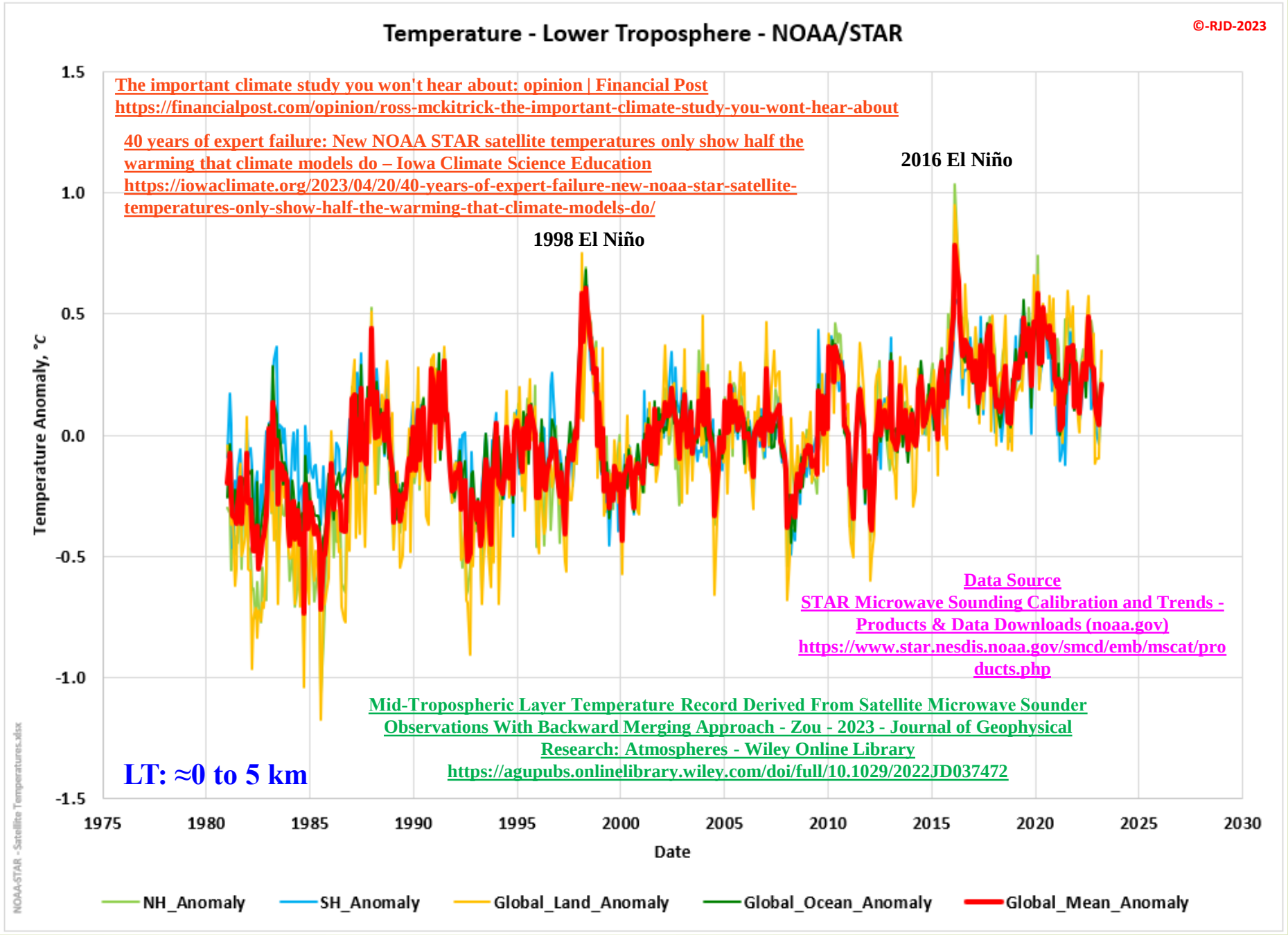
Satellite Temperature Comparisons – NOAA-STAR

Lower Troposphere - LT

Something strange just happened in the global temperature measurement realm. NOAA through their Satellite Applications and Research (STAR) initiative, has just corroborated the University of Alabama, Huntsville's (UAH) satellite temperature datasets. This looks like another step towards a narrative change. Similar to the IPCC programmer's self acknowledgement that their computer models run too hot and their upper (supposedly "dangerous") emission scenarios are implausible (I would suggest they are ridiculous). The links can be found in my OPS-55 – The State of Climate Science post and are discussed further in my CSS-30 – CMIP6 Climate Model post.

Satellite Temperature STAR-LT

The NOAA-STAR adjustments are discussed in the two articles and the relevant technical paper (Zou et al 2023) highlighted on the plot to the right. The data shown here covers the NOAA-STAR's Global, Northern Hemisphere, Southern Hemisphere, Global Land, and Global Ocean LT-Temperature Anomalies. Hard to see but the Land and NH curves are more erratic than the Ocean and SH curves.

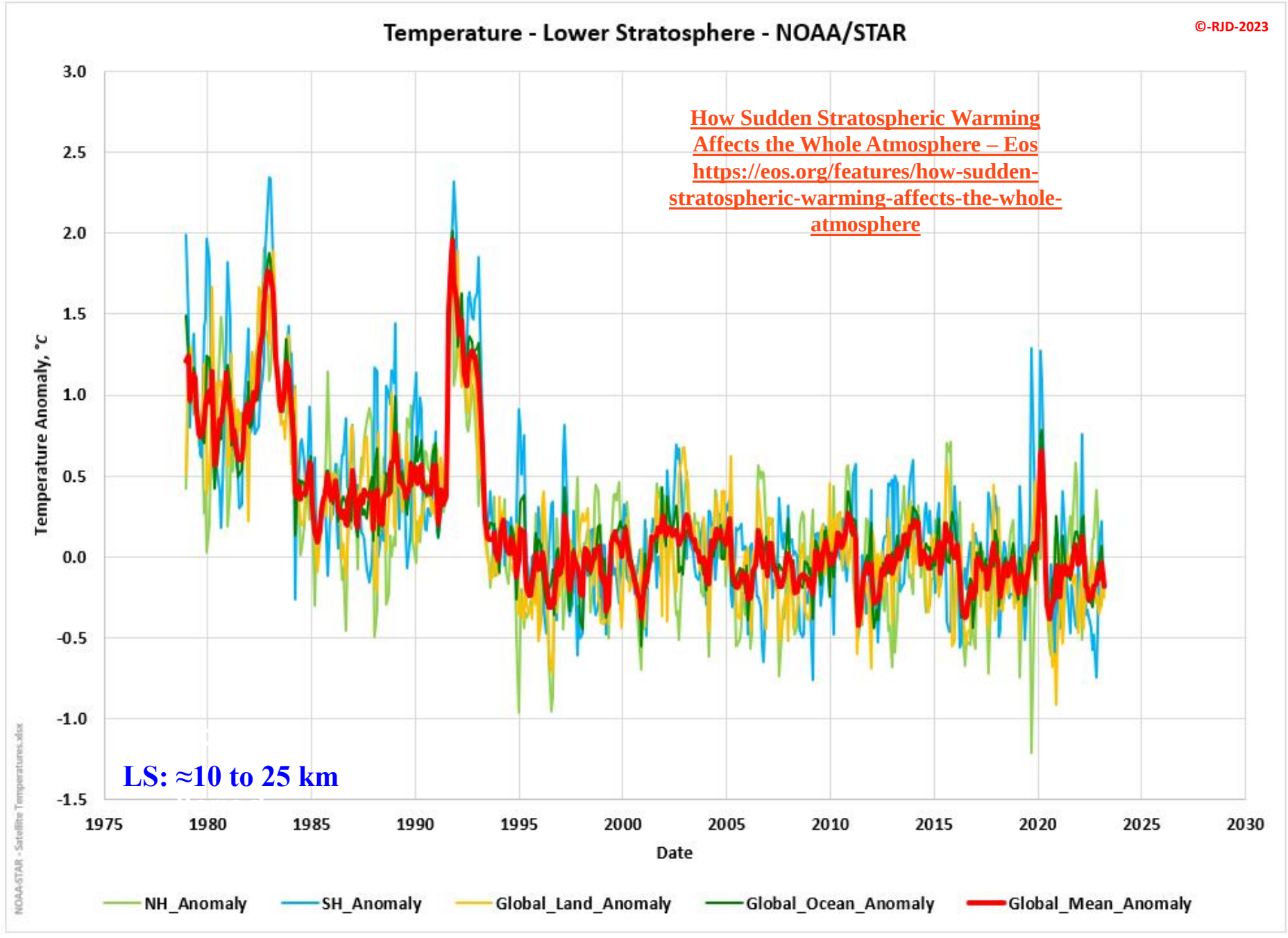


Satellite Temperature Comparisons – NOAA-STAR

Lower Stratosphere - LS

The NOAA-STAR datasets are also broken down into various atmospheric levels (the Lower, Middle, and Upper Troposphere, and the Lower Stratosphere). The Lower Troposphere was discussed on the first slide. This slide will focus on the Lower Stratosphere. Unlike the rising global temperature anomalies in the Lower Troposphere (1.29 °C/century), Lower Stratospheric temperatures are declining at 2.39 °C /century). Notably, these LS temperatures have not declined as "smoothly" as the LT temperatures. A shallower, more representative decline begins in 1994 (0.29 °C/century). The spikes in 1982-83, 1991-93 and 2020 are interesting. What is causing those spikes? Could be related to the Sudden Stratospheric Warming discussed in the linked article. One more complication for the "Climate Change" discussion. However, SSWs sound like they are shorter lived than these spikes. So, there may be another driver. Solar maybe, CO_2, no. The atmospheric levels are all interconnected and can easily affect one another. That is as deep as I will get into this discussion.

Satellite Temperature STAR-LS



Satellite Temperature Comparisons – NOAA-STAR - Levels

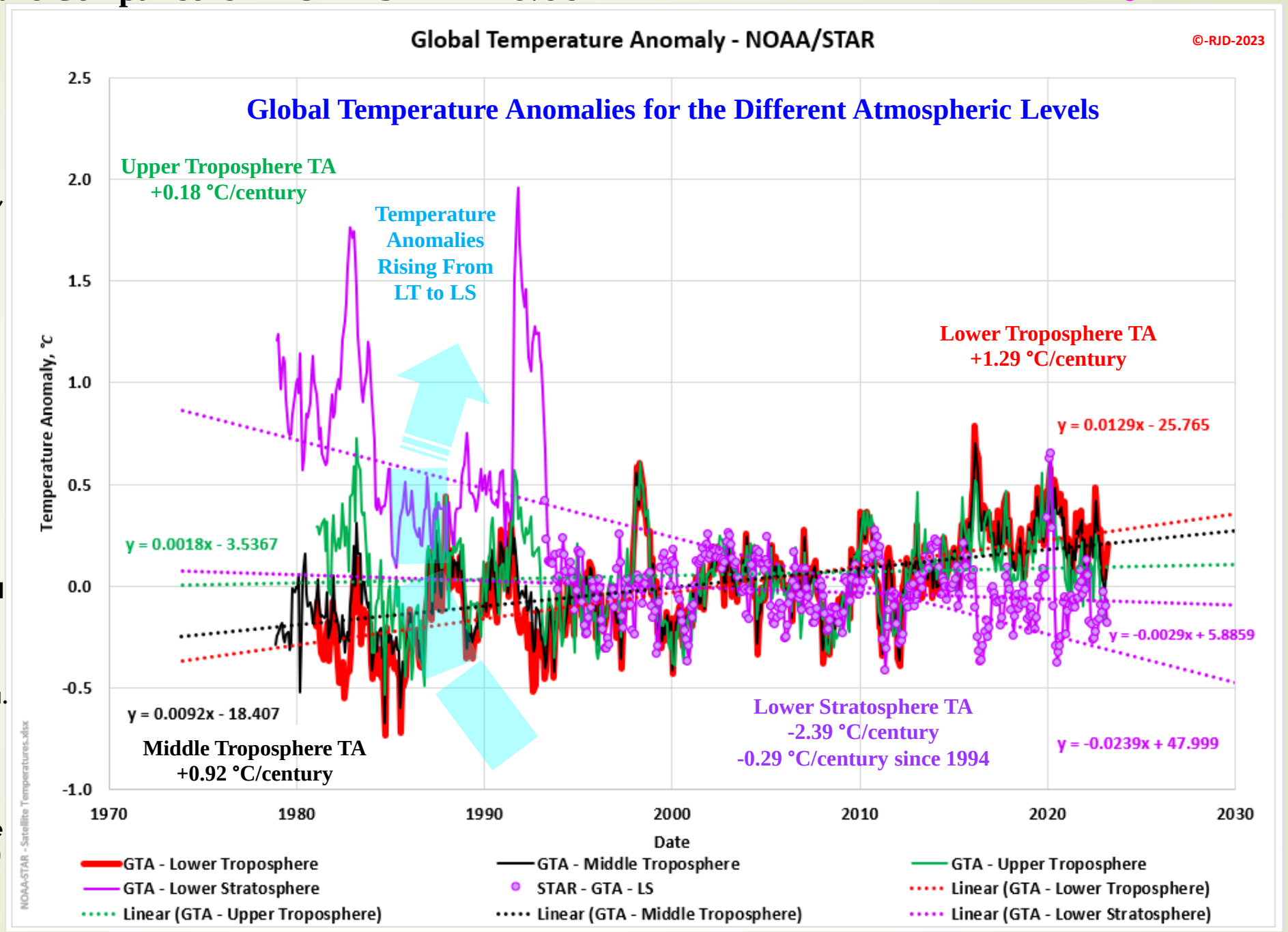
This plot just compares the time distribution of temperatures over the satellite period at each level of the atmosphere (LT,MT,UT, and LS). The LT TA is rising the fastest at 1.29 °C/century. The higher up in the atmosphere, the lower the rise, with the LS actually declining.

Atmospheric Level	Temperature Trend
LS - Lower Stratosphere	-2.39 °C/century -0.29 °C/century
UT - Upper Troposphere	+0.18 °C/century
MT - Middle Troposphere	+0.92 °C/century
LT - Lower Troposphere	+1.29 °C/century

Satellite Temperature STAR-Levels

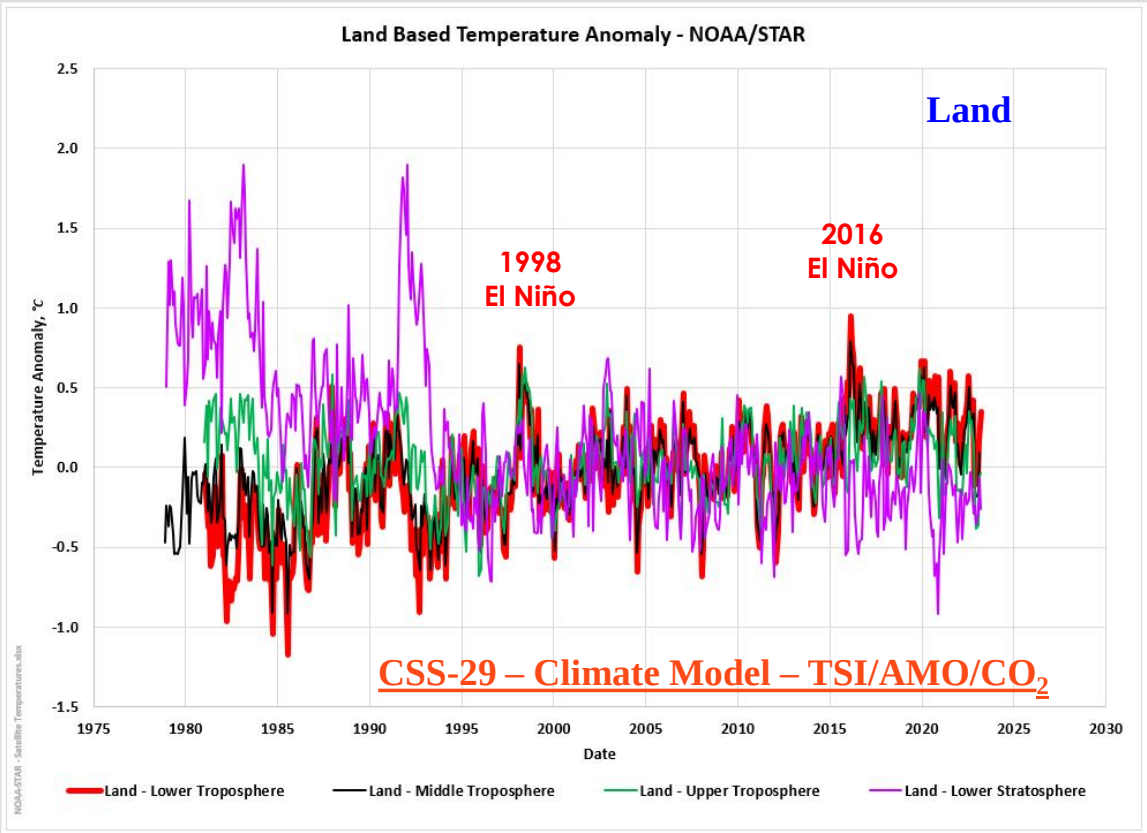
The same general patterns are repeated in the NH/SH and Land/Ocean data.

Most of the LT divergence occurs in the early data. Whatever is affecting the LS in the 1982-83 spike appears to have influenced all the Troposphere temperatures as well. The 1991-93 spike only affected the UT and the small 2020 spike was isolated to the LS. Post-93, all the troposphere temperature anomalies have moved in unison.

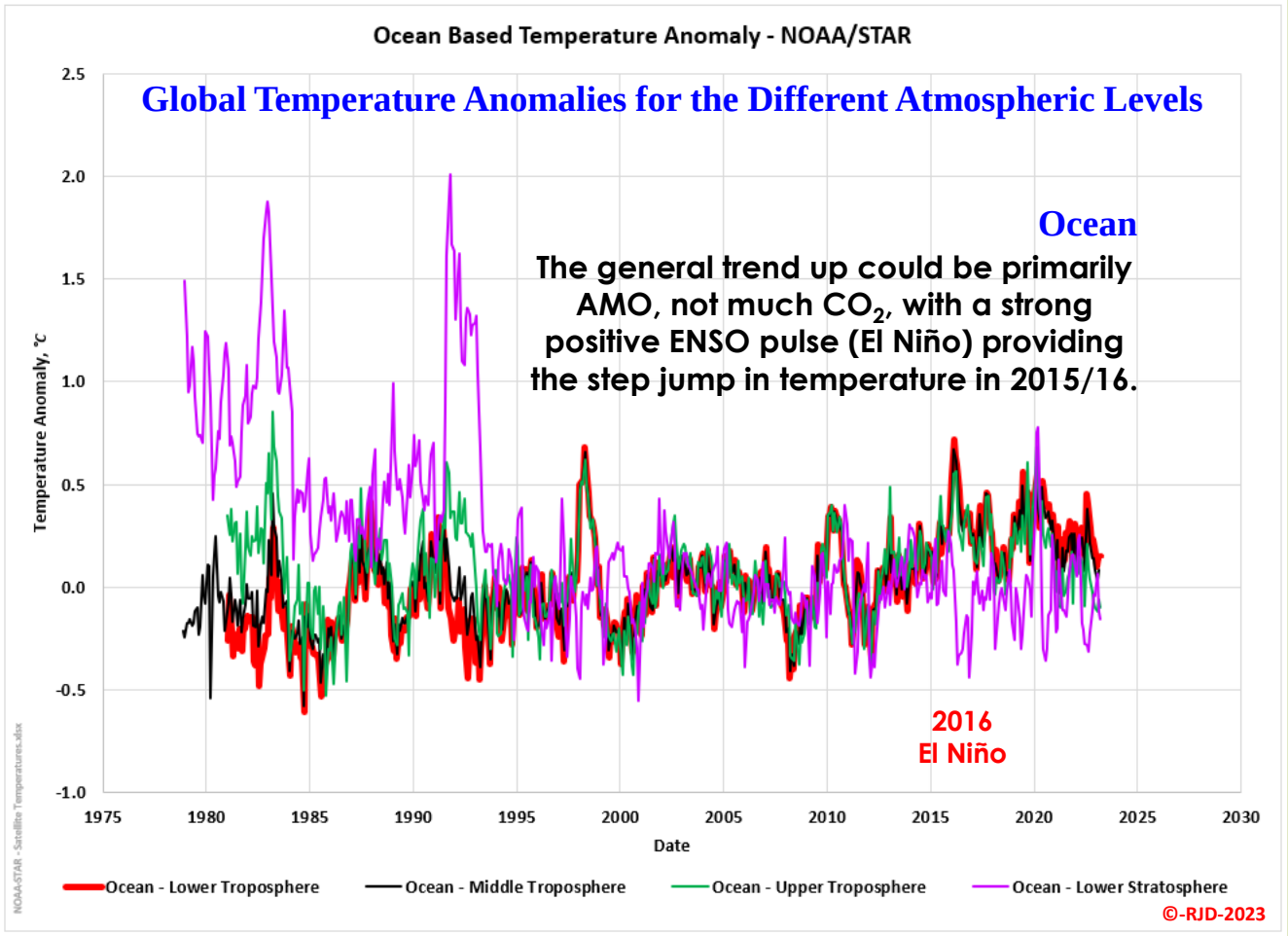


Satellite Temperature Comparisons – NOAA-STAR – Land/Ocean

More detail? climatechangeandmusic.com



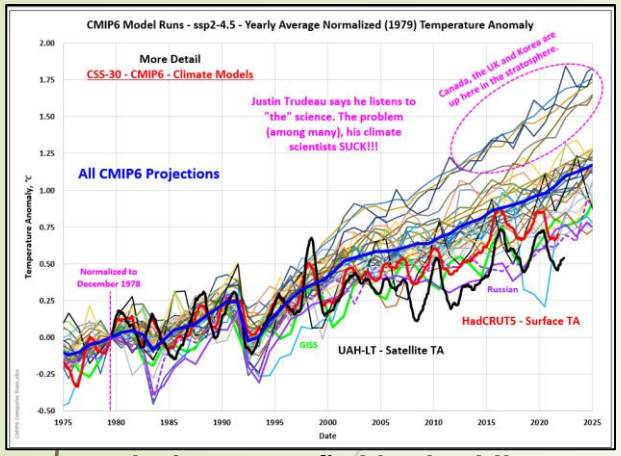
These plots compare the temperature profiles over the earth's land and oceans. The data is a bit more erratic over land but the fluctuations have slightly higher magnitudes over the oceans. The same general patterns are in play when the Northern and Southern Hemispheres are compared. Not surprising, given that the Northern Hemisphere is predominantly land mass and the Southern Hemisphere is predominantly ocean. The satellite datasets (NOAA-STAR included) are the most accurate global temperature measurements available. Why do you suppose the CAGW alarmist crowd rarely recognize their existence? For one, they are not able to "homogenize" (i.e.: manipulate) the data to fit the narrative. At least not as easily as they manipulate the surface data. More on that later.



Satellite Temperature STAR-L/O

Another reason is the relatively short time frame. The surface temperature datasets go back further (to the mid 1800s) and provide a longer (but not a full climate) perspective. But that short time frame is important since two thirds of our emissions happened over that period. There is obviously a lot more going on than just the slow, steady accelerating increase that might be due to CO_2 warming. The temperatures fluctuate significantly due to other forcings. The El Nino Southern Oscillation (ENSO) is very visible (due to its short cycle time and dominant temperature changes). On this scale, the Atlantic Multi-decadal Oscillation (AMO) is not as prominent, but the overall temperature profile fits the AMO cycle very well. The 60 year sinusoidal AMO cycle began warming around 1975 peaking around 2005 (contributing to the 'PAUSE'). The AMO could be responsible for almost all the warming shown here.

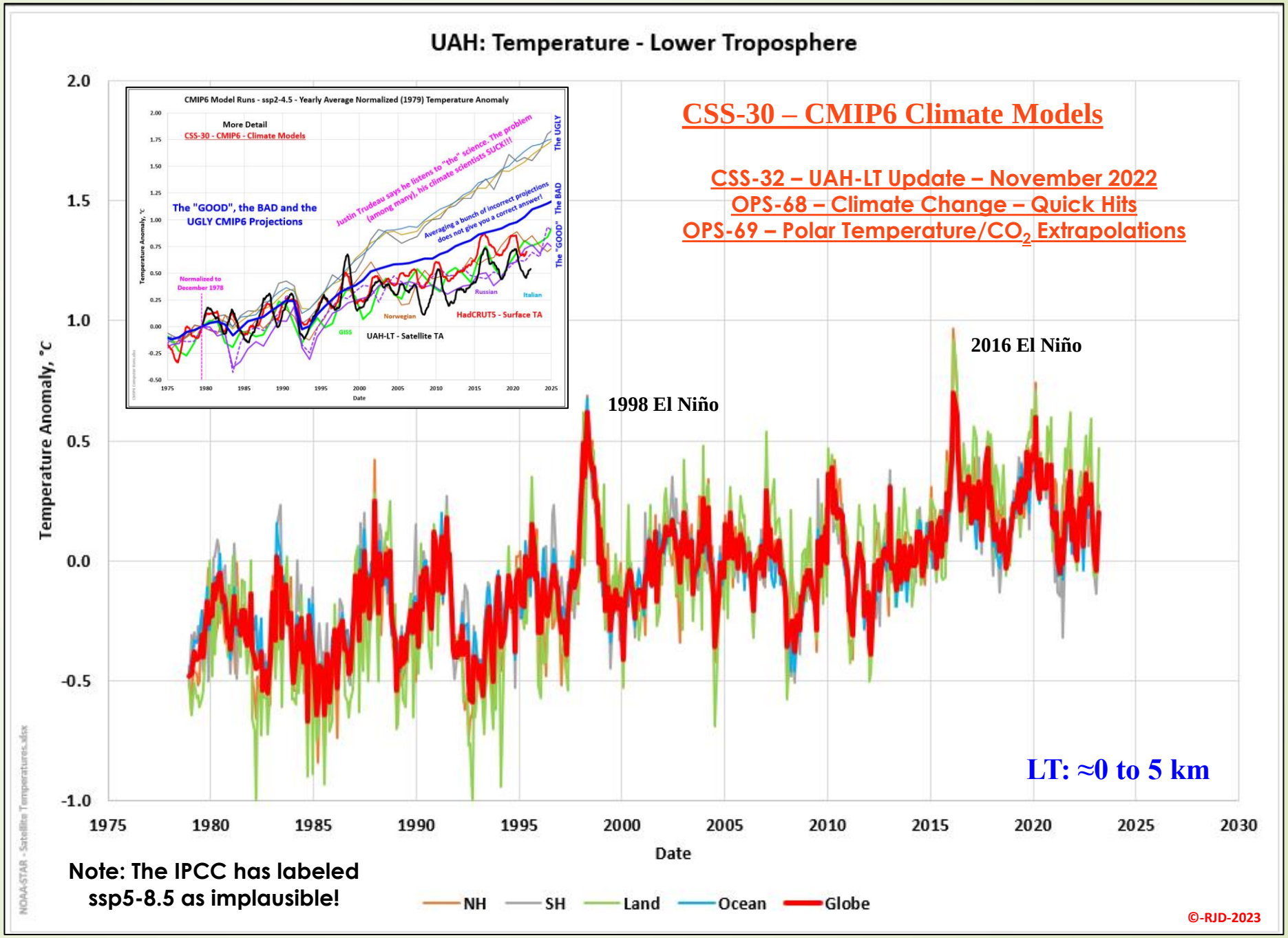
Satellite Temperature Comparisons – UAH-LT



That was my first look at the NOAA-STAR data. I have always preferred the UAH data (shown to the left). They just do not play the games that the alarmists are so fond of doing. The UAH and STAR data are very similar, so the UAH discussion here will be limited. More detail can be found at the posts listed on the graph.

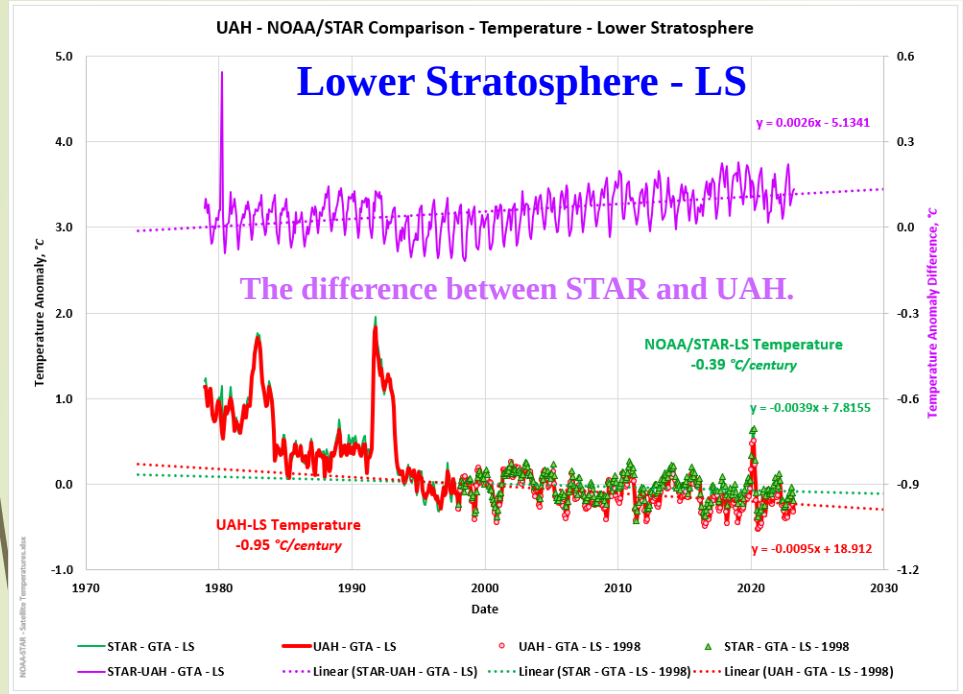
Satellite Temperature UAH-LT

As will be shown in the coming slides, the STAR data when added to the plots above would just add further confirmation that the models run too hot (as the programmers have already acknowledged). Note how bad Canada's projections compare to reality. And these curves are based on a very conservative emissions scenario (ssp2-4.5). How out to lunch are Canada's runs with ssp5-8.5?

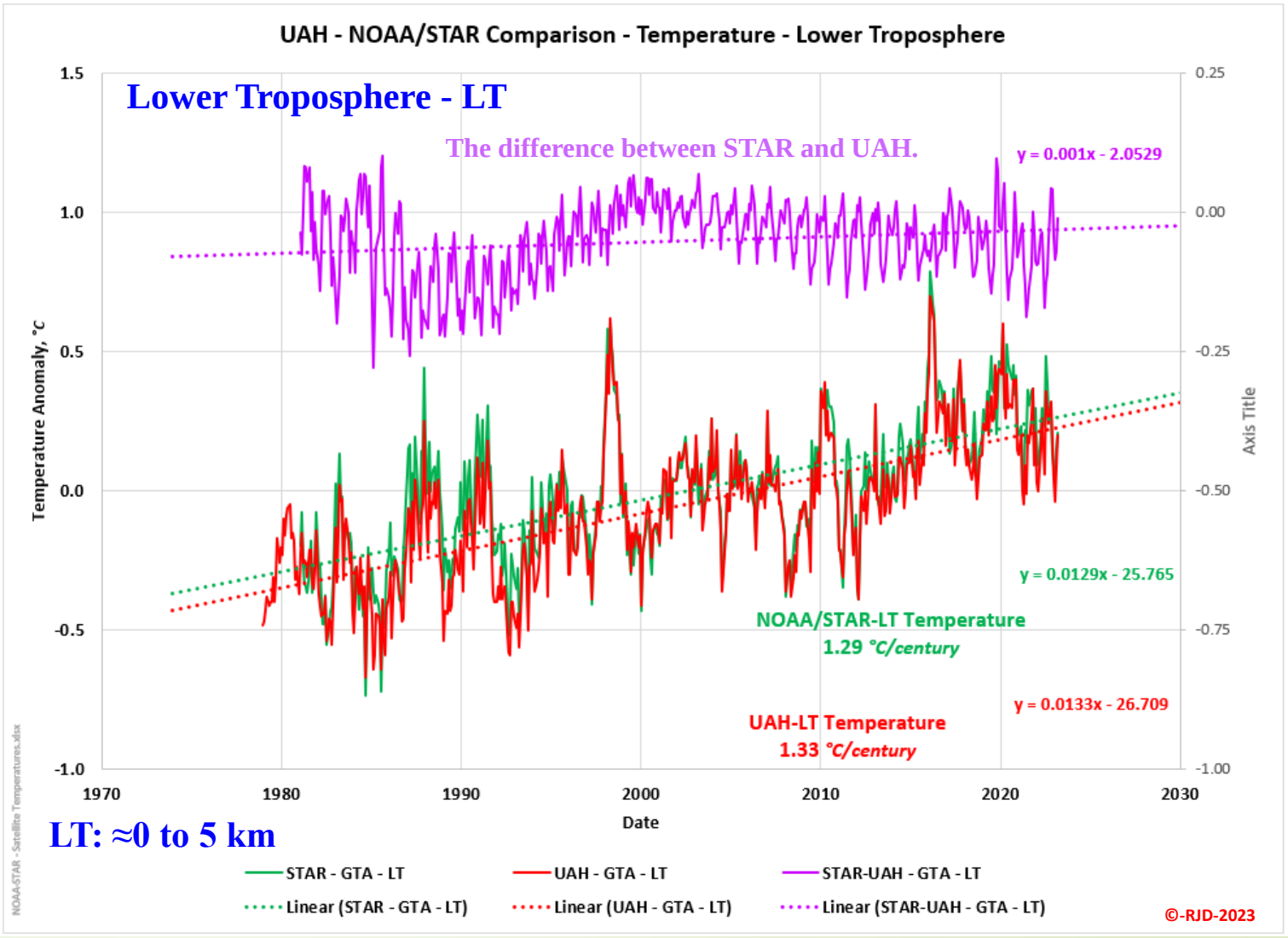


Note: The IPCC has labeled ssp5-8.5 as implausible!

Satellite Temperature Comparisons – UAH-STAR



These charts compare the UAH and NOAA-STAR data sets. The plot below covers the Lower Troposphere, the plot to the left covers the Lower Stratosphere. There are minor differences in the two products, but they do tell the same story. The UAH Lower Troposphere data has increased at a 1.33 °C/century rate since 1978. That climb has been very erratic (i.e.: inconsistent with the slow, steadily accelerating CO_2 concentrations). As discussed earlier, those fluctuations (on short and longer term cycles) are not driven by CO_2 concentrations. The 2016 step jump in temperatures and subsequent decline are primarily due to the strong El Niño and the unusual triple La Niña (that played out over the last three years). A new El Niño appears to be forming that will again warm the planet briefly, but the transition into the cold phase of the Atlantic Multi-decadal Oscillation (AMO) will drop temperatures over the next few decades. And no not even the IPCC's CO_2 "science" is strong enough to stop that temperature drop.



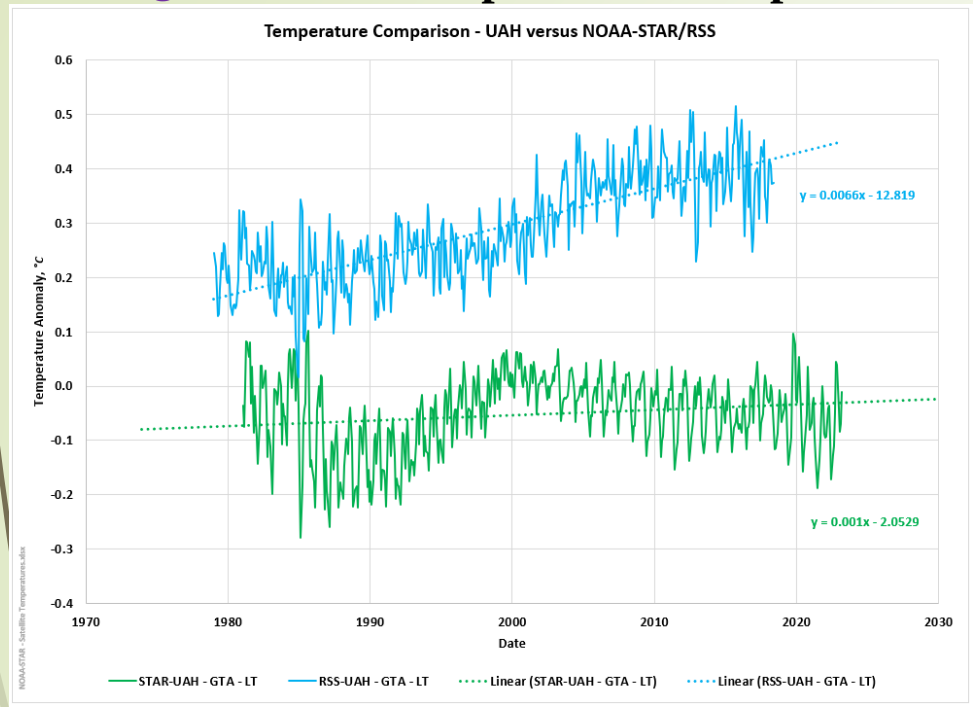
Satellite Temperature UAH-STAR

The forecasted Grand Solar Minimum (GSM) also needs to be factored in. The NOAA-STAR LT decline is a little less than the UAH value at 1.29 °C/century but does provide definitive confirmation. The Lower Stratosphere correlation appears to be a little tighter. The UAH-LS data is declining at a 0.95 °C/century rate, while the STAR-LS decline is 0.39 °C/century. The differences between the two datasets does appear to fluctuate on a yearly basis (higher during the northern winter and lower during the northern summer). Overall a good match.

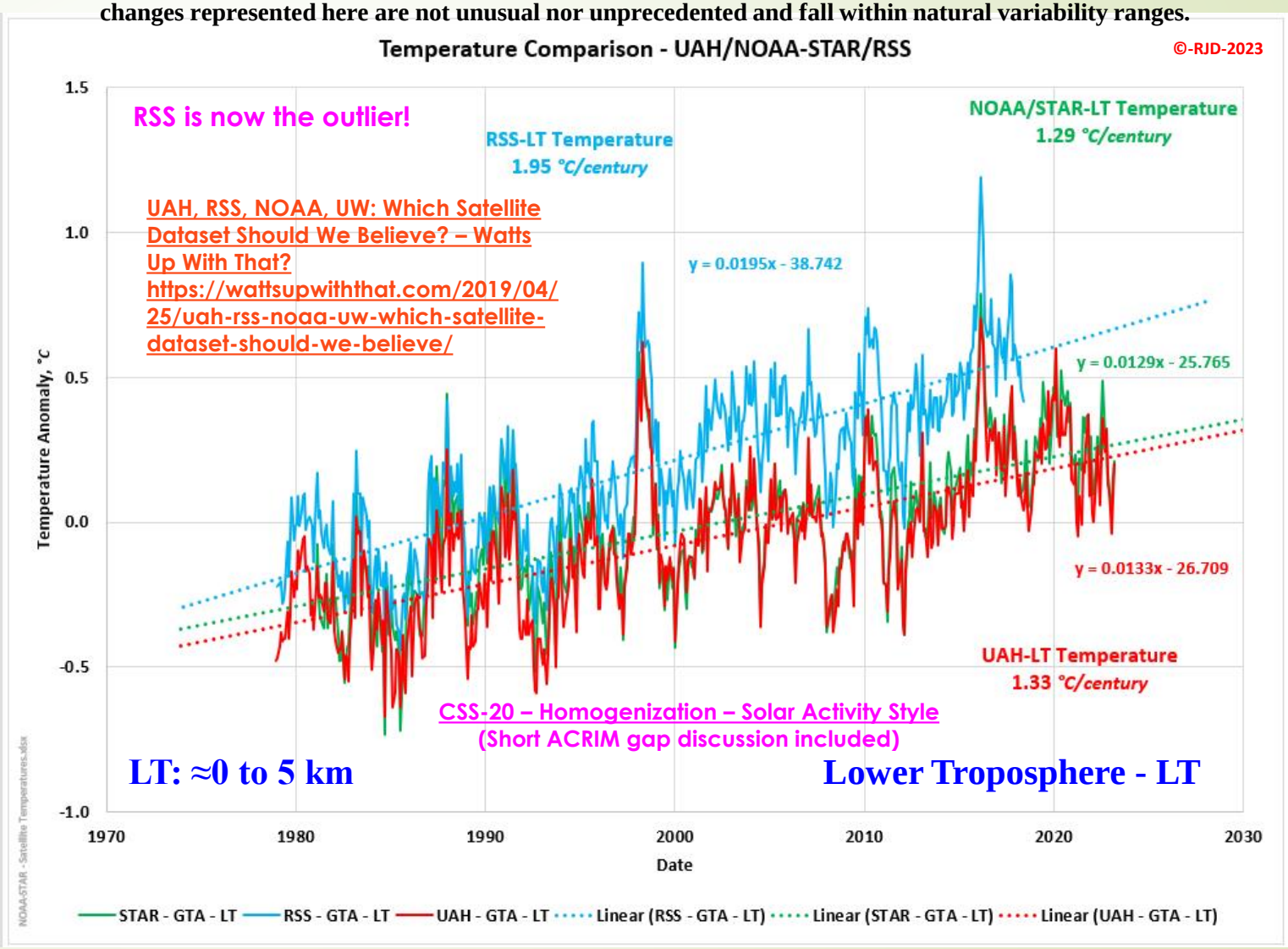
GSM – Grand Solar Minimum. The real "Climate Change" existential threat is right around the corner. Do the Research!

CSS-40g Satellite Temperature Comparisons – UAH-STAR-RSS

More detail? climatechangeandmusic.com



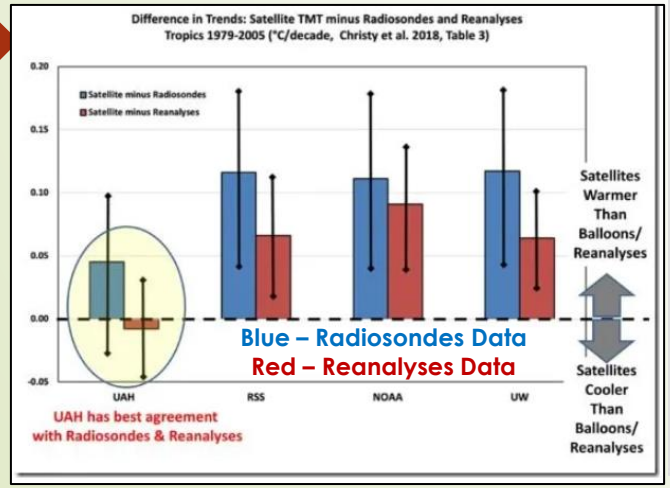
Remote Sensing Systems (RSS) is a third long term satellite option. The RSS data (1.95 °C/century) noticeably deviates from both the UAH (1.33 °C/century) and NOAA (1.29 °C/century) data. That was not always the case. The chart (bottom left) was produced in 2019 and shows that NOAA and RSS were comparable at the time. UAH was the outlier, but that outlier compared better to both the radiosonde (weather balloon) and reanalysis data sets. That is the simple reason I have always preferred the UAH data. And now NOAA has obviously also come to the same conclusion. In my opinion, RSS has been playing the alarmist game for a long time (as had NOAA). There were grey areas (like the ACRIM gap issue) that allowed room for questionable manipulation. Regardless of the differences, the temperature changes represented here are not unusual nor unprecedented and fall within natural variability ranges.



The RSS data presented here only goes up to 2018. I looked to update the data on woodfortrees.org, but the data links for RSS were unavailable. The chart is available and the recent data can be compared to UAH there. Like the UAH data, the RSS data has been declining since 2015.

Satellite Temperature UAH-STAR-RSS

As a result the temperature trend will drop a bit from the 1.95 °C/century shown here. With the AMO, GSM and an imminent Beaufort Gyre release, temperatures will continue to drop.



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