

THE REAL ARCTIC AND ANTARCTIC ICE STORIES

By Joe D'Aleo

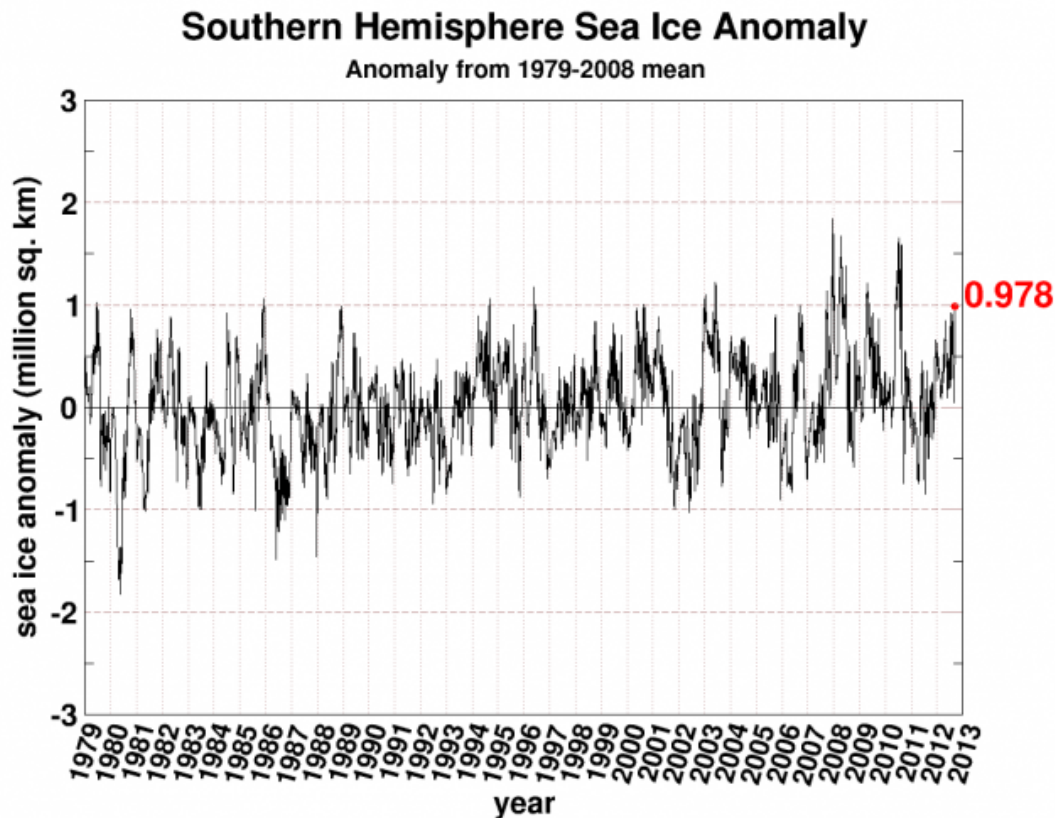
We hear a constant hyping of the new low arctic ice record and the ignoring of the simultaneous increase of Antarctic ice which appears heading towards a near new record high.

To these so called scientists and the media, the world began in 1979 when satellite tracking began, The famous picture of the submarine Skate surfacing at the North Pole in August 1959 shows this has happened before.



Steve Goddard at Real Science has catalogued many stories in the mainstream media in the first half of the century
<http://stevengoddard.wordpress.com/polar-meltdown/> and
<http://stevengoddard.wordpress.com/ice-free-arctic-forecasts/>.

The last arctic minimum in 2007 coincided with the southern hemisphere record high, which never was acknowledged. Here is today's Southern Hemisphere ice anomaly chart.



Also note a new paper finds Antarctic Peninsula has accumulated significant extra ice since 1850. The paper Grace et al. (2012) published in *Geophysical Research Letters* finds the Antarctic Peninsula has experienced a "significant accumulation" of "up to 45 meters of extra ice thickness over the past 155 years." This finding is contrary to the [claims of the highly-flawed study published by RealClimate's Dr. Eric Steig](#), which alleged that the Antarctic Peninsula is rapidly warming. The finding is particularly surprising since the "significant accumulation" of ice has occurred since the end of the Little Ice Age in ~ 1850.

Increased ice loading in the Antarctic Peninsula since the 1850s and its effect on Glacial Isostatic Adjustment

Key Points:

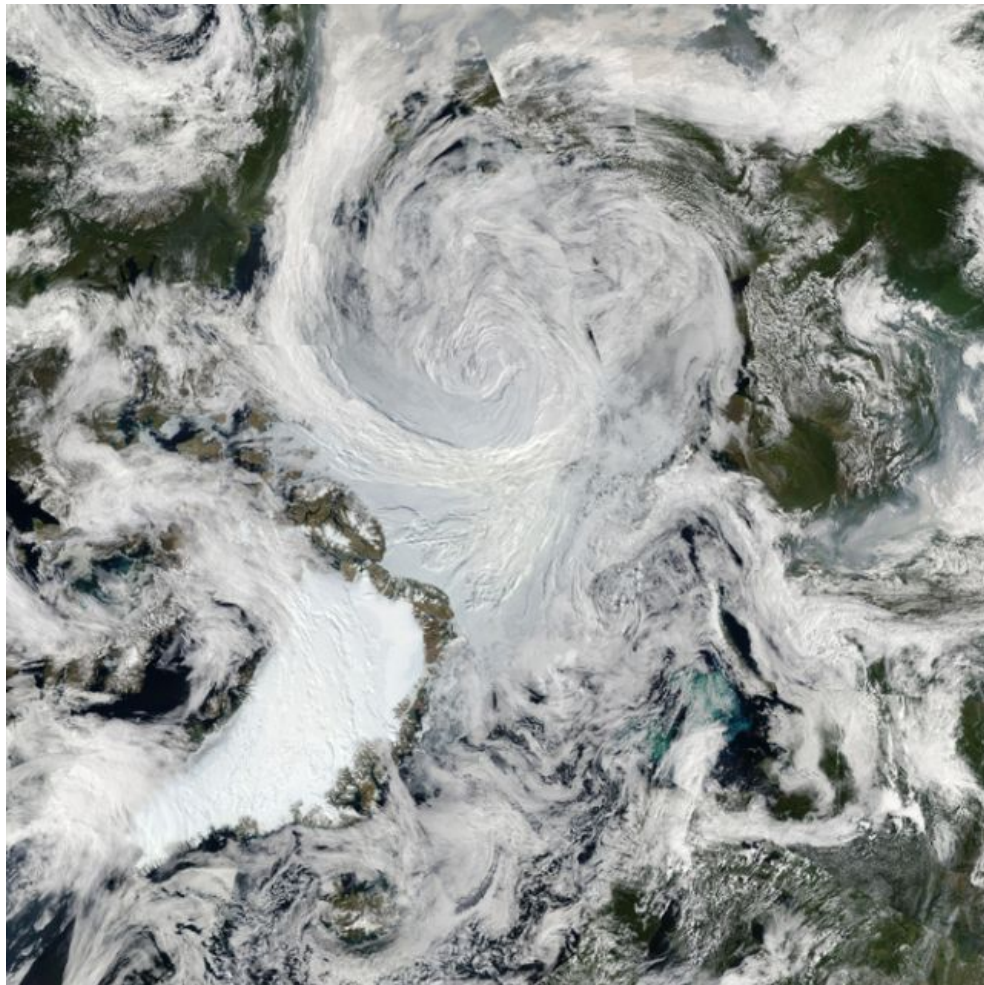
- Accumulation increase results in up to 45 m extra ice thickness over 155 years
- Model predicts GIA-related subsidence of up to 7 mm/yr which will

affect GPS

- GRACE-derived rates of ice-mass change are biased low by ignoring this signal

ARCTIC ICE

On October 21st in 2011, the Associated Press hit the wires with a story entitled "[Sea Ice Melting as Arctic Temperatures Rise](#)." This summer, numerous stories have appeared in newspapers and magazines about this year's record. Part of this related to the arctic storm, which broke up the ice.



The stories inevitably talked about the threat to the polar bears and some even penguins. Here they are photo shopped together although penguins are not found at the North Pole or polar bears Antarctica (for which the penguins are grateful because they would not exist if they did).



The temperatures in the arctic have indeed risen in recent years and ice has declined, bottoming out in first in 2007 and now exceeded in 2012. But this is likely neither unprecedented or unexpected. The arctic temperatures and arctic ice extent varies in a very predictable 60-70 year cycle that relates to ocean cycles which are likely driven by solar changes.

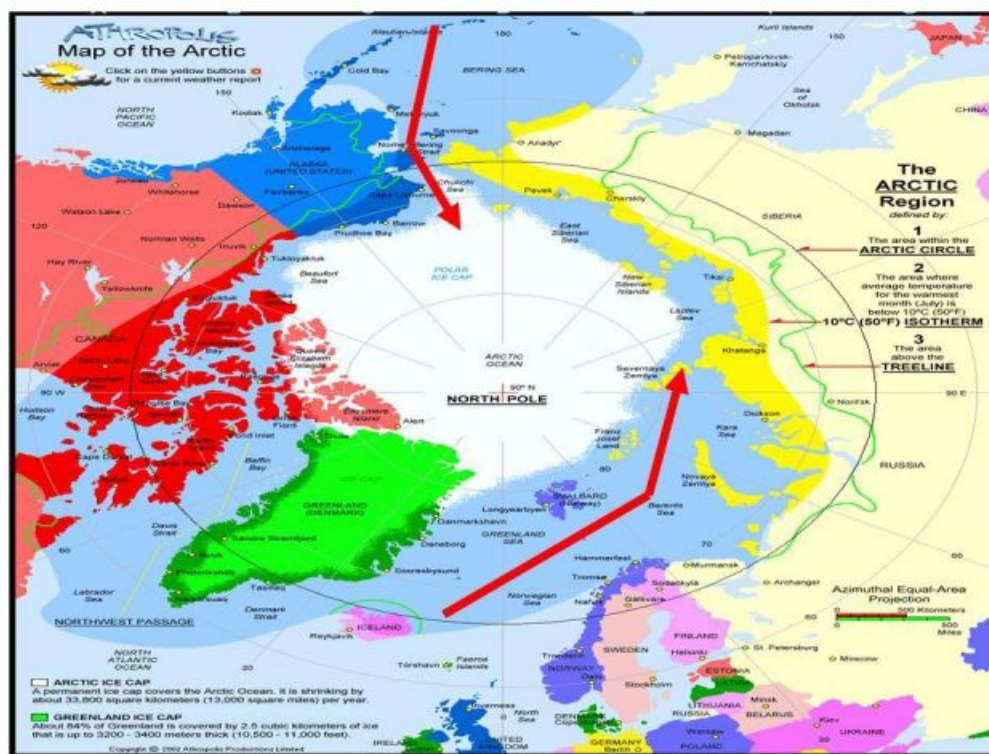
In 2007, [NASA scientists](#) reported that after years of research, their team had assembled data showing that normal, decade-long changes in Arctic Ocean currents driven by a circulation known as the Arctic Oscillation was largely responsible for the major Arctic climate shifts observed over the past several years. These periodic reversals in the ocean currents move warmer and cooler water around to new places, greatly affecting the climate. The AO was at a record low level last winter explaining the record cold and snow in middle latitudes. A strongly negative AO pushes the coldest air well south while temperatures in the Polar Regions are warmer than normal under blocking high pressure. See post [here](#).

We agree. And indeed both oceans play a role. In the record-setting (since satellite monitoring began in 1979) summer melt season of 2007, NSIDC scientists noted the importance of both oceans in the arctic ice.

“One prominent researcher, Igor Polyakov at the University of Fairbanks, Alaska, points out that pulses of unusually warm water have been entering the Arctic Ocean from the Atlantic, which several years later are seen in the ocean north of Siberia. These pulses of water are helping to heat the upper Arctic Ocean, contributing to summer ice melt and helping to reduce winter ice growth.

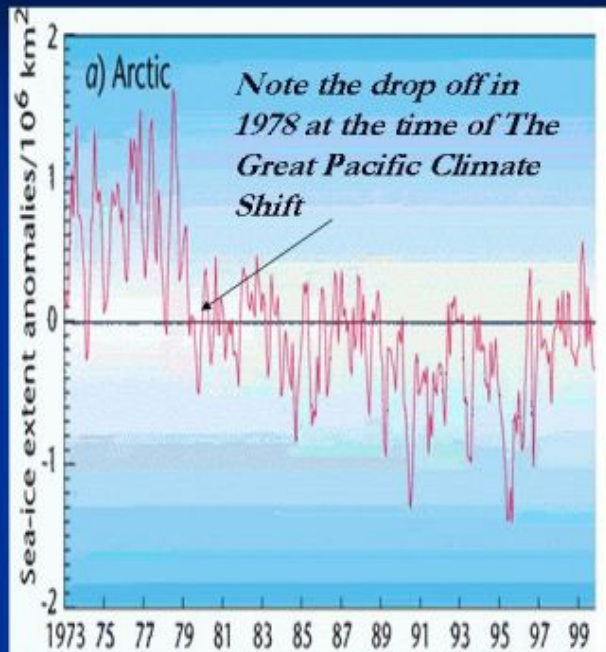
Another scientist, Koji Shimada of the Japan Agency for Marine-Earth Science and Technology, reports evidence of changes in ocean circulation in the Pacific side of the Arctic Ocean. Through a complex interaction with declining sea ice, warm water entering the Arctic Ocean through Bering Strait in summer is being shunted from the Alaskan coast into the Arctic Ocean, where it fosters further ice loss.

Many questions still remain to be answered, but these changes in ocean circulation may be important keys for understanding the observed loss of Arctic sea ice."



The Pacific warm mode favors more El Ninos and warmer water in the far northern Pacific including the Bering Straits. The PDO flipped into its warm mode in 1978 and the arctic temperatures began to warm and ice began to melt.

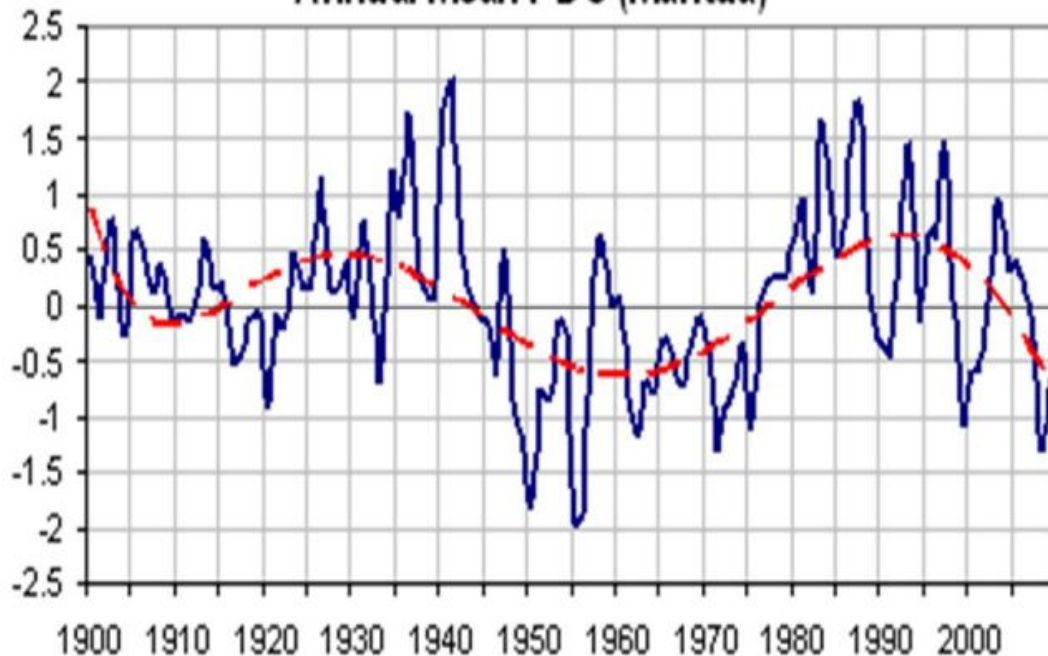
Arctic



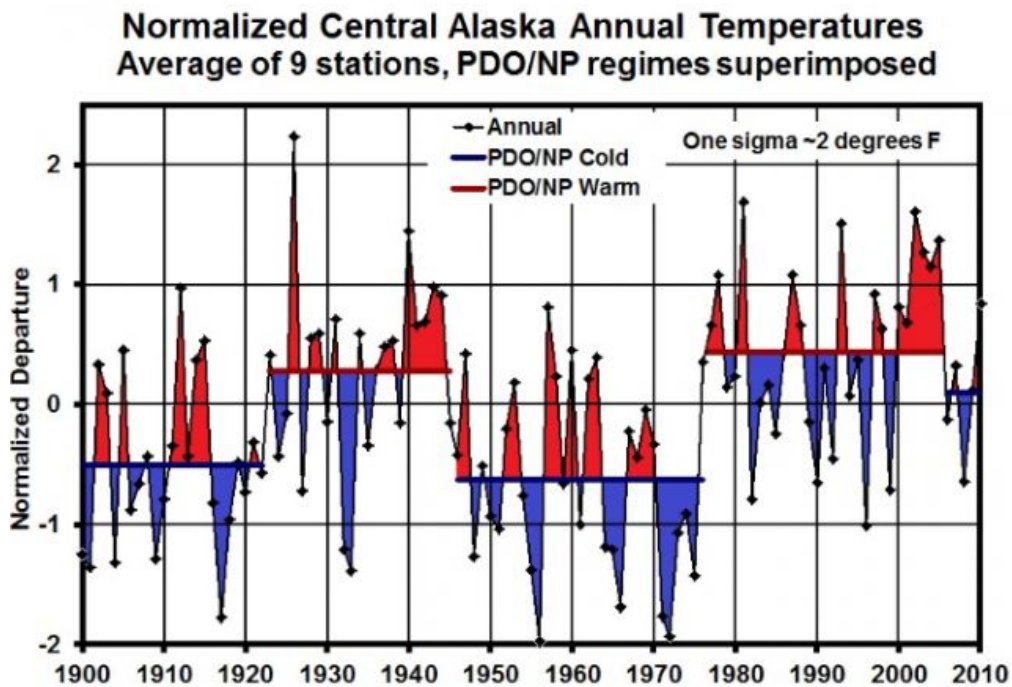
USGRCP, June 2000

- Arctic ice has diminished in thickness and extent in the summer since the Great Pacific Climate shift in 1978 as warming North Pacific water made its way into the arctic through the Bering Straits
- Trenberth (1994) has suggested this El Nino arctic relationship.

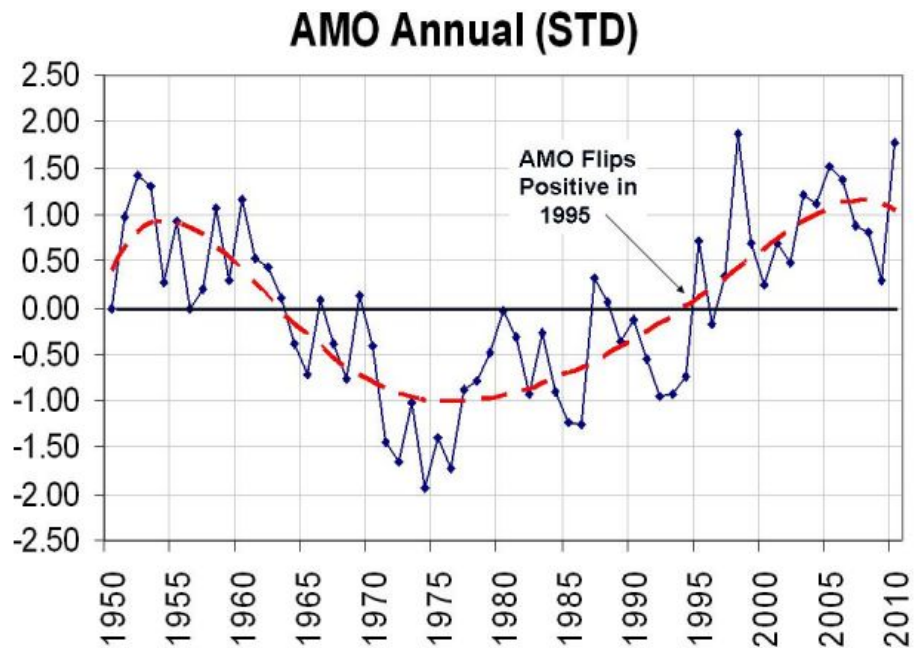
Annual Mean PDO (Mantua)



Notice how the temperatures in Alaska go through step changes tied to the PDO (Keen).

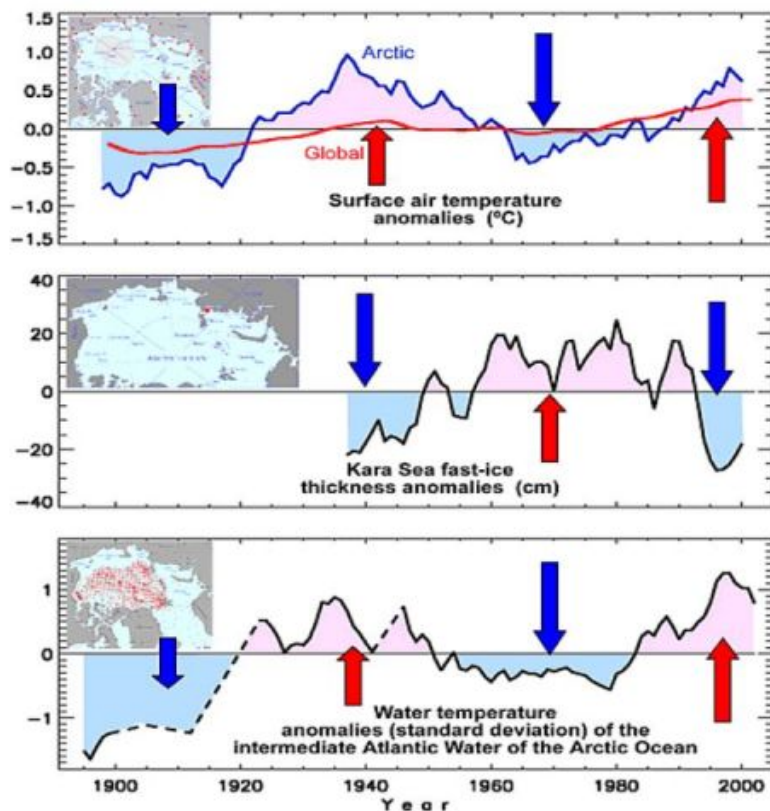


The Atlantic also cycles on a 60-70 year period. The Atlantic Multidecadal Oscillation or AMO returned to the positive warm mode in 1995.



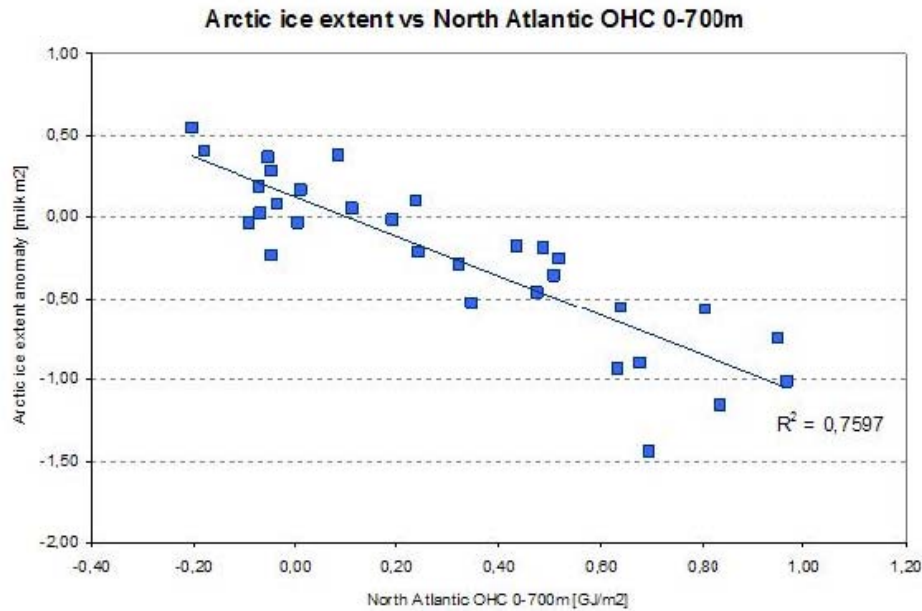
Frances et al. (GRL 2007) showed how the warming in the arctic and the melting ice was related to warm water (+3C) in the Barents Sea moving slowly into the Siberian arctic and melting the ice. She also noted the positive feedback of changed “albedo” due to open water then further enhances the warming.

The International Arctic Research Center at the University of Alaska, Fairbanks showed how arctic temperatures have cycled with intrusions of Atlantic water - cold and warm.

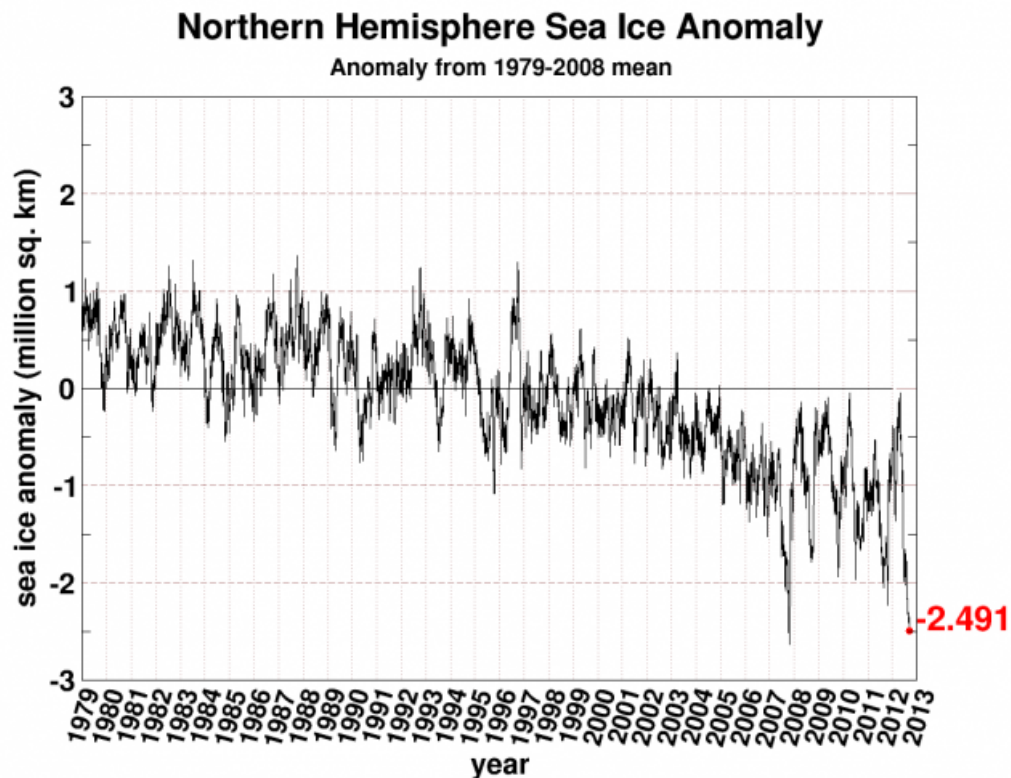


IARC

The correlation was also confirmed by [Juraj Vanovcan](#).



See how quickly the arctic ice reacts to warming of the Atlantic sea surface temperatures in 1995 (source Cryosphere Today). This marked a second leg down. We have seen large swings after the big dip in 2007 following a peak in Atlantic warmth in 2004-2005 and again in 2012 following the new spike in AMO.



The following from Chylek (2009) shows the tight correlation of the AMO and arctic temperatures.

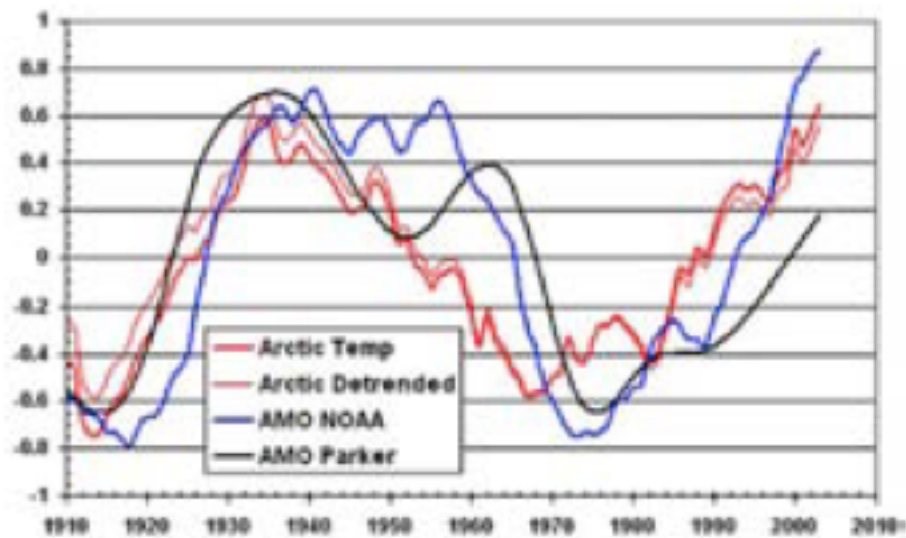


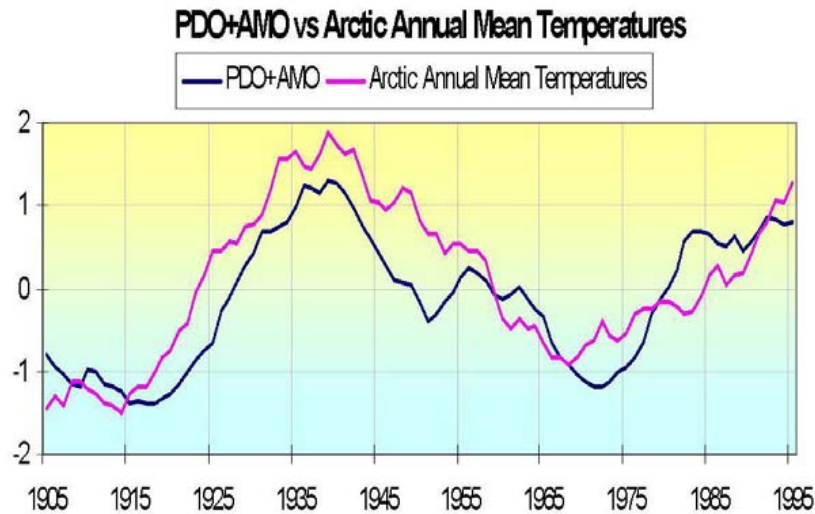
Figure 3. 11 year running average of the Arctic temperature (combined low and high Arctic stations with long term temperature records) anomaly (thin red line) with respect to 1910–2008 average, detrended anomaly (thick red line), and the AMO index anomaly. The NOAA (blue) and the [Parker *et al* [2007]] (black) AMO index anomaly have been normalized to a peak value of 0.7 within 1930–1940s.

The authors conclude “Our analysis suggests that the ratio of the Arctic to global temperature change varies on multi-decadal time scale. The commonly held assumption of a factor of 2–3 for the Arctic amplification has been valid only for the current warming period 1970 – 2008. The Arctic region did warm considerably faster during the 1910–1940 warming compared to the current 1970–2008 warming rate. During the cooling from 1940-1970 the Arctic amplification was extremely high, between 9 and 13. The Atlantic Ocean thermohaline circulation multi-decadal variability is suggested as a major cause of Arctic temperature variation.”

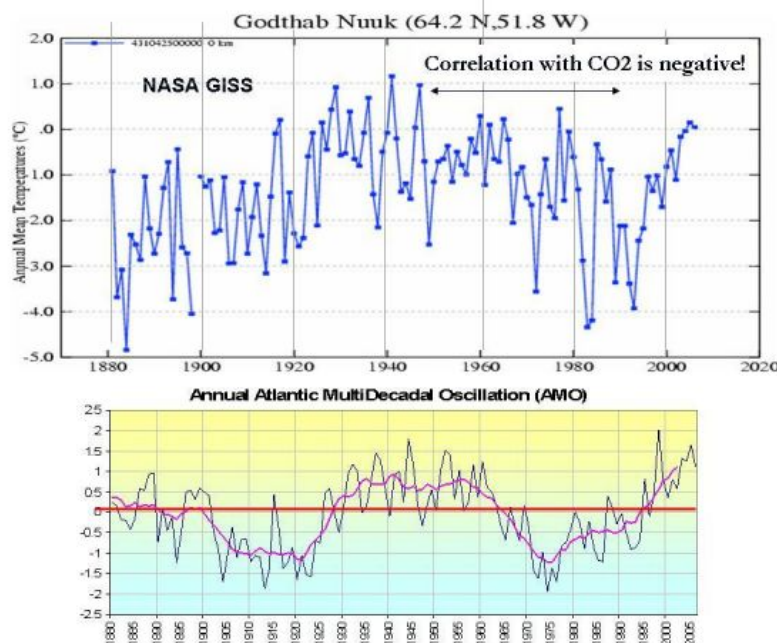
Although the PDO and AMO are measured differently, both reflect a tri-pole of ocean temperatures. Both have warm north and tropics and cool relative to normal in between in the positive phase and cold north and tropics and warm in between in the negative phase.

By normalizing the two data sets and then adding the two, you get a

measure of net warmth or cooling potential for both global and arctic temperatures. See how well the sum tracks with the arctic temperatures. Though we don't have measurements of ice extent, there are many stories and anecdotal evidence that arctic ice was in a major decline from the 1920s to 1940s as Goddard showed above.

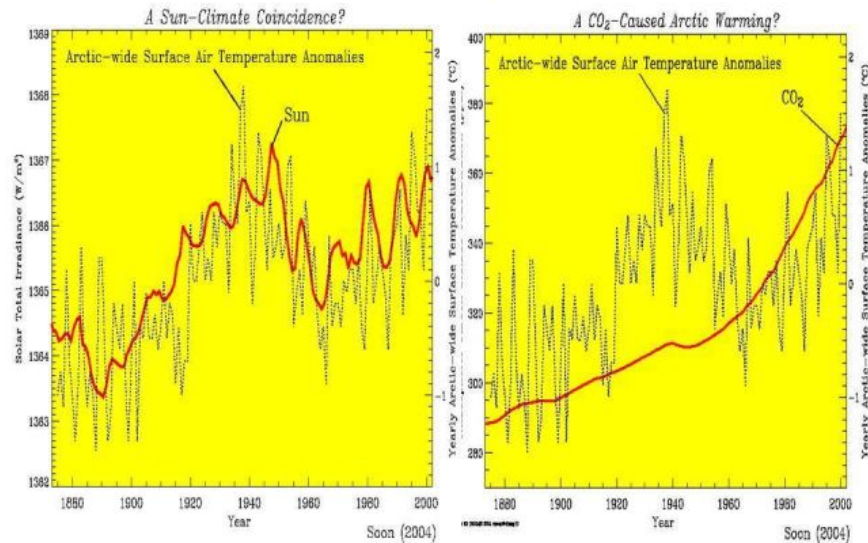


At the edge of the arctic, Greenland behaves in the same way - with warming and cooling tied to the AMO.

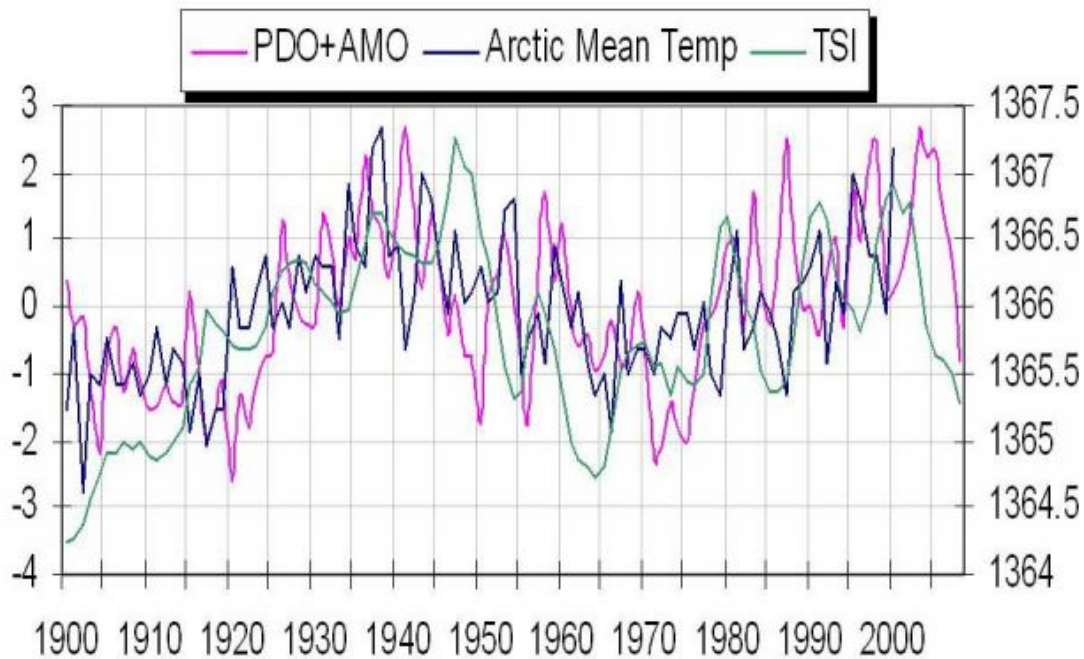


Dr. Willie Soon has shown how the arctic temperatures match the solar Total Solar Irradiance (Hoyt/Schatten/Willson) well. Correlation is poor with CO₂.

The Sun is more likely the dominant driver
of the recorded Arctic temperature variations



We see here how the annual TSI and annual PDO+AMO track together with arctic temperatures.



In the last post on this topic a year ago I said:

"Though the current spike in the Atlantic temperatures and more high latitude blocking may cause another spike of melting in the next few winters as warm water from the AMO pop the last year works its way into

the arctic, longer term you can expect arctic temperatures to decline and ice to rebound as the Pacific stays cold and the Atlantic cools and the sun stays in its 213 year Eddy minimum.

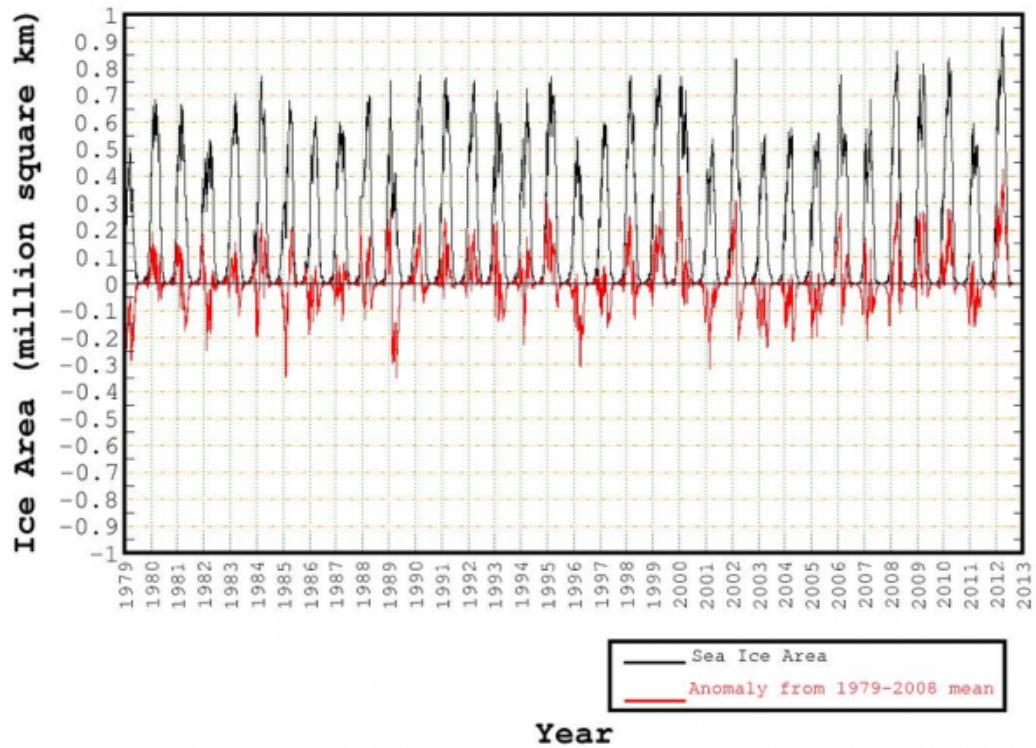
That doesn't preclude some very cold and snowy winters short term. In 2008 glaciologist Bruce Molnia reported a bitterly cold Alaskan summer of 2008 following a La Nina winter with extreme cold and heavy snows resulted in area glaciers to expand, rather than shrink for the FIRST TIME IN RECORDED HISTORY. Summer temperatures, which were some 3 degrees below average, allowed record levels of winter snow to remain much longer, leading to the increase in glacial mass for the first time in at least 250 years."

Recall that Alaska in 2011/12 had a brutal winter with all time record snow and incredible January cold.

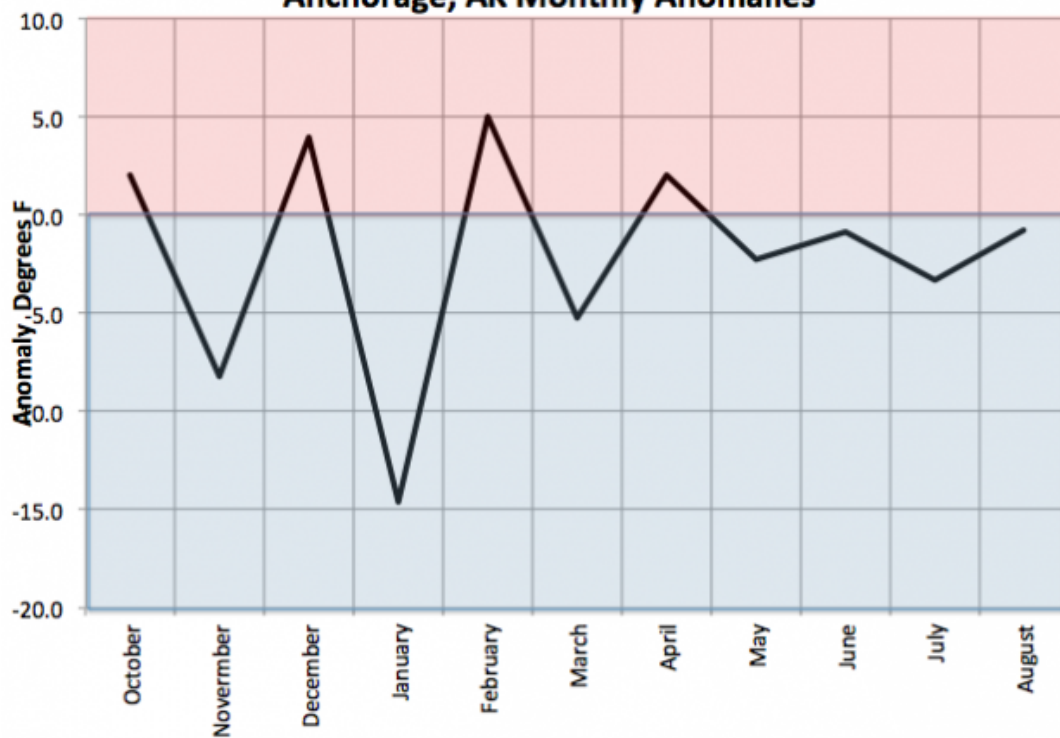


Bering Sea ice set a new satellite era record.

Bering Sea Ice Area



Anchorage, AK Monthly Anomalies



Anchorage Monthly Anomaly (F)		
	Month	Anomaly (F)
2011	October	2.0
2011	November	-8.2
2011	December	4.0
2012	January	-14.6
2012	February	5.0
2012	March	-5.2
2012	April	2.0
2012	May	-2.3
2012	June	-0.9
2012	July	-3.3
2012	August	-0.8

...Snowfall Records for Anchorage Alaska...

Top 5 Highest Winter Snowfall (Normal = 74.5 inches)

134.5 inches.....2011-2012
 132.6 inches.....1954-1955
 128.8 inches.....1955-1956
 121.5 inches.....1994-1995
 113.9 inches.....2003-2004

Top 5 Lowest Winter Snowfall

30.4 inches.....1957-1958
 32.6 inches.....1941-1942
 32.9 inches.....1980-1981
 36.8 inches.....2002-2003
 38.5 inches.....1960-1961

See PDF [here](#). See Verity Jones recent post on the arctic data [here](#). See more on glaciers and icecaps [here](#). See post by Arnd Bernaerts on Verity Jones' Digging in the Clay [here](#) with much more on the arctic.

Bottom line is that if CO2 warming was the climate driver for the polar ice, both the Antarctic and arctic would be diminishing. Ocean cycles in the northern oceans explain very nicely the observed changes. In 5 or 10 years when the Atlantic cools again, they will have to pick another story

that is consistent with global warming – maybe a rapidly increasing ice and snow cover and rapid cooling.