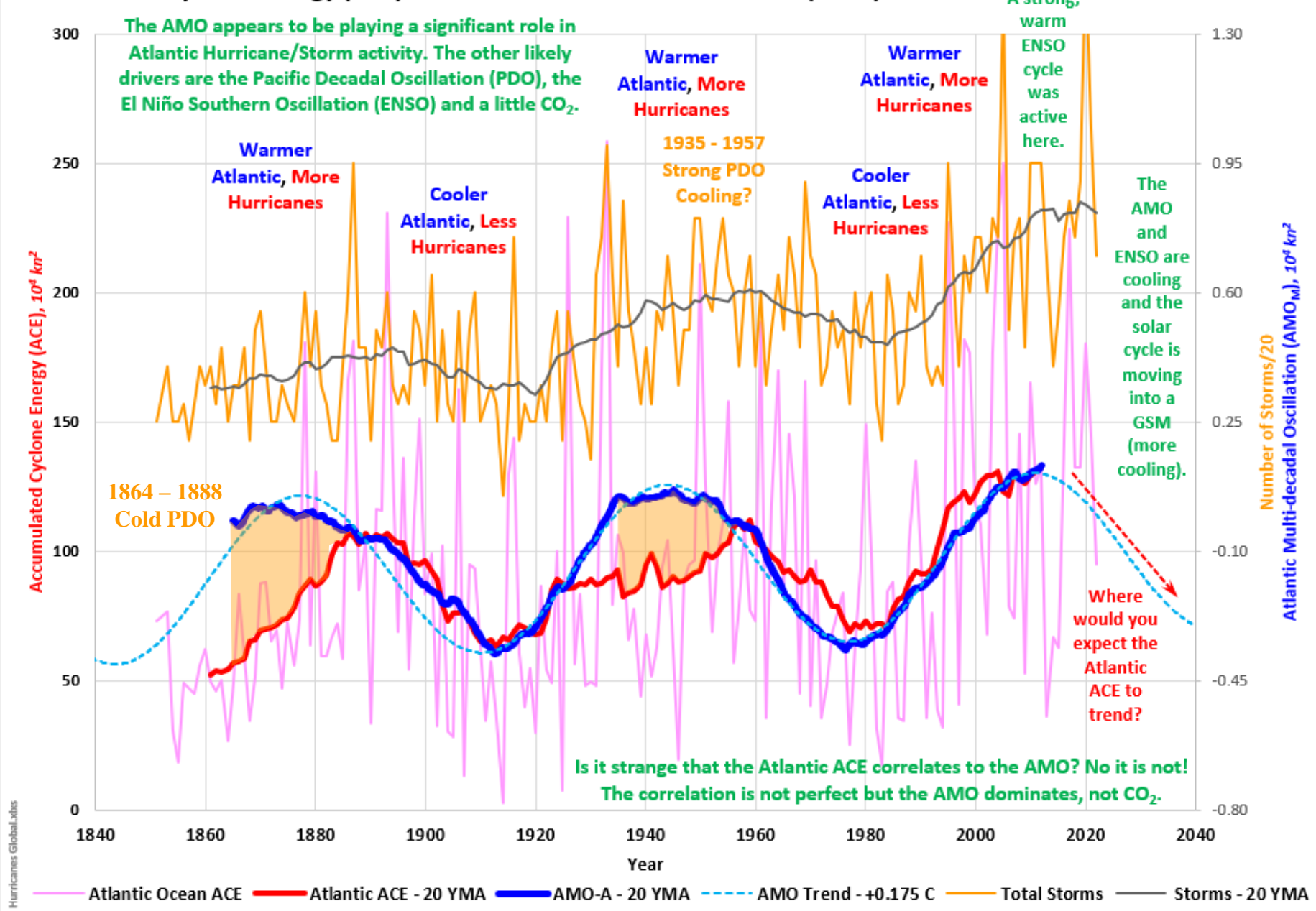
This slide adds in the number of storms. And again, not surprisingly, you can easily see the cyclic AMO<sub>M</sub> influence in the storm data. Do you really still believe that CO<sub>2</sub> is the primary climate driver? In my opinion/analysis CO<sub>2</sub> does play a minor role, but you cannot ignore the ocean cycles and the solar activity. Human emissions are focused post-1950 (86%+). So, What caused the temperature and storm activity pre-1950 to increase? How much of the 1975 to 2005 temperature/storm activity is due to the AMO<sub>M</sub> (how much is CO<sub>2</sub>, how much is due to homogenization)? How much of the temperature response since 2015 is due to the ENSO (which may be tied directly to geothermal heating (a somewhat overlooked driver (???)))? The strong El Niño warming pulse in 2015/16 caused a step rise in temperatures

followed by an unusual triple La Niña event leading to cooling. As laid out in my [CSS-25 -](#)

[Incremental Homogenization – HadCRUT4 to HadCRUT5](#) post, the global temperatures have declined at a 0.7 °C/century rate (in both surface and satellite data). Atmospheric CO<sub>2</sub> levels will not be controlling the temperatures or storm activity over the next few decades (even if “their science” were correct). Temperatures are headed colder (courtesy the AMO<sub>M</sub> and GSM)!

## ACE Hurricanes Storms

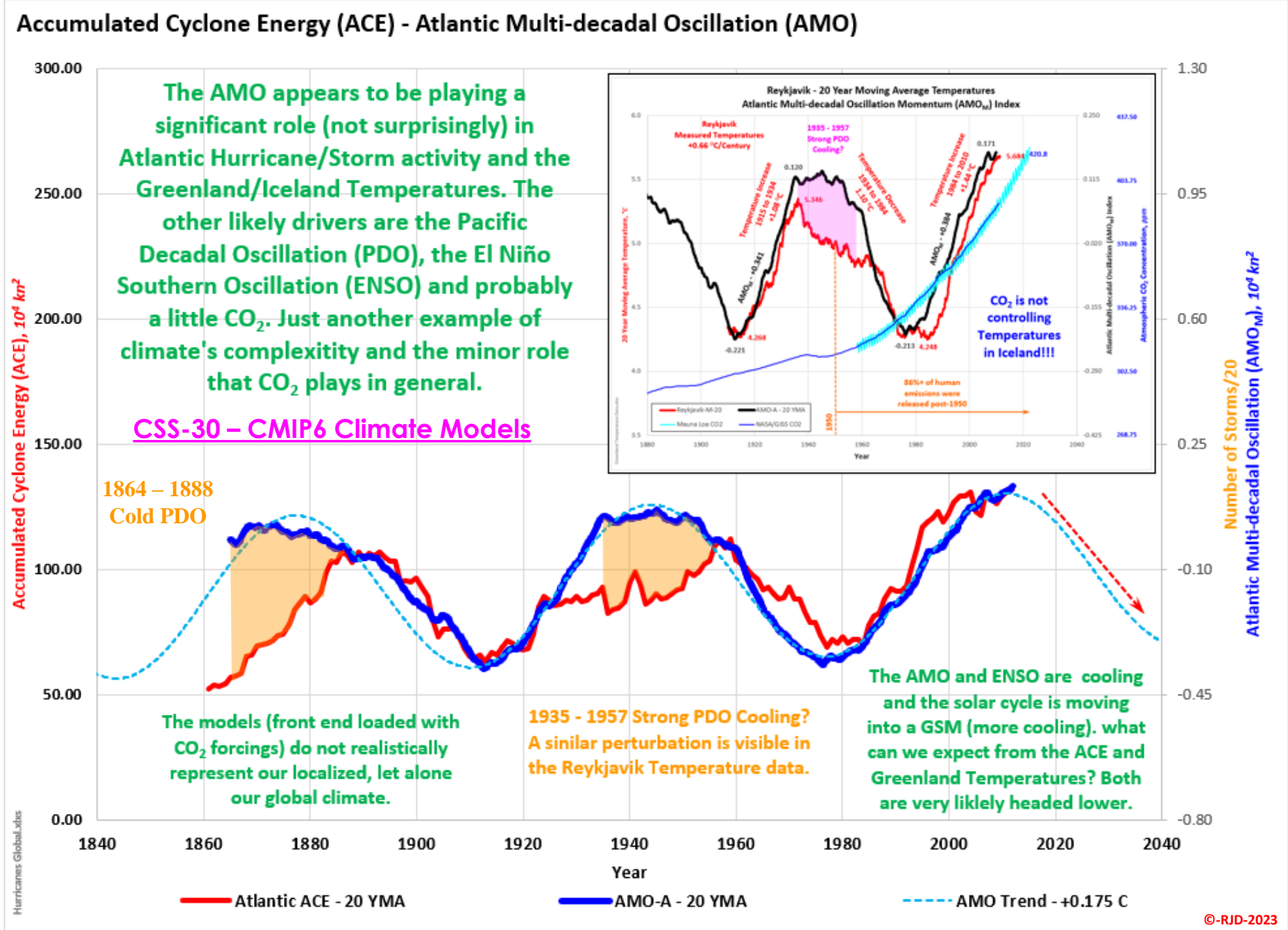
### Accumulated Cyclone Energy (ACE) - Atlantic Multi-decadal Oscillation (AMO)



GSM – Grand Solar Minimum. You really should do the Research!

The ACE<sub>M</sub> anomalies align closely with the temperature anomalies visible in the Iceland (shown to the right) and Greenland datasets (measured and/or homogenized). Again, not surprising, since Iceland/Greenland are located in the North Atlantic. CO<sub>2</sub> is obviously not controlling temperatures in Greenland/Iceland. And as laid out in my [CSS-27 – Is CO<sub>2</sub> Really the Primary Climate Driver](#) post, CO<sub>2</sub> is not controlling temperatures in Antarctica where at best temperatures have been flat in the recorded data (with indications that temperatures have actually declined). So, how much longer are you (the typical citizen/taxpayer) going to continue to allow the Catastrophic Anthropogenic Global Warming (CAGW) alarmist narrative to continue unnecessarily destroying our economies and way of life. There is no scientific proof (i.e.: empirical data) that shows CO<sub>2</sub> is driving our climate. The simplistic, unscientific front loaded [CO<sub>2</sub> climate models](#) that are used to generate our supposed apocalyptic future are self admittedly running too hot and are using emission scenarios that are in the IPCC's words, implausible ([OPS-55 – The State of Climate Science](#)). We (the collective we) and our political "leadership" are ignoring the very real and immediate climate threats.

**ACE  
Hurricanes  
Temperatures**

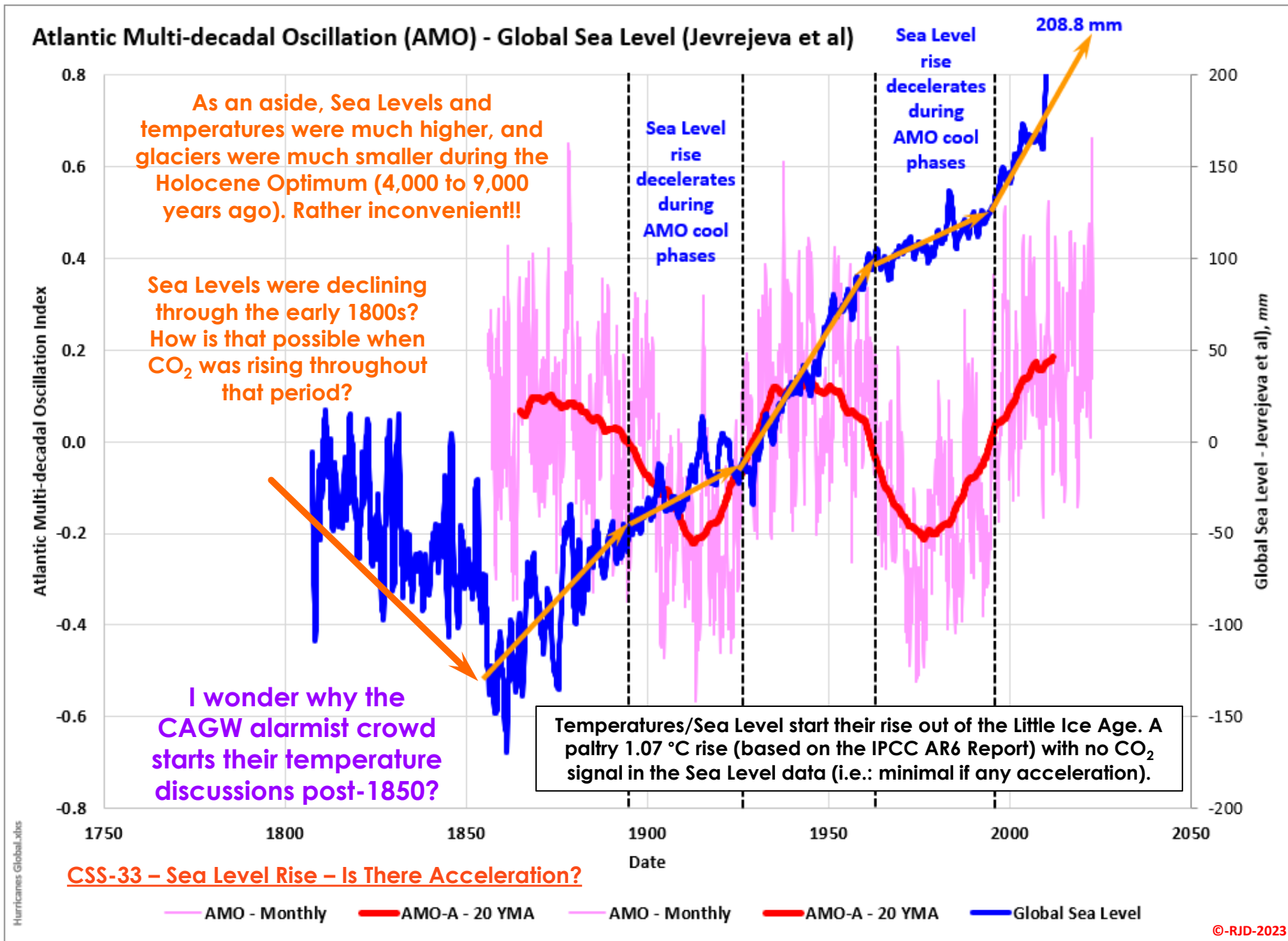


GSM – Grand Solar Minimum. You really should do the Research!

This is a bonus slide that provides a little more perspective on the AMO – Sea Level (SL) connections. The AMO-SL connection is more subtle than the Greenland/Iceland AMO-Temperature connection but the connection is there. Sea Levels appear to rise at a higher rate during AMO warm phases than they do during AMO cold phases. Is that surprising? Not really, the AMO has a strong influence on global temperatures and could therefore have a noticeable effect on Sea Level. The AMO data only goes back to 1856 (although as shown in previous posts, a sinusoidal curve can be extrapolated back in time ([CSS-29 – Climate Model – TSI-AMO- CO<sub>2</sub>](#))). Something is obviously affecting the temperatures and sea level (pre-1850). But we are not that influence (our emissions are primarily post-1950 (86%+) and CO<sub>2</sub> concentrations are low pre-1850 with a very shallow incline (i.e.: inconsequential).

## ACE Hurricanes AMO-Sea Level

The AMO and other ocean cycles would still be active, but there has to be more at play. To reach the cold experienced through the depths of the Little Ice Age (1300s to the late 1800s) solar activity has to be factored in. There is no way CO<sub>2</sub> is the primary climate driver and there is no way that the current front end loaded CO<sub>2</sub> climate models will predict our real climate future.



**CSS-33 – Sea Level Rise – Is There Acceleration?**

— AMO - Monthly    — AMO-A - 20 YMA    — AMO - Monthly    — AMO-A - 20 YMA    — Global Sea Level