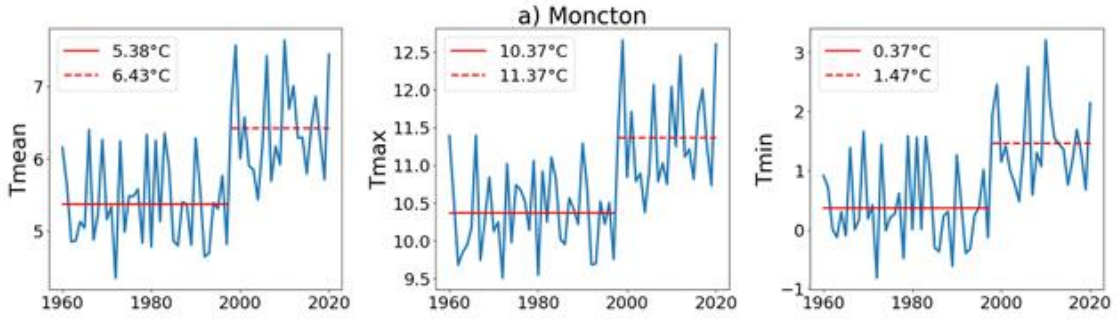


Figure 3: The panels from Figure 2a with added horizontal lines showing the average of plotted data points for 1960-1997 (solid red line) and 1998-2020 (dashed red line). All temperatures are in degrees Celsius.

CSS-77a

The 1998 Step Change in Temperature
Dr. Joseph Hickey's December 2025 Paper

1998
December 2025
Dr. Hickey

The paper referenced above has called into question Environment Canada's Adjusted and Homogenized Canadian Climate Data (AHCCD), showing *"a significant non-climatic artifact exists in the AHCCD, which is a stepwise increase of approximately 1°C in magnitude occurring at 1998 in the annual average temperature records for most AHCCD stations across Canada, and that this 1°C increase occurring at 1998 can, on its own, be responsible for essentially all of the claimed warming (of approximately 1-2 °C) calculated for Canada over the past six or seven decades".*

The Moncton example is included above. As shown in the map to the right, the same profile exists over most of Canada (east of the Rocky Mountains). Dr. Hickey suggests that the step increase is a non-climatic artifact. That might depend on the definition of "climatic artifact". That is a lot of stations reporting similar results so the chance of the step increase being equipment related is highly unlikely. Is the step increase real? I suspect that it is, given that the same step is seen in other data sets (including the original measured data). Environment Canada has been asked to address this step and has provided inadequate responses. There are certainly issues with Environment Canada's data handling, but this may not be one of them. They should still provide an explanation for the step increase (should it be real) and the 10,000+ instances where T_{min} is higher than T_{max}. This post explores the possibilities.

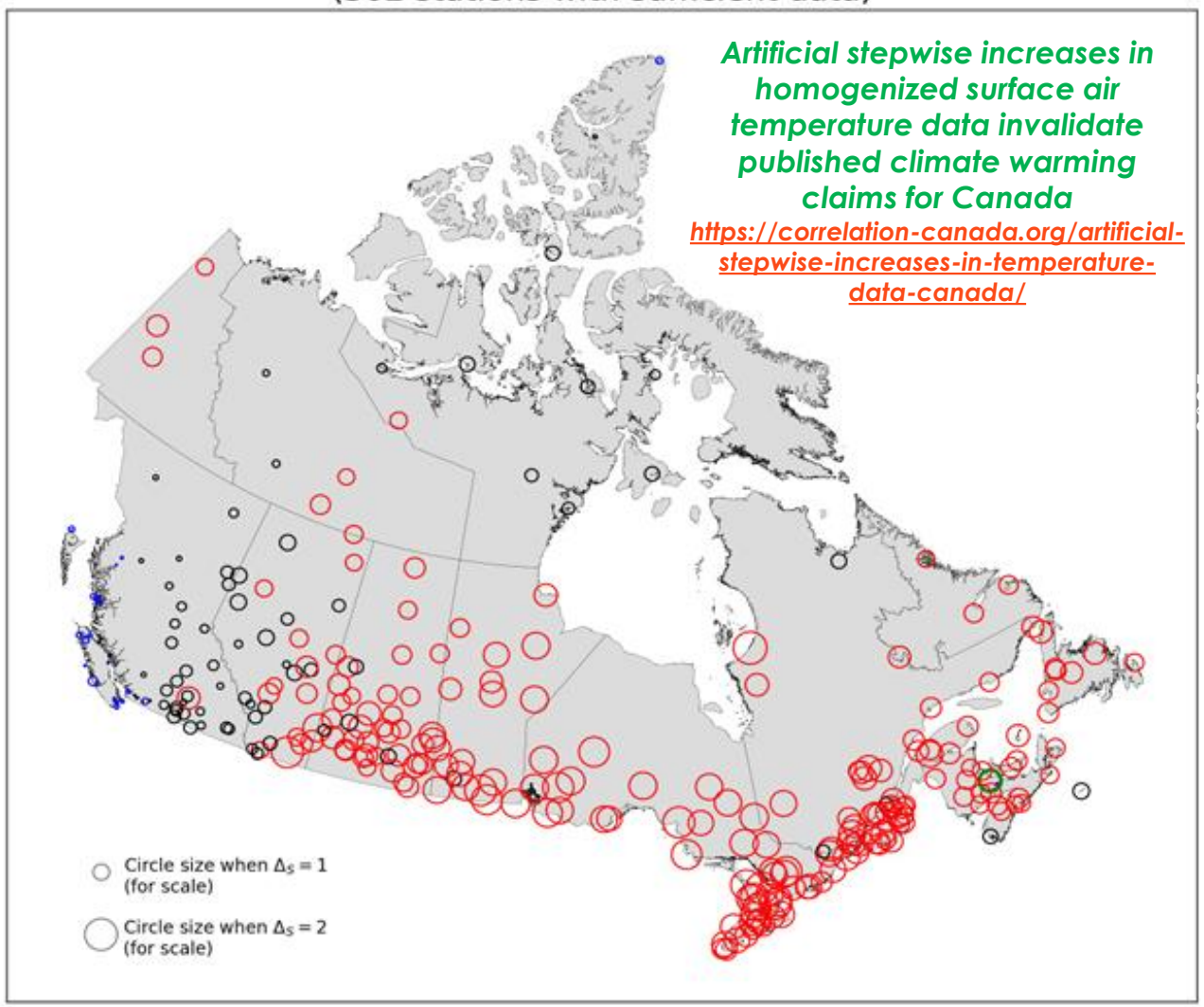
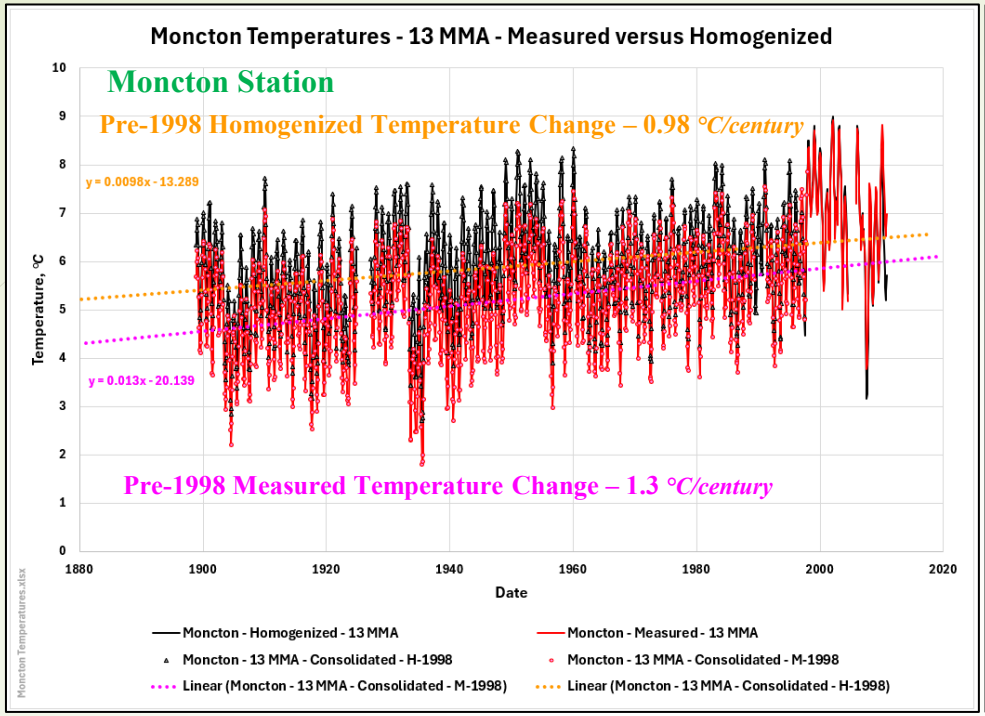
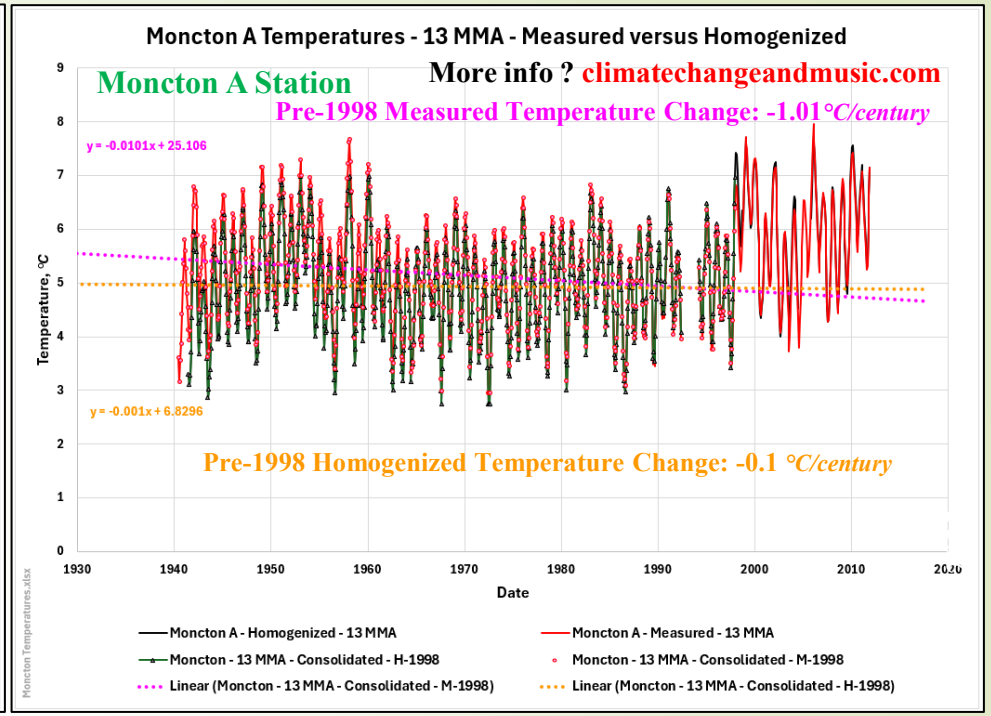


Figure 5: Map showing Δ_S calculated using Tmean, for the break year 1998 with two five-year windows (1993-1997 and 1998-2002) (N = 5) for the 302 3rd generation AHCCD stations with sufficient data. Circle radius is proportional to the absolute value of Δ_S. Circle colour indicates Δ_S ranges as follows: blue: $\Delta_S < 0$; black: $0 \le \Delta_S \le 1$; red: $\Delta_S > 1$ (°C magnitude). Moncton, NB (Δ_S = 1.35) is indicated with a green circle, for reference.

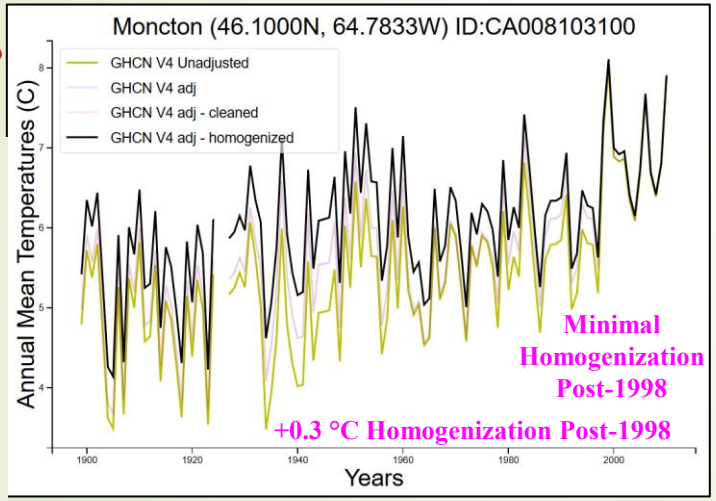
The 1998 Step Change in Temperature Moncton Raw Data

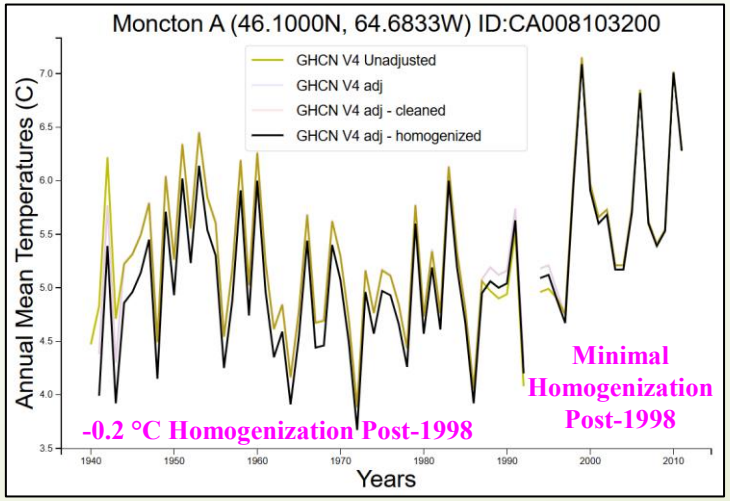
Both the raw and "homogenized" temperature data can be easily downloaded from the NASA-GISS Station data website. There are three different stations (in close proximity) required to produce a long-term temperature data set (images (using yearly data) from the NASA-GISS website are included below). The original Moncton station ran from 1898 to 2010 and displays the same 1998 step change as the Environment Canada data set (i.e.: the step change is not an EC artifact). The pre-1998 Moncton temperature rise is not very dramatic. Just 1.01 °C/century for the measured data and less (surprisingly) for the homogenized data (0.98 °C/century). There appears to be other examples of step changes visible throughout the data, although not quite as dramatic as the 1998 event). The Moncton A station was commissioned in 1940 and ran in parallel to the original Moncton station until 2011. Since 1940, pre-1998 measured temperatures declined at a rate of 1.01 °C/century. Homogenized temperature adjustments effectively flattened the decline to -0.1 °C/century. The post-1998 Moncton A temperatures are on the same order of magnitude as the 1940s and 50s. Maybe, just maybe CO_2 is not the only parameter driving our climate? Not much of a climate emergency in Moncton. The post-2011 data switches to the Moncton International A station (no homogenization). These individual stations need to be consolidated.

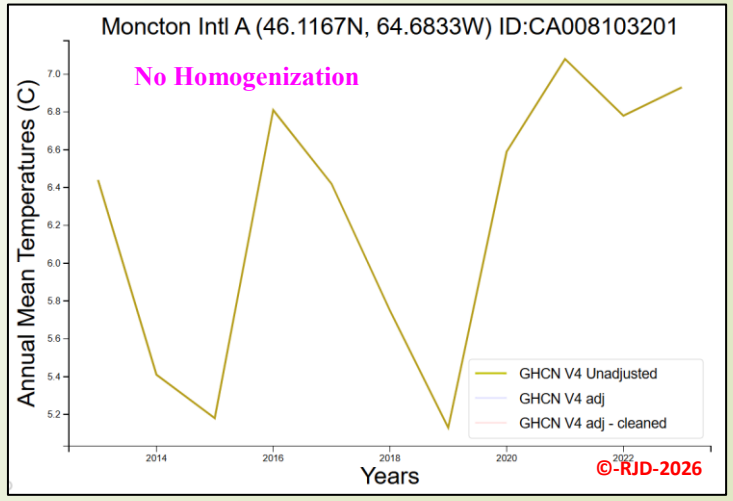




1998 Moncton Raw Data







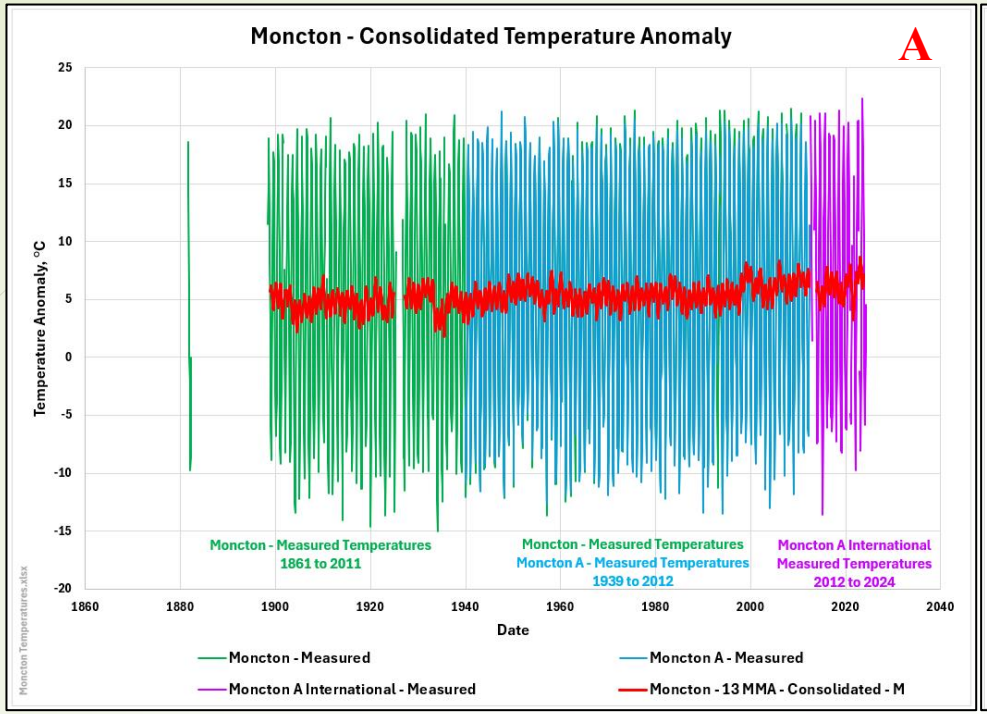
CSS-77c

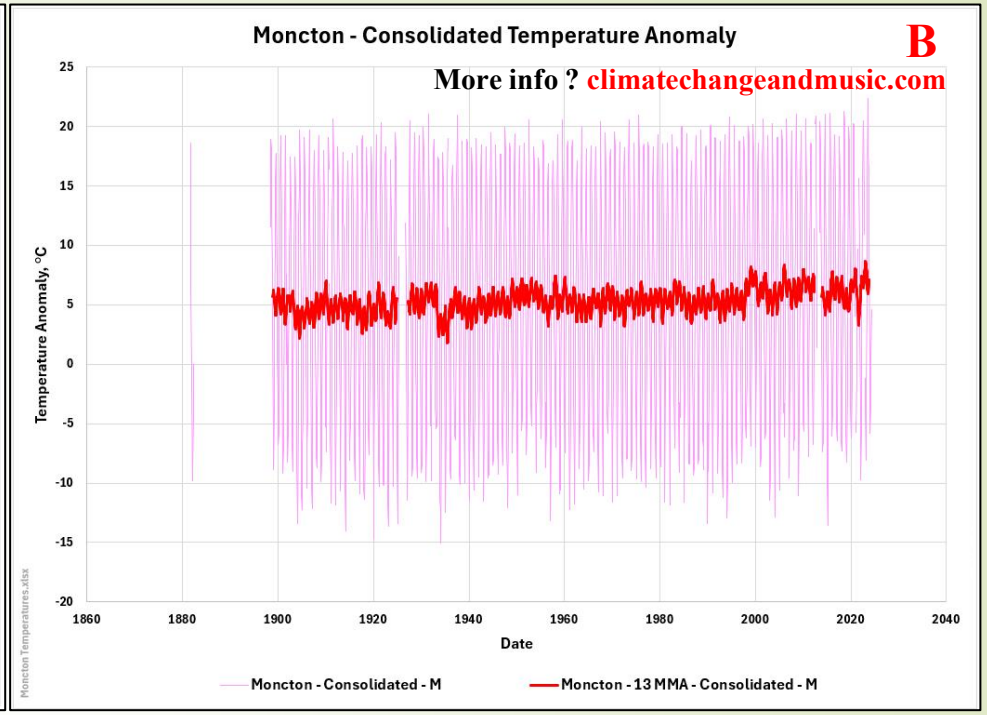
The 1998 Step Change in Temperature Moncton Temperatures

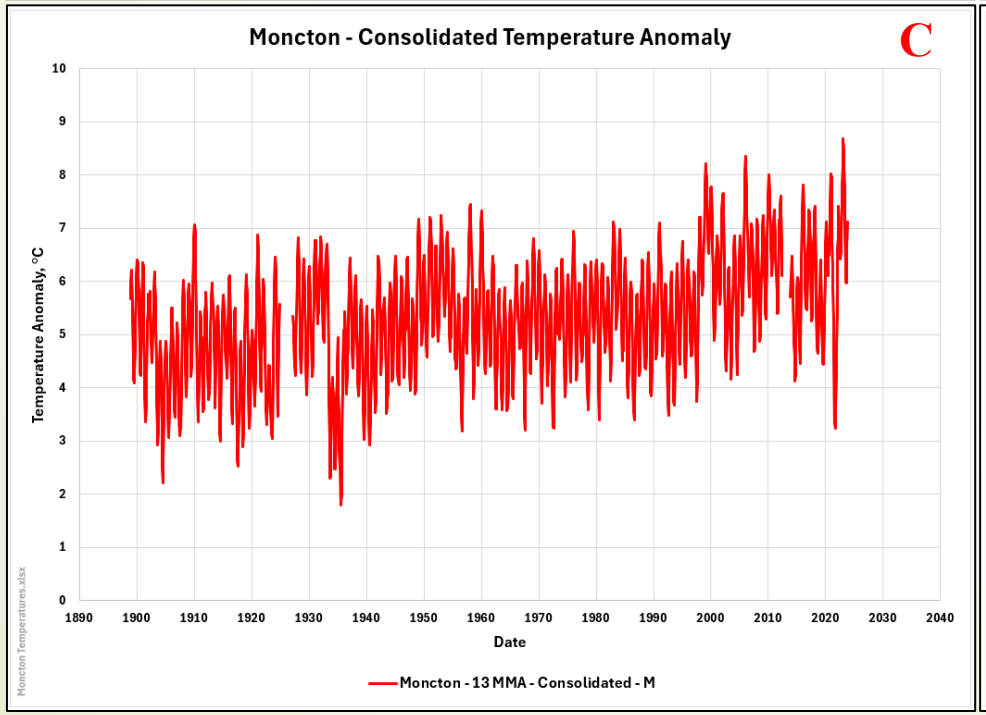
GSM – Grand Solar Minimum. You really should do the Research!

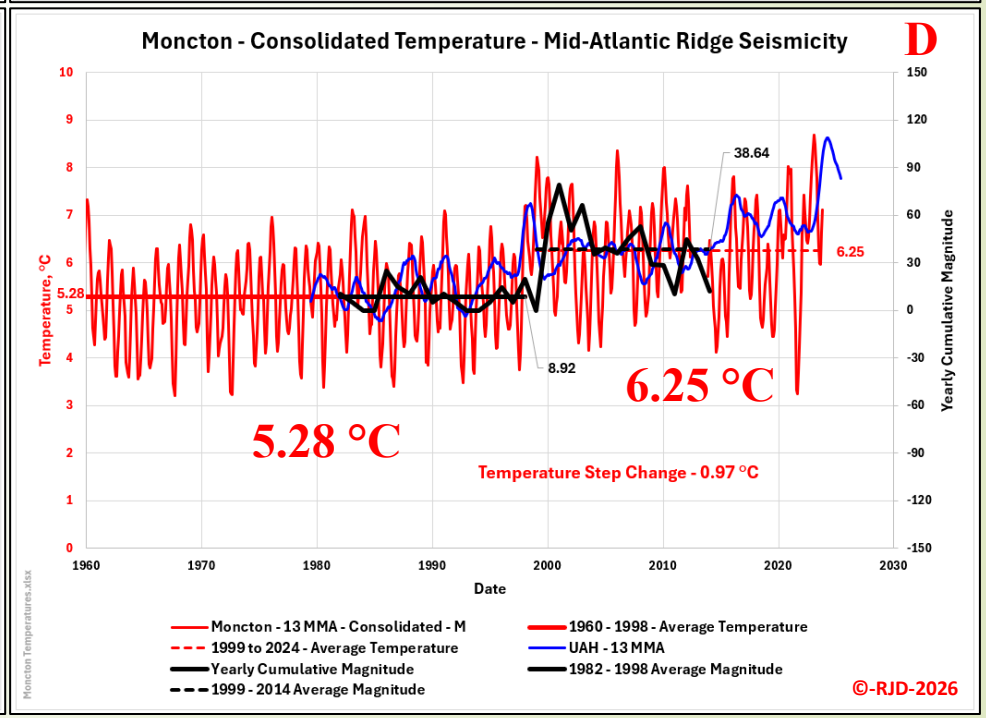
1998 Temperatures Moncton

Note, all temperatures shown here are measured data. Chart A plots the three individual stations' data together. Green is the original Moncton station. The Moncton A station is blue, and the Moncton International A station is purple. The Moncton and Moncton A stations had similar temperature measurements where they overlapped. The bold red curve is the 13 MMA of the consolidated data. Chart B shows just the consolidated data for both the monthly and 13 MMA data. Chart C focuses in on the 13 MMA data. Chart D includes just the post-1960 Moncton measured temperature data. The UAH satellite temperature data was overlain on the Moncton temperature data, along with seismic activity levels along the Mid-Atlantic Ridge (discussed later). The same analysis can be conducted on the homogenized data (with similar results). Temps were generally flat from 1960 to 1998.







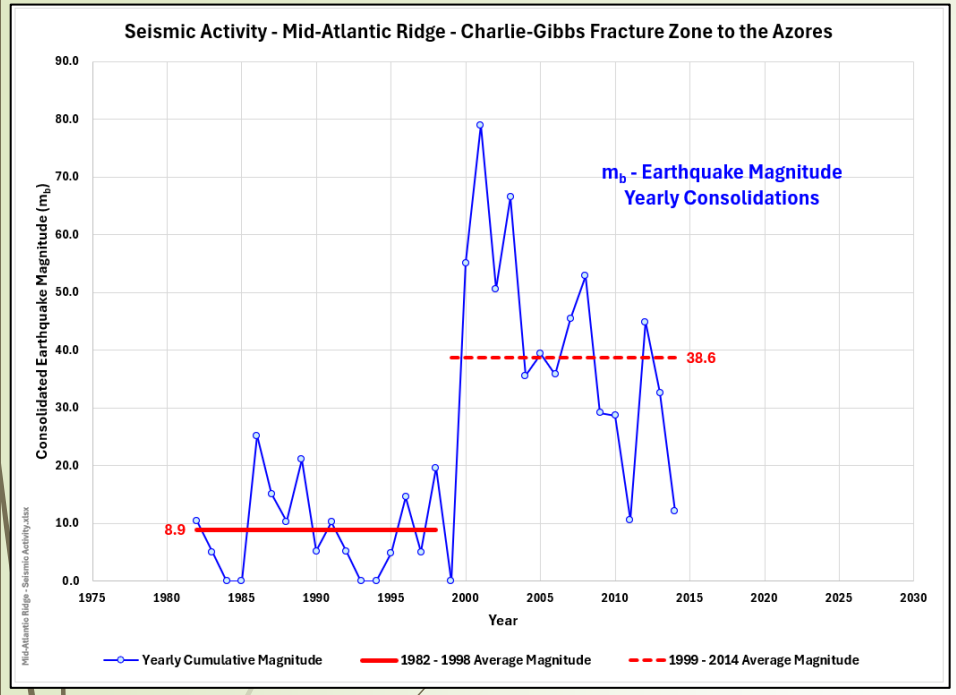


GSM – Grand Solar Minimum. You really should do the Research!

CSS-77d

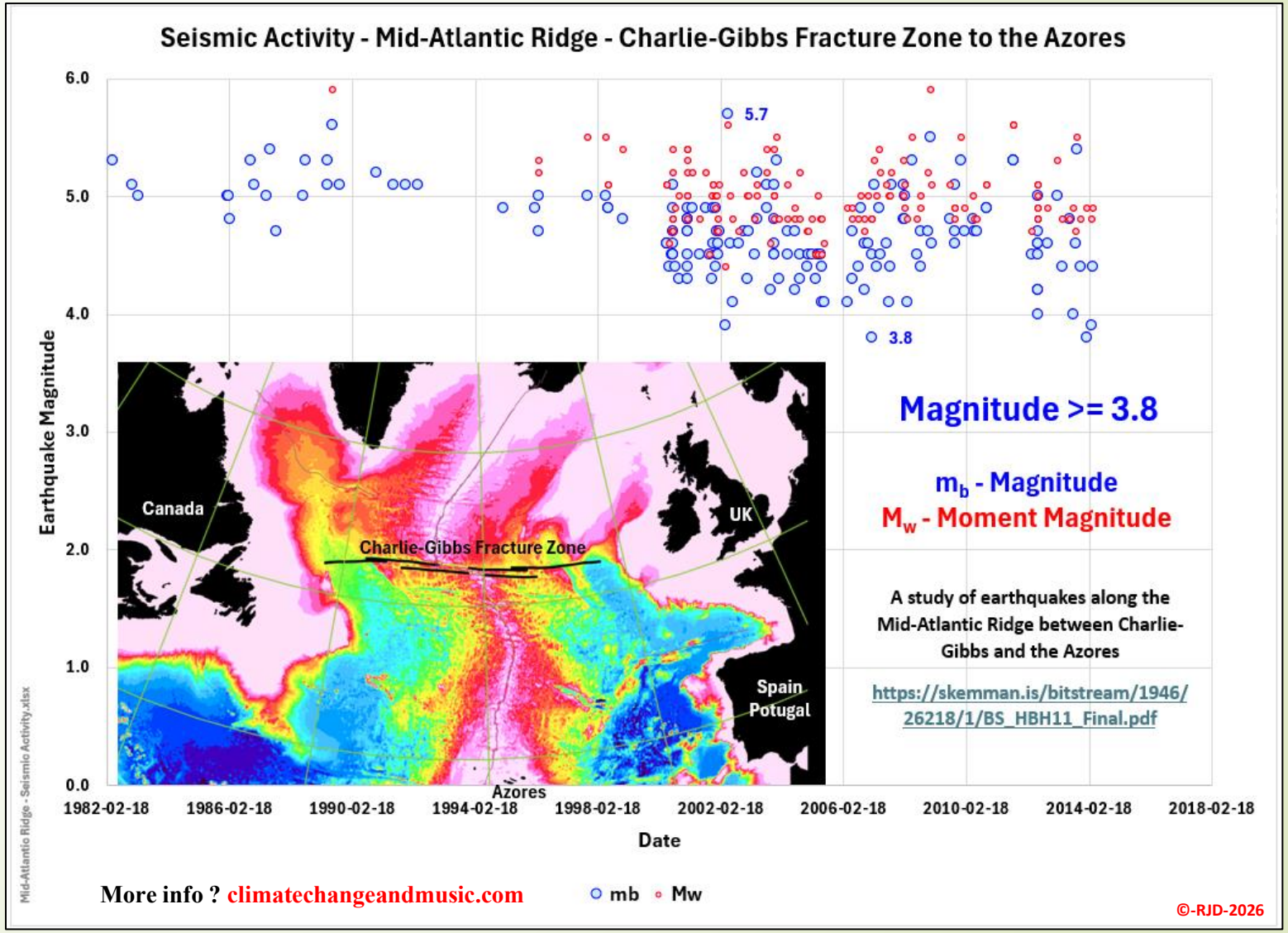
The 1998 Step Change in Temperature Seismic Activity in the North Atlantic

This slide focuses on the seismic activity along the northern Mid-Atlantic Ridge (from the Charlie-Gibbs fracture zone (between Newfoundland and Ireland)) down to the Azores Islands (off southern Spain/North Africa). The data was pulled from Harðarson's 2015 paper "A study of earthquakes along the Mid-Atlantic Ridge between Charlie-Gibbs and the Azores". There is an obvious jump in seismic activity post-1999.



The data plotted above is the yearly consolidation of the individual event data plotted to the right. Prior to 2000, there were roughly two to three events per year averaging a consolidated 8.9 magnitude per year. The activity jumped sharply in 2000, peaking at a consolidated magnitude of 79.0 in 2001. Over the 2000 to 2014 period, the consolidated magnitude averaged 38.6 (close to 10 events per year). Why might this be important? Increased seismic activity could indicate that the Mid-Atlantic Ridge volcanic intrusions are also rising. Rising volcanic intrusions could add significant heat to the North Atlantic contributing to or outright producing the sharp temperature increase visible in eastern Canadian temperatures. The internal heat of our planet (which is routinely released (in large volumes) under our oceans and major ice caps) is very likely an underestimated 'climate' parameter. The Mid-Atlantic Ridge is just one portion of the planet's plate tectonic system. The Pacific Ring of Fire is another component that likely has significant effects (linked to El Niño/La Niña and solar activity).

1998 North Atlantic Seismicity



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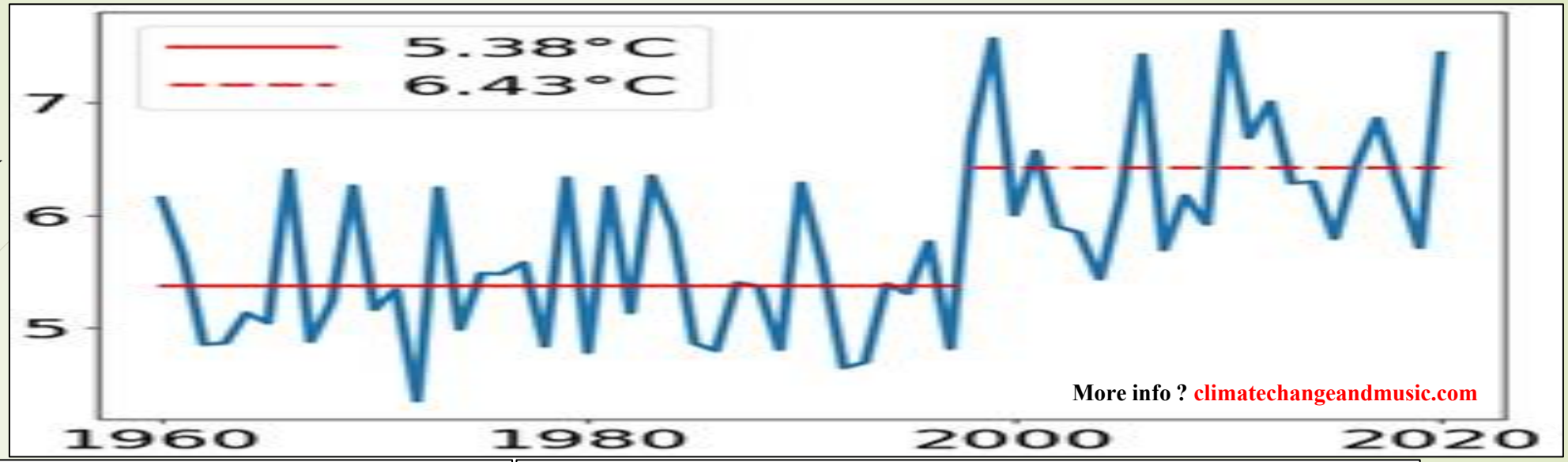
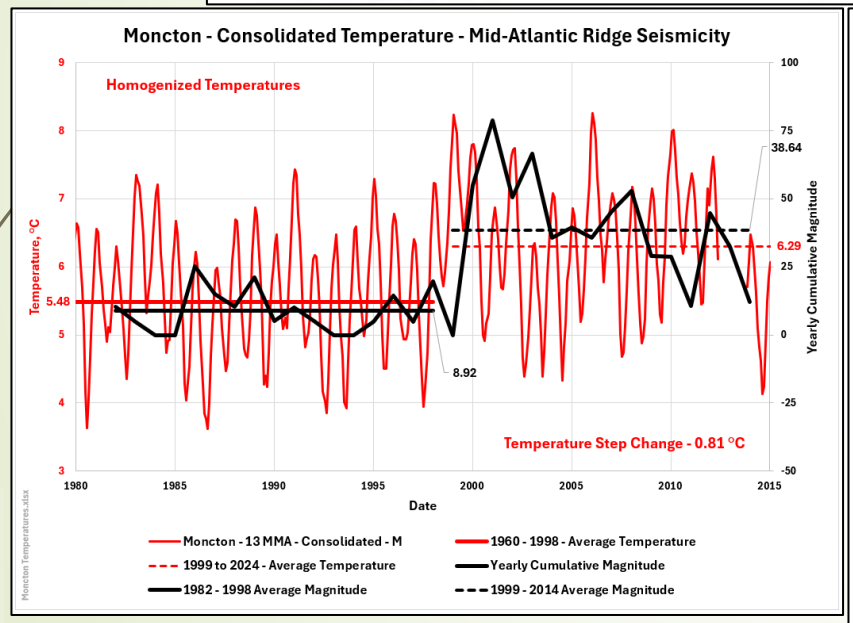
The 1998 Step Change in Temperature Comparing Dr. Hickey and NASA-GISS

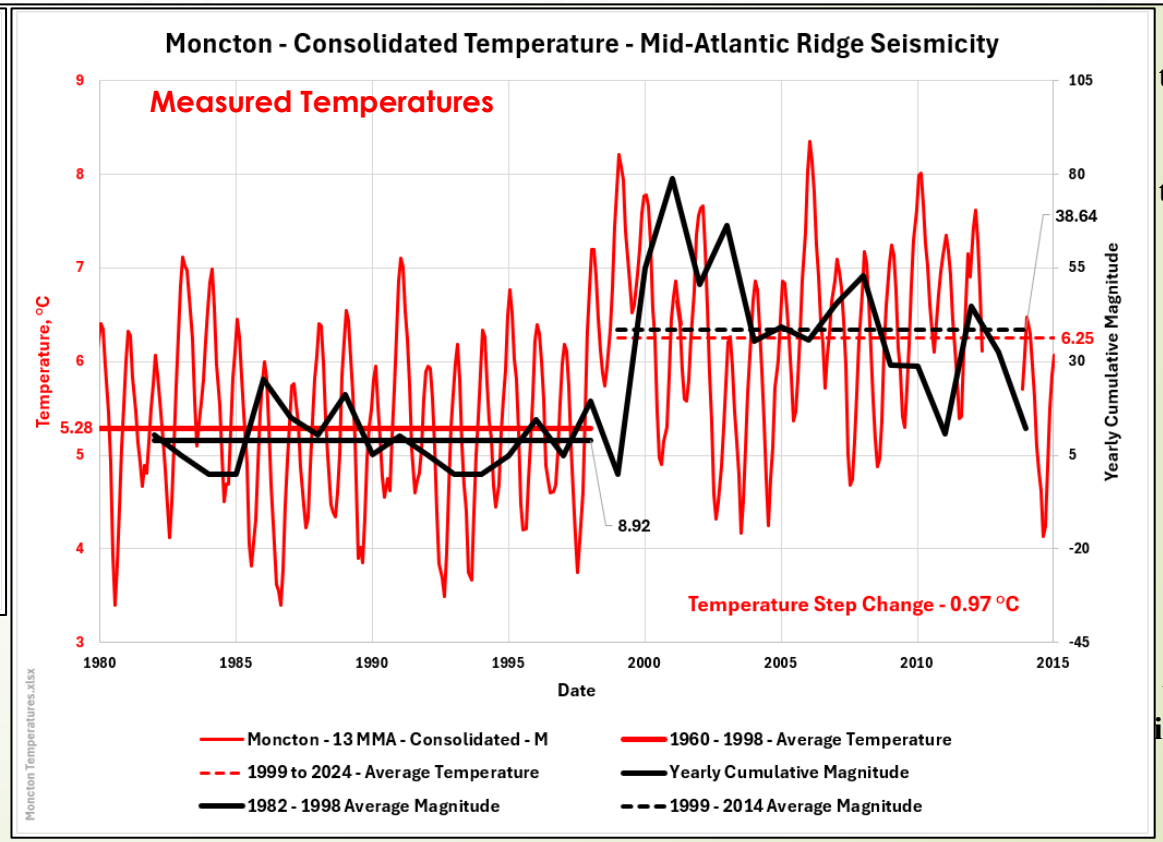


Dr. Hickey's Moncton homogenized temperature data plot is shown in the upper chart. The lower right chart is the NASA-GISS measured data lined up temporally with Dr. Hickey's chart. The time frames are different but the results are similar. The chart directly to the right is the NASA-GISS' homogenized

1998 Temperatures Hickey-NASA



data. Both NASA-GISS charts were overlain with the northern Mid-Atlantic Ridge seismic activity. There is obviously an interesting correlation between the Moncton temperatures and the northern Mid-Atlantic Ridge seismicity. The step change is obviously not due to CO_2 (the parameter of choice in the alarmist community). In my opinion, the step change is likely a real artifact related to the very complicated overall solar system's gravitational and/or electromagnetic interactions. The step increase in temperature needs an explanation.



CO_2 appears to have minor effects on Moncton temperatures, at best. The same general profiles exist across much of Canada. Gravity and electro-magnetism drive our planet's temperature, directly and through their impacts on the sun

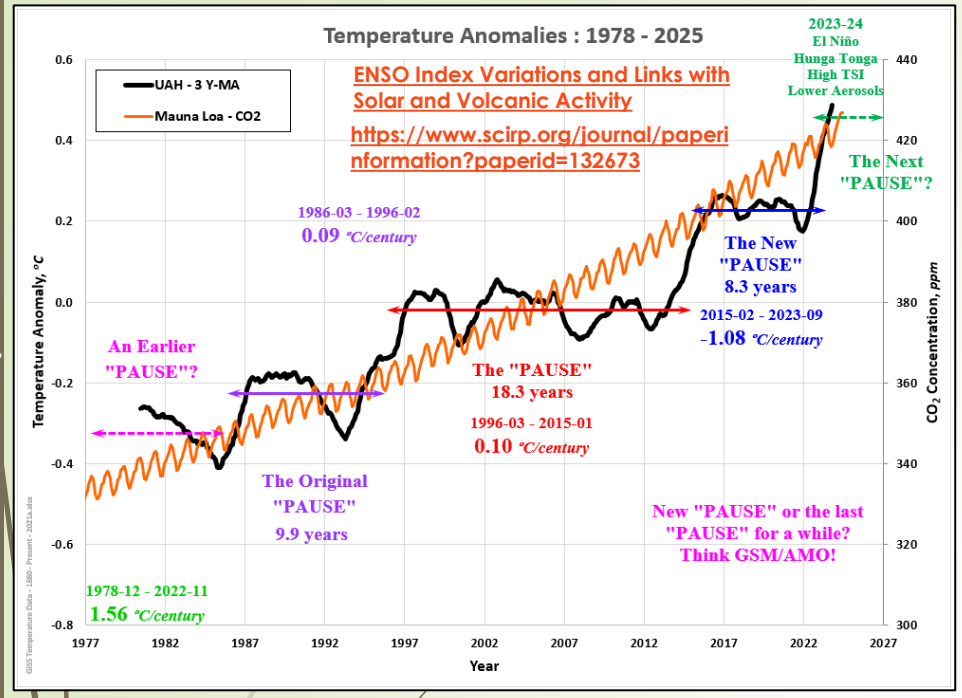
GSM – Grand Solar Minimum. You really should do the Research!

CSS-77f

The 1998 Step Change in Temperature

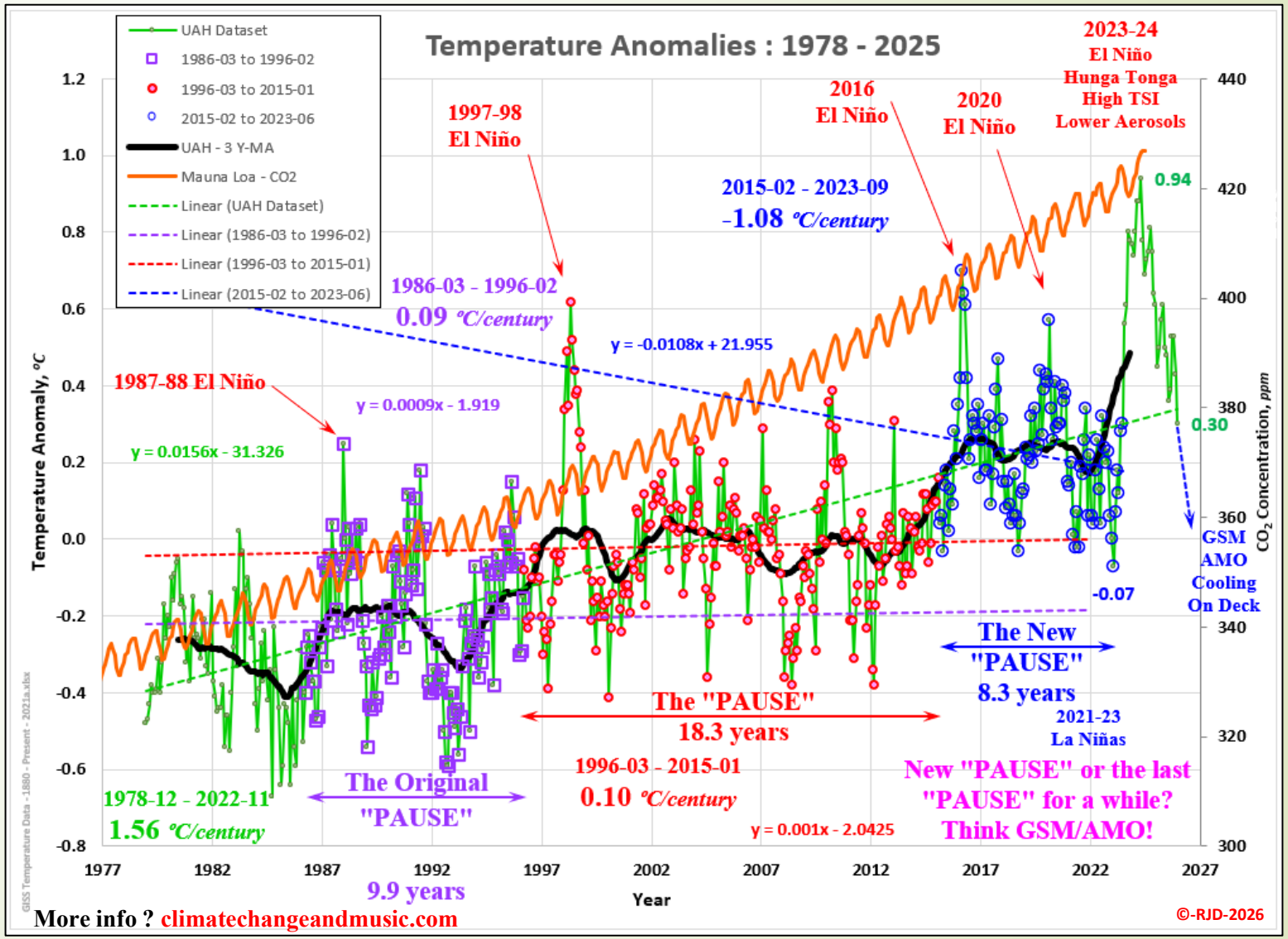
University of Alabama, Huntsville (UAH), Satellite Temperatures

The global temperature data also shows a step increase around 1998. The change is not as dramatic as the individual station datasets, but the fact that there is a step would indicate that there may be a parameter(s) affecting temperatures around the globe. CO_2's current rise is quite steady with a slow acceleration. The very noticeable temperature fluctuations have little to nothing to do with CO_2. The "PAUSES" appear to be



strong, positive El Niño Southern Oscillation (ENSO) pulses (beginning with a strong El Niño, followed by many years of less prominent, alternating El Niño and La Niña). While ENSO is a global phenomena, the origin begins in the west Pacific Ocean along the Ring of Fire. During an El Niño, the western Sea Surface Temperatures (SST) warm and spread along the equator and ultimately raise temperatures around the world through a variety of atmospheric processes. La Niña is the reverse, a cooling Phase. The question becomes what is causing that SST warming? A Bing search produced the following quote, *"Recent studies suggest that underwater volcanic eruptions, potentially induced by tidal forces from Jupiter and the Sun, could be a contributing factor to ENSO variability."* Like CO_2 Equilibrium Climate Sensitivity (ECS) and Total Solar Irradiance (TSI) reconstructions, the contributions of volcanic activity (land and ocean) to global climate is NOT "settled science". Our current policies are being driven by "Unsettled Science" at great and unnecessary cost to our children's future!

1998 UAH Temperatures



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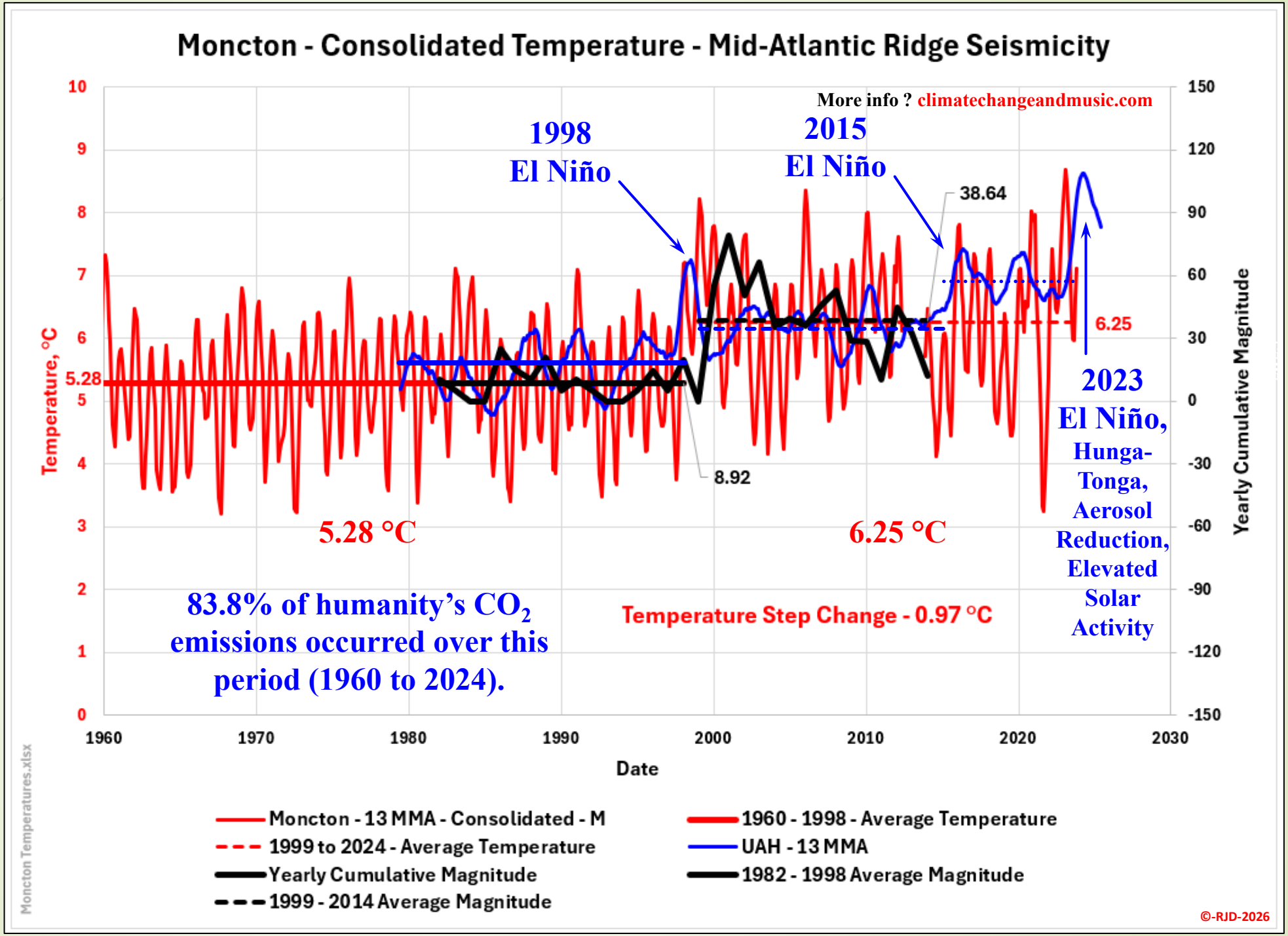
The 1998 Step Change in Temperature Seismicity and UAH

This plot is a larger version of that shown earlier on the CSS-77c slide. There is a very noticeable 1998 step increase in the temperature, but that step is also visible in the seismic activity along the northern portion of the Mid-Atlantic Ridge and the UAH (13 MMA) global satellite temperature dataset. The seismicity step increase occurs in 2000 (a bit late for the initial jump in temperatures). The initial temperature rise could easily be due to 1998 El Niño. Is the increased seismic activity responsible for some of the step increase in global temperatures? The seismicity data set shown here is localized, but the forces that likely produced the earthquakes act globally. Global volcanic activity has been increasing steadily since 1900 and has likely been accompanied by rising global seismic activity. Confirmed, no, but more plausible than CO_2.

1998 Seismicity, UAH & Temperatures



CSS-77h

The 1998 Step Change in Temperature - European Temperatures

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1998 Temperatures European

The step increase is not limited to the eastern three quarters of Canada. The other side of the northern Atlantic has a similar step increase. There is a sharp spike in 1988 (likely due to the 1988 El Niño that kicked off the "Original PAUSE" shown in CSS-77f) that appears to start the step earlier, but much of the 10-year temperature between 1988 and 1998 is lower and consistent with the pre-1988 temperatures. The additional steps visible in the UAH satellite temperature data are also present in the NASA-GISS surface temperature data. These are not CO_2 responses, although CO_2 is is likely contributing to the general rise. How much depends on CO_2's Equilibrium Climate Sensitivity (ECS), an "unsettled science". The ocean cycles, like the Atlantic Multi-decadal Oscillation (AMO) highlighted in purple, also contribute to the temperature rise (on a sinusoidal basis), along with the ENSO (El Niño/La Niña).