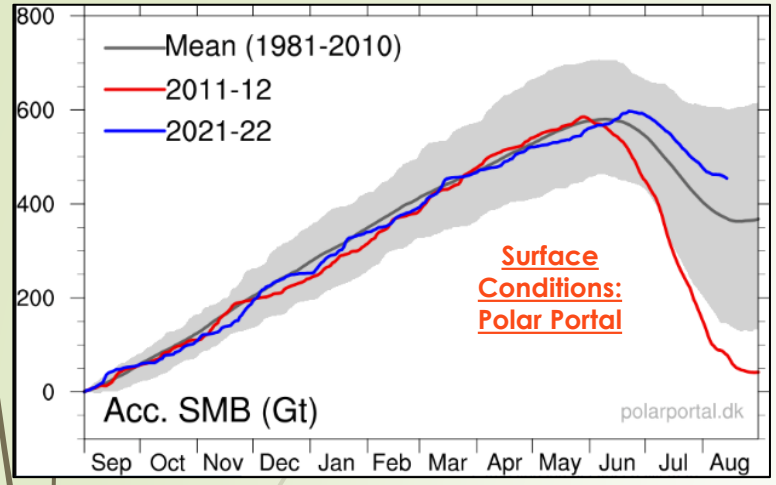
CSS-28a

Greenland Glaciers
Petermann Glacier

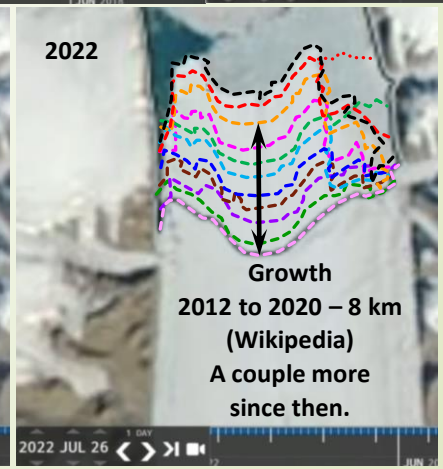


https://realclimatescience.com/2022/08/growth-of-greenlands-petermann-glacier-since-2012/

This is just a quick look at two of the poster child glaciers routinely used by the CAGW alarmist crowd to frighten the general public with tales of catastrophic melting in Greenland and the subsequent devastating rise in sea level. Just one problem, the glaciers are not cooperating, giving them a narrative problem. The Petermann Glacier, shown to the right, has been growing since 2012 at roughly 1 km/year (roughly 10 km). A rather inconvenient fact. But not surprising since temperatures have been colder in Greenland since the unusually warm melt year in 2012. Large icebergs calved off in August 2010 (260 km^2) and July 2012 (according to Wikipedia, 130 km^2, although the accompanying video says 31 km^2 (?)), leaving the glacier front as shown in the upper left picture. At some point in the near future, another large iceberg will be calved off. These are natural processes and are not correlated to CO_2 concentrations. Scientists had been watching this particular crack develop since 2001. Wikipedia also mentions an iceberg calving in 2008 but does not provide detail.

Petermann Glacier Visuals

Petermann Glacier



2022
2021
2020
2019
2018
2017
2016
2015
2014
2013
2012

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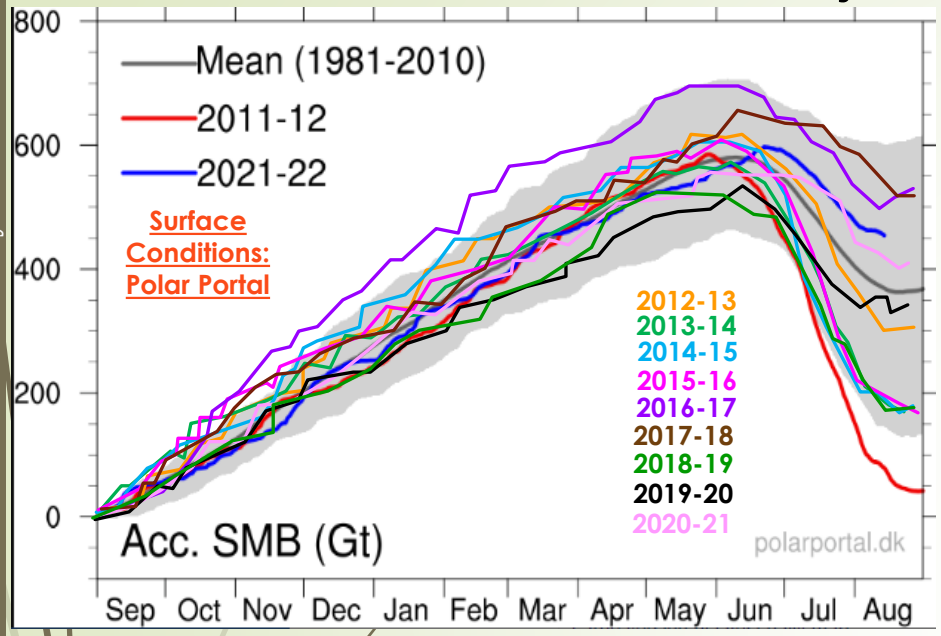
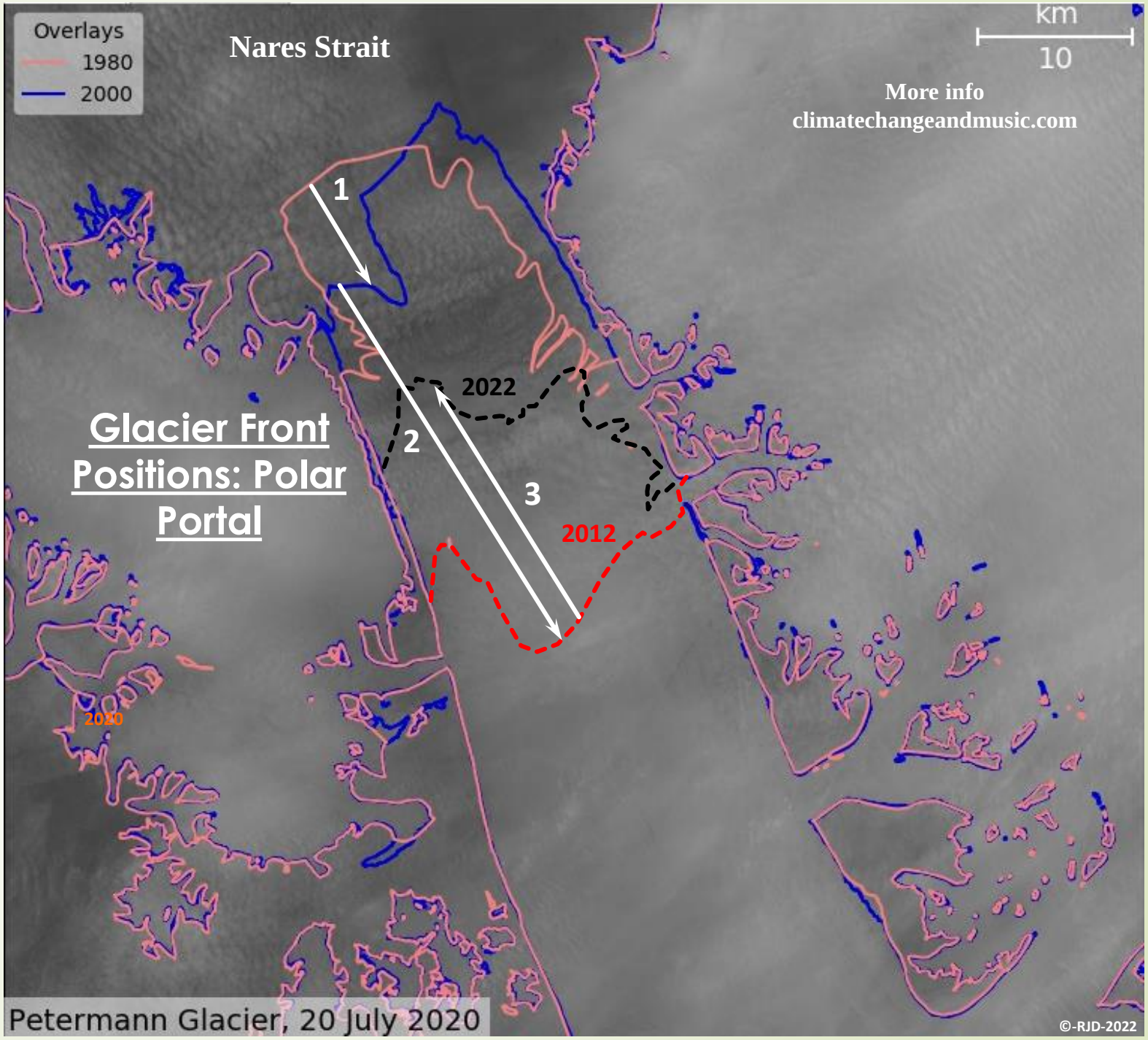
GSM – Grand Solar Minimum. You really should do the Research!

Greenland Glaciers
Petermann Glacier - History

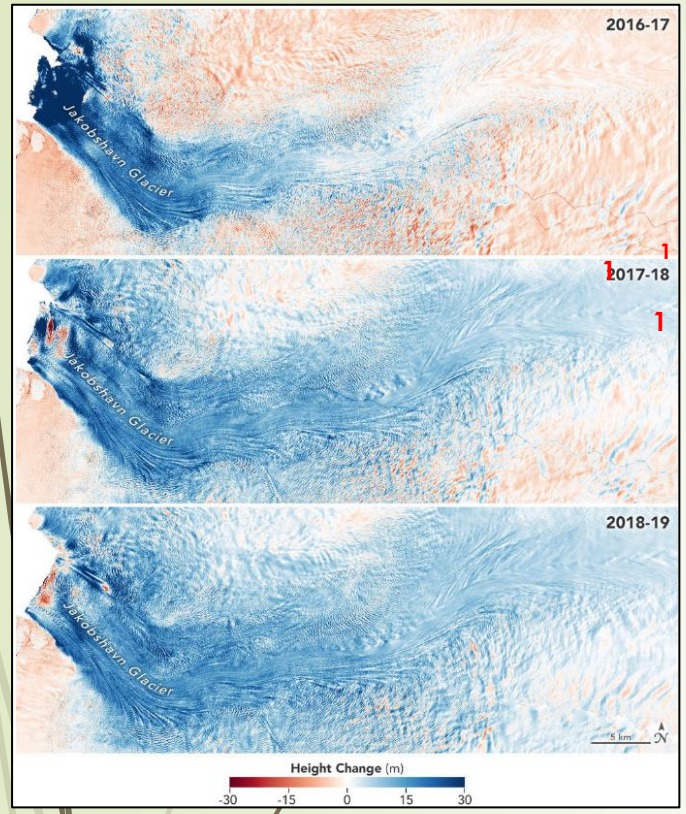


Petermann Glacier History

This slide adds some additional history to the Petermann Glacier story. This July 2020 photo (to the right) comes from the Denmark Meteorological Institute's (DMI) Polar Portal site. Unfortunately, cloud cover is obscuring the glacier front itself. The lighter haze may be the glacier front. The general glacial terminus will always be somewhere at or near the fjord's entrance to the Nares Strait. The currents in the Nares Strait will place continuous stress on the floating ice in the fjord, initiating calving. The bigger picture in Greenland is also important. The plot above consolidates the yearly Surface Mass Balance (SMB) additions every year since the anomalously warm year of 2012. But even that year had a 40 Gt SMB add (accumulation less surface melt, the SMB does not include glacial calving). The Greenland temperatures cycle up and down for a variety of reasons (primarily the AMO and the ENSO, CO_2 not so much (CSS-26 and CSS-27)).



Greenland Glaciers - Jakobshavn



The Jakobshavn Glacier terminus has generally stabilized with only minor localized retreats since 2006. But the glacier is actively growing. The thicknesses (behind the terminus) have increased significantly (as shown in the NASA images to the left). The thickening is not surprising, given that global temperatures have declined noticeably since the El Niño peak in early 2016.

Jakobshavn Glacier Visuals

[Jakobshavn Glacier Grows for Third Straight Year –(nasa.gov)]

The Jakobshavn Glacier has more history (going back to 1851). But most Of the glacial retreat, 27.8 of the 49.1 kilometers occurred pre-1950. Since 86%+ of human emissions occurred post-1950, that early retreat was not our fault. Most of the remaining retreat took place from 2001 to 2006. CO_2 changed very little over that period. The faster periods of retreat (shaded red) correlate to the peaks in the AMO (as do Greenland's temperatures). The much wider fjord might be also be a factor (i.e. stresses).

Original Image from The Washington Post April 11th, 2017

Red Shading lines up with Atlantic Multidecadal Oscillation (AMO) highs, and therefore Greenland temperature highs (CSS-27)

The Ice Age is Coming Scare

Number of Years

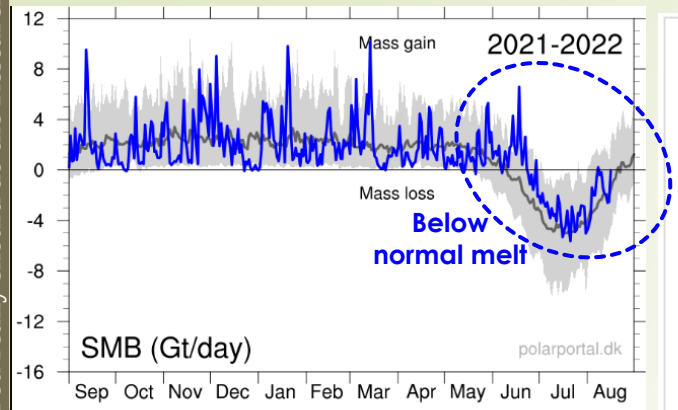
Retreat Rate km/year

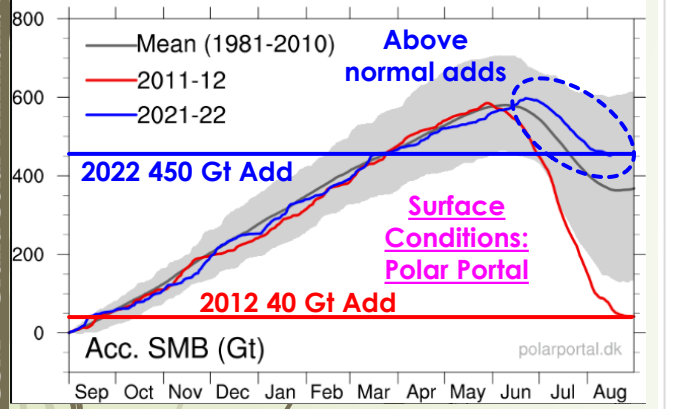
1851 24 0.25
1875 8 0.64
1883 19 0.28
1902 11 0.32
1913 1929 16 0.1
1931 2 1.1
1953 22 0.19
1964 11 0.33
0.02 37
2001 1 3.5
2002 1 7.4
2003 1 2.7
2004 1 0.6
2005 1 1.5
2006 1 0.15
2007 0.07
2009 3
2010
2019 8
2021 2

Jakobshavn Glacier (Washington Post) 2019 and 2021 added

Greenland Glaciers - Graphics

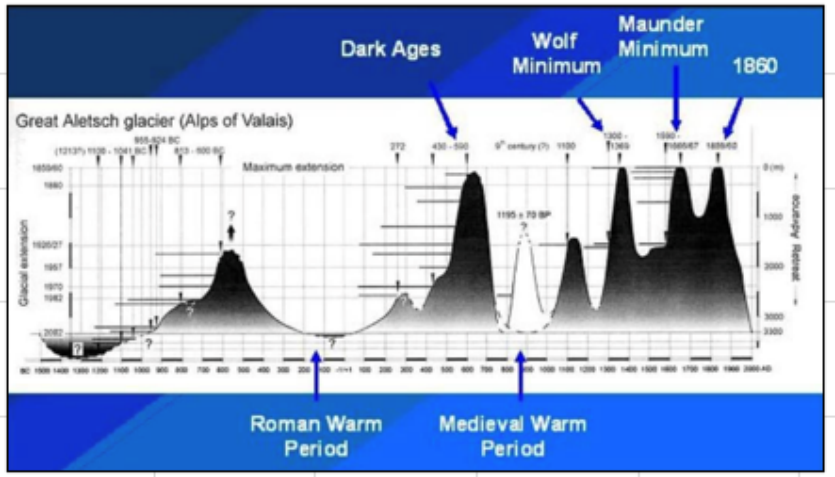
GSM – Grand Solar Minimum. You really should do the Research!





Jakobshavn Petermann Graphics

The graphical representations of the images on the previous slides are shown to the right. The Jakobshavn glacier began retreating retreating long before CO_2 concentrations ever became a factor. Through most of the post-1950 period (1964 to 2001, corresponding to 86%+ of human emissions), the glacier front was very stable. The rapid retreat from 2001 to 2006 was likely related to ice flow dynamics within the much wider channel beginning at the current glacier front. Greenland's Surface Mass Balance (SMB)above), the difference between land melt and accumulation) has increased every year since recording began (even the anomalously warm year of 2012. More detail.



Advancement Rates, *km/year*
Retreat Rates, *km/year*

CSS-5 – Snow and Ice - September 2020, CSS-11 – Snow and Ice – July 2021, CSS-22 – Snow and Ice – June 22

Jakobshavn/Petermann Glacier - Progression Rates

86%+ of human emissions have occurred post-1950. No correlation with CO_2.

The Jakobshavn glacier has thickened significantly in recent years along with the reduced retreat rate. Not exactly playing along with the CAGW alarmist narrative.

This is not a CO_2 response!!

Rapid breakdown (likely related to flow mechanics (not CO_2)) from 2001 to 2006 then back to very little retreat despite ever rising CO_2.

Over longer periods, the glaciers of the world have retreated and advanced many times (as in the example shown above). The temperatures have warmed since the mid-1800s. So, not surprisingly, glaciers have retreated. Temperatures have started to cool and will cool further as we move deeper into the Grand Solar Minimum (GSM). As those temperatures drop further, the glacier growth (already showing) will accelerate (despite rising CO_2 levels).

Natural retreat (minimal anthropogenic CO_2 influence).

Very little retreat (0.02 km/year) from 1964 to 2001 despite ever rising CO_2.

Minimal retreat despite significant CO_2 concentration increases.

The Petermann Glacier advance is continuous over time. As the glacier advances, large chunks calve causing abrupt retreats and then the process starts over. The current advancement will end when another chunk calves. CO_2 is not controlling the glacier front movements. The flow mechnics, channel configurations, etc. are more important. Every year more snow falls than ice melts.

The Petermann Glacier has been advancing at a rate of 0.95 km/year since 2012.

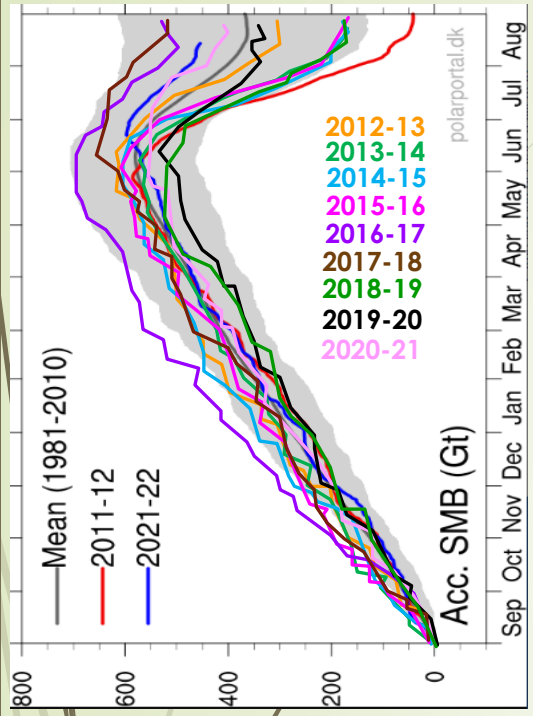
OPS-25 – Greenland Surface Mass Balance
OPS-43 – Glaciers and Sea Level

CSS-28e

Surface Conditions: Polar Portal

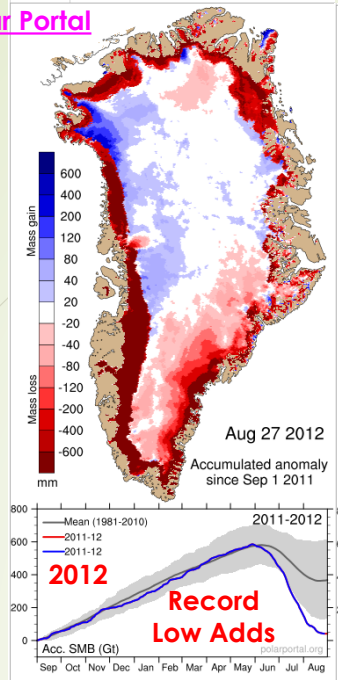
Greenland Glaciers Surface Mass Balance

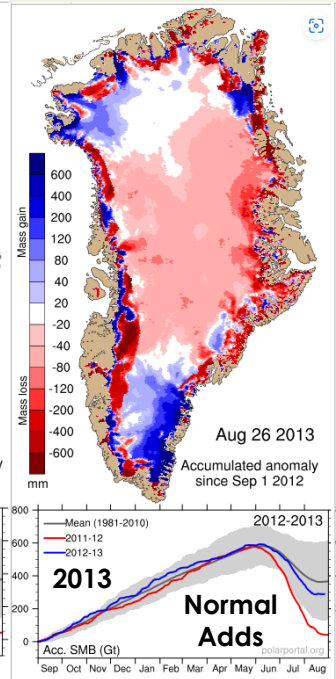
GSM – Grand Solar Minimum. You really should do the Research!

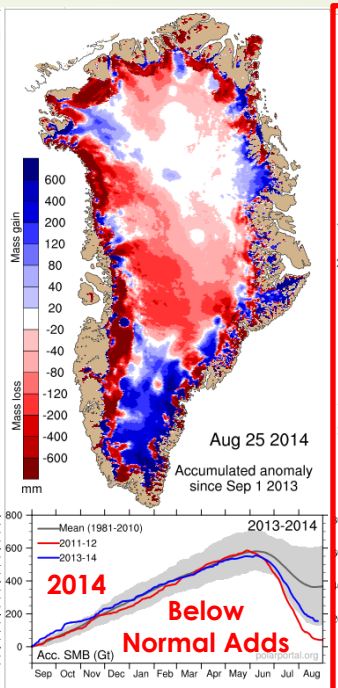


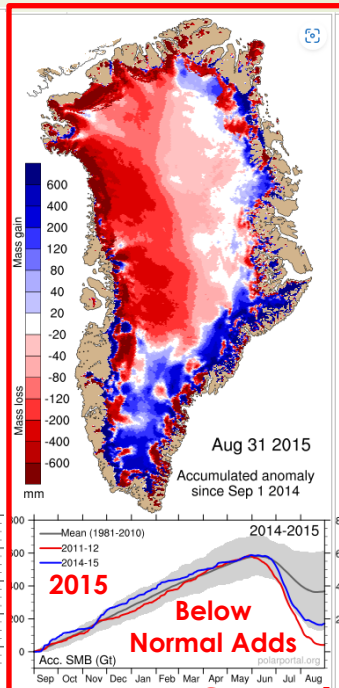
Greenland Surface Mass Balance

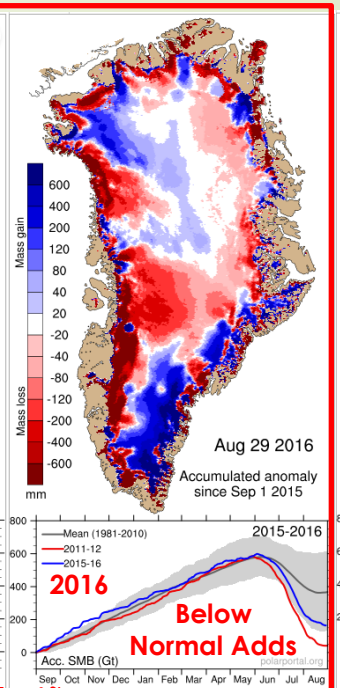
The Greenland SMB detail (2012 to 2022) is laid out here. The data starts in 2012 (an anonymously warm year (not a trend). Since then 4 years have been above normal, 2 years have been close to normal (but below) and 4 years have been significantly below Normal. Of those 4 years significantly below normal, 3 of them were strongly influenced by El Niños. So, once again, we find that global temperatures can change quickly and significantly without any help from CO_2. And those temperature changes can cause dramatic events (large iceberg calving, droughts, fire, hurricanes, etc.) that are not indicative of climate change. Focusing on CO_2, ignores the much more dangerous cooling that will develop as we move further into the AMO cooling phase and the GSM. Wake Up!

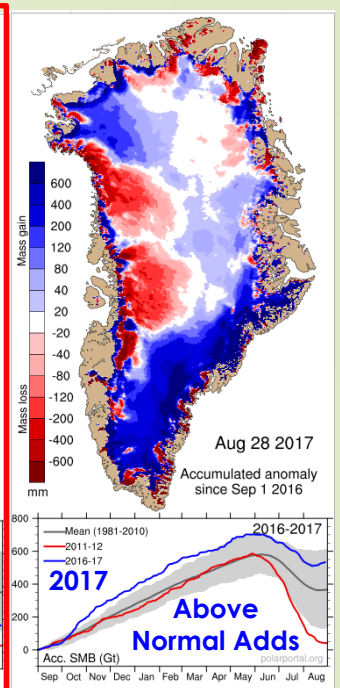




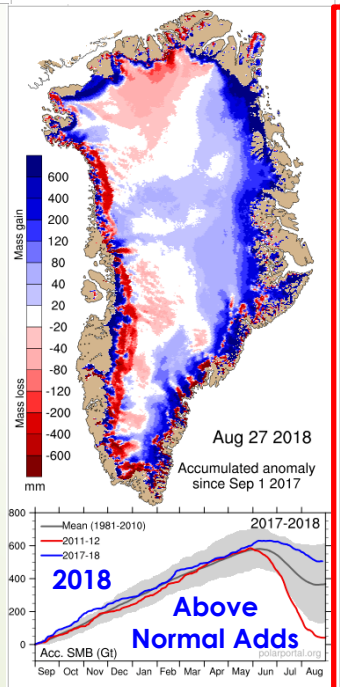


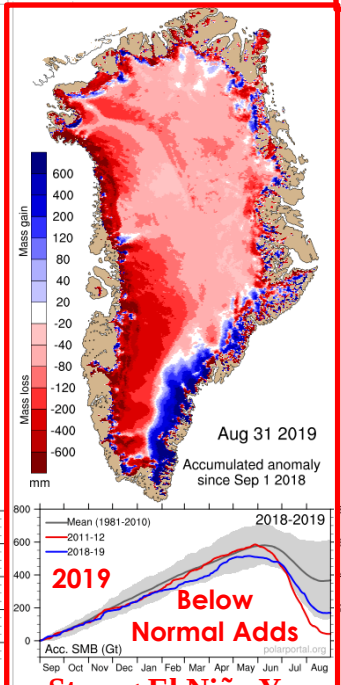


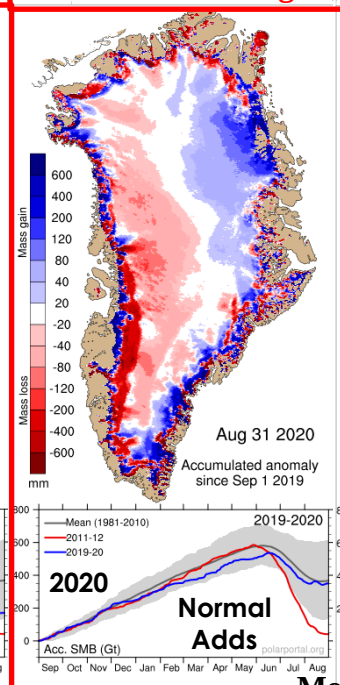


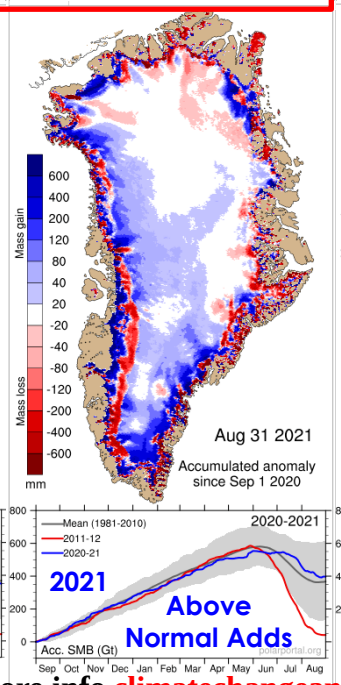


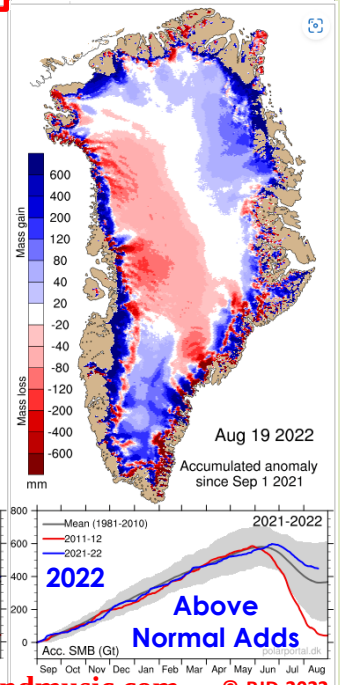
Strong El Niño Years











Strong El Niño Year

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