Response to Tamino on arctic temperatures

In my post in ICECAP that was extracted to WUWT, we presented a case for cyclical, natural arctic changes. Here are some of the key points made, inconvenient to the warmists, which he not surprisingly avoided:

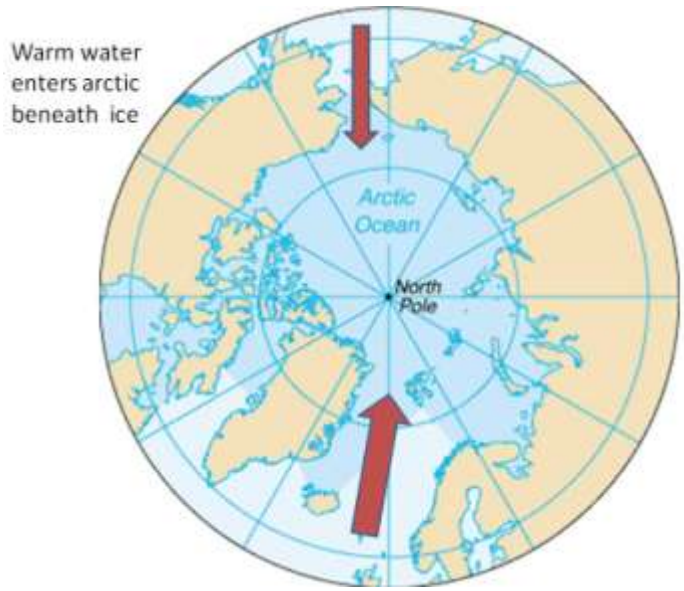
In 2007, NASA scientists reported that after years of research, their team had assembled data showing that normal, decade-long changes in Arctic Ocean currents driven by a circulation known as the Arctic Oscillation was largely responsible for the major Arctic climate shifts observed over the past several 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 in 2009/10 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 on the amazing winter of 2009/10 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 itself before funding opportunist Mark Serreze took over editorial control, noted the importance of both oceans in the arctic ice.

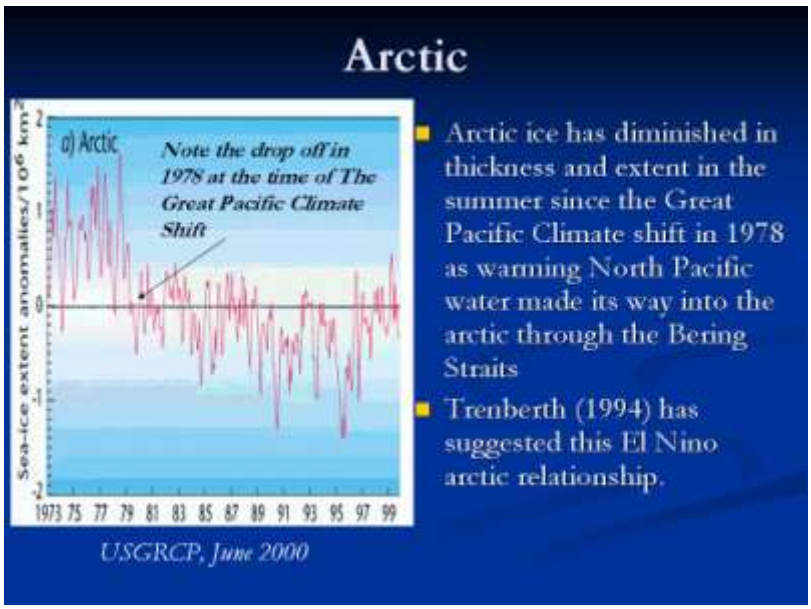
"One prominent researcher, Igor Polyakov at the University of Fairbanks, Alaska, points out that pulses of unusually warm water have been entering the Arctic Ocean from the Atlantic, which several years later are seen in the ocean north of Siberia. These pulses of water are helping to heat the upper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

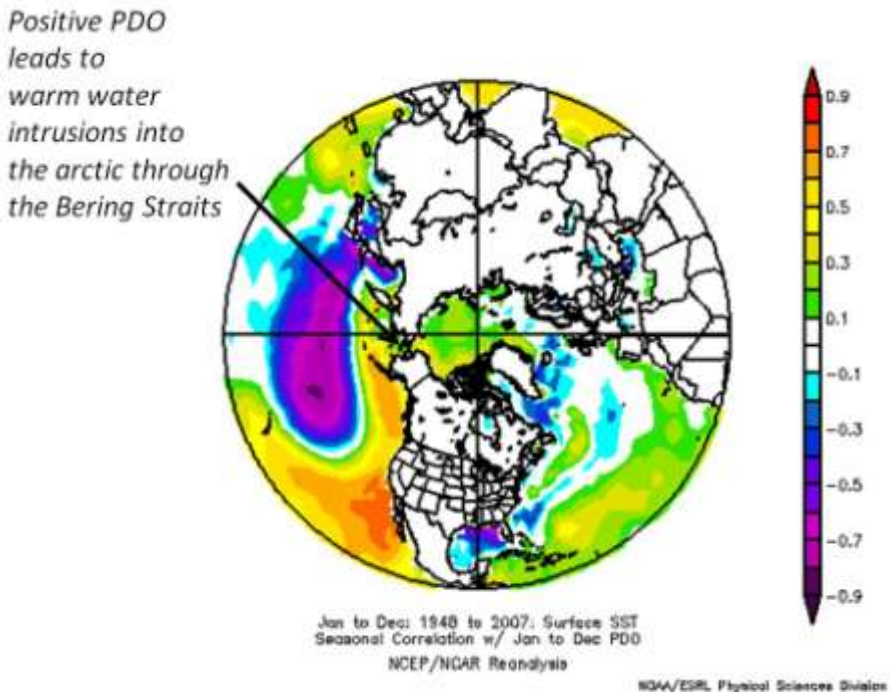
Kevin Trenberth reported in a 1994 paper that during El Ninos, warm water can enter the arctic through the Bering Straits and enhance melting.



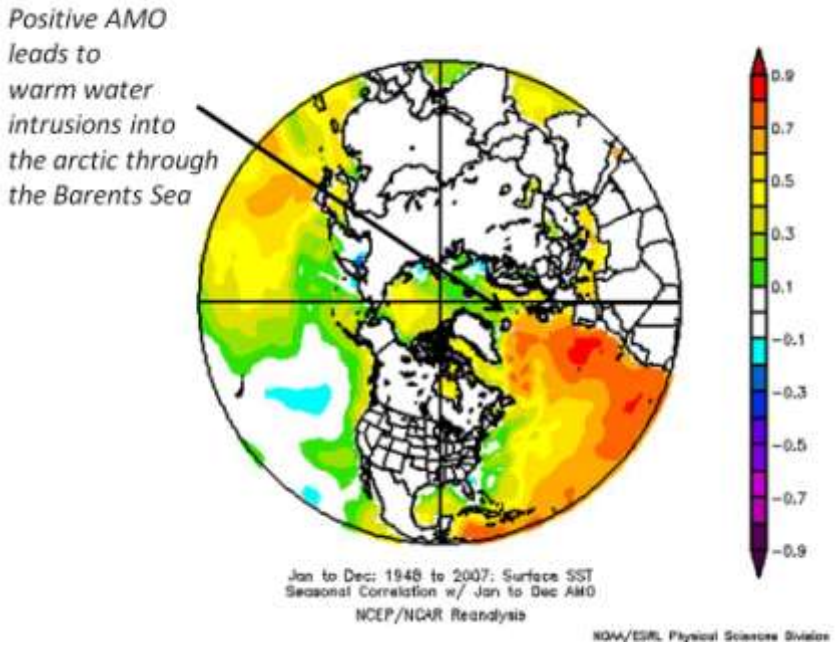
The Pacific warm mode favors more El Ninos and warmer water in the far northern Pacific including the Bering Straits. The PDO flipped into its warm mode in 1978 and the arctic temperatures began to warm and ice began to melt.



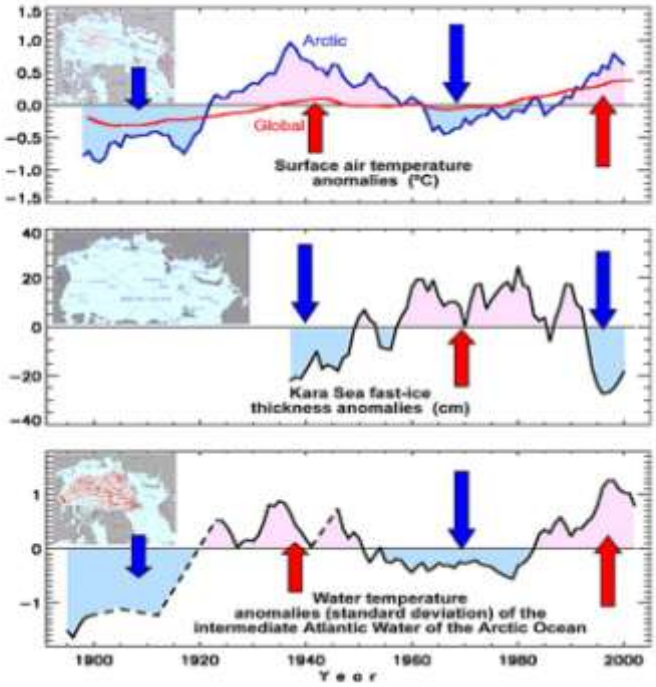
A correlation of SSTs with the annual PDO state shows a positive correlation of SSTs off Alaska. In the positive warm PDO as we saw from 1977 to 1998, this meant warm water that could leak into the arctic.



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.



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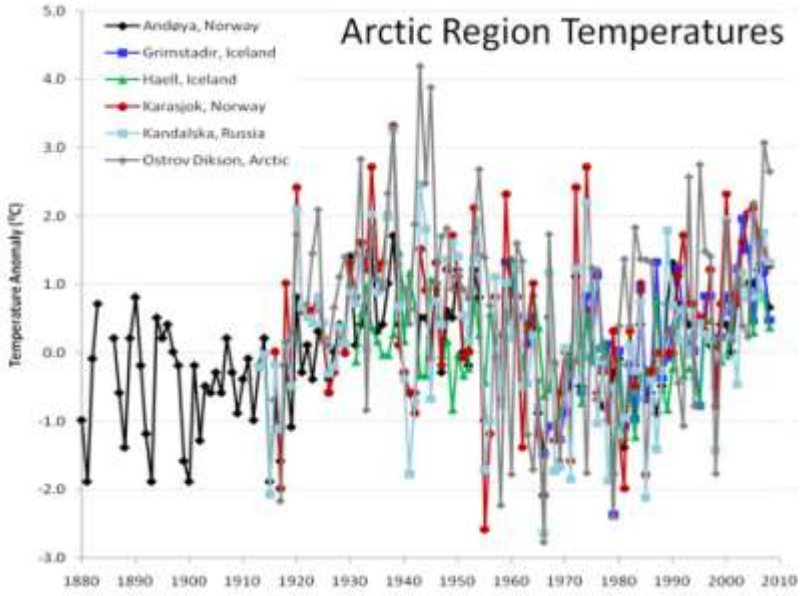
I also presented the graph that Verity Jones in Digging in the Clay presented of long record stations in the eastern arctic that showed this cyclical behavior.



Tamino in his blog claimed this was cherry picking (regional) and that the current arctic is much warmer than that in the 1940s. Let's look beyond these southeast arctic stations

See this listing of stations for the western Arctic from the NASA GISS temperature map. See how the years of observation all vary. Very few are long enough to see the 1930s/1940s peak and the most recent one. Verity Jones in her analysis on Digging in the Clay "Cherries are not the only fruit" discussed

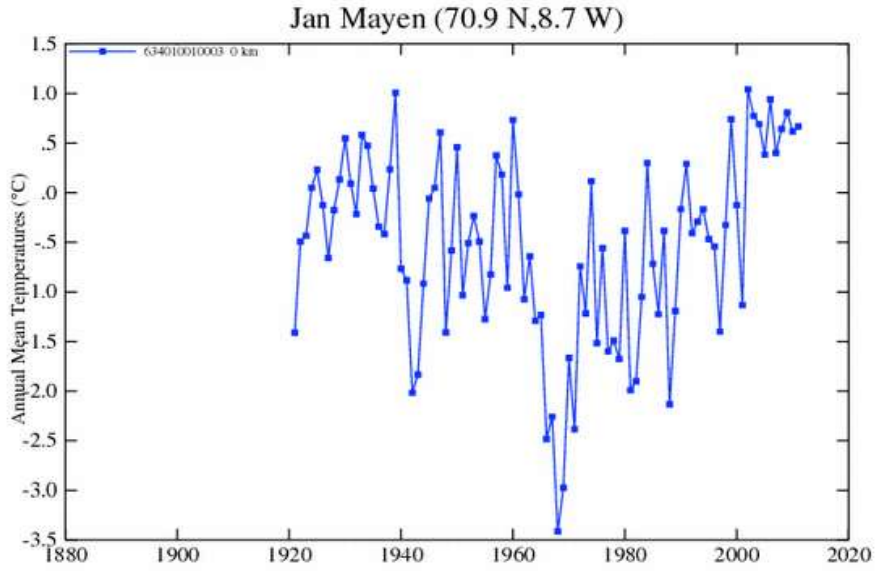
this dilemma. It is hard to find long term stations in arctic that cover both the 1930s and 1940 warm period and the recent one. He is one such GISS regional data set, periods of record are shown to the right.

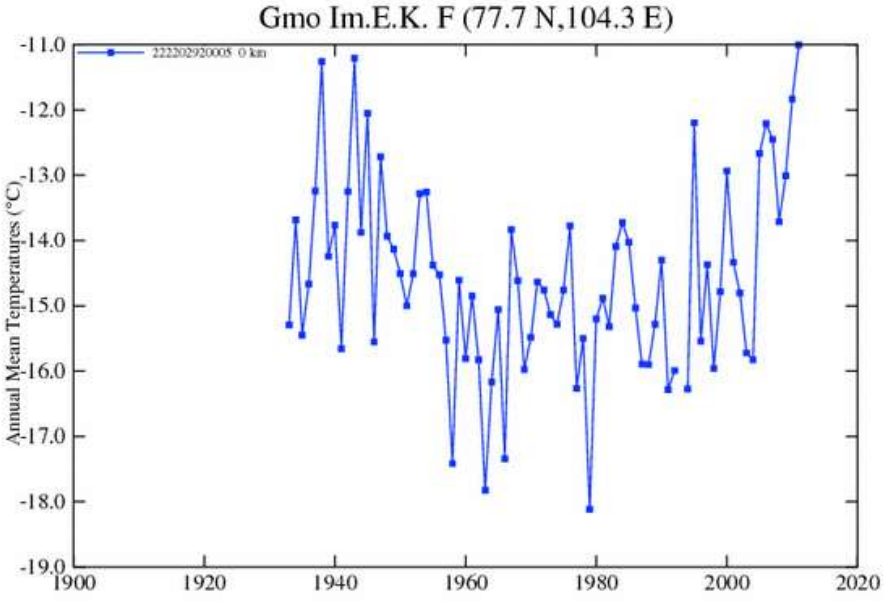
Distance	Station Name	Lat	Lon	ID	Pop.	Years
137 km (*)	Mould Bay, N.	76.2 N	119.3 W	403710720006	< 10,000	1948 - 1997
471 km (*)	Sachs Harbour	72.0 N	125.3 W	403710510000	< 10,000	1955 - 1990
491 km (*)	Isachsen,Nw	78.8 N	103.5 W	403719170010	< 10,000	1948 - 1978
515 km (*)	Holman,Nw	70.7 N	117.8 W	403719480030	< 10,000	1941 - 1969
603 km (*)	Resolute,N.W.	74.7 N	95.0 W	403719240005	< 10,000	1947 - 2004
642 km (*)	Cape Parry,N.	70.2 N	124.7 W	403719480000	< 10,000	1957 - 1989
660 km (*)	Clinton Point,Nw	69.6 N	120.8 W	403719480010	< 10,000	1957 - 1989
713 km (*)	Cape Young A,Nw	68.9 N	116.9 W	403719380010	< 10,000	1957 - 1989
737 km (*)	Nicholson Peninsula,Nw	69.9 N	129.0 W	403719480020	< 10,000	1957 - 1989
766 km (*)	Lady Franklin	68.5 N	113.2 W	403719370000	< 10,000	1957 - 1989
768 km (*)	Byron Bay A,Nw	68.8 N	109.1 W	403719250020	< 10,000	1957 - 1989
782 km (*)	Cambridge Bay	69.1 N	105.1 W	403719250005	< 10,000	1929 - 2011
836 km (*)	Coppermine,N.	67.8 N	115.1 W	403719380005	< 10,000	1930 - 2005
865 km (*)	Eureka,N.W.T.	80.0 N	85.9 W	403719170006	< 10,000	1947 - 2011
865 km (*)	Tuktoyaktuk,Nw	69.5 N	133.0 W	403719570040	< 10,000	1957 - 1989
884 km (*)	Jenny Lind Island A,Nw	68.7 N	101.7 W	403719250010	< 10,000	1957 - 1989
956 km (*)	Arctic Bay,Nw	73.0 N	85.2 W	403710950030	< 10,000	1937 - 1976
960 km (*)	Gladman Point A,Nw	68.7 N	97.8 W	403719110020	< 10,000	1957 - 1989
984 km (*)	Inuvik,N.W.T.	68.3 N	133.5 W	403719570006	< 10,000	1957 - 2011
1005 km (*)	Shingle Point	69.0 N	137.2 W	403719680000	< 10,000	1957 - 1989

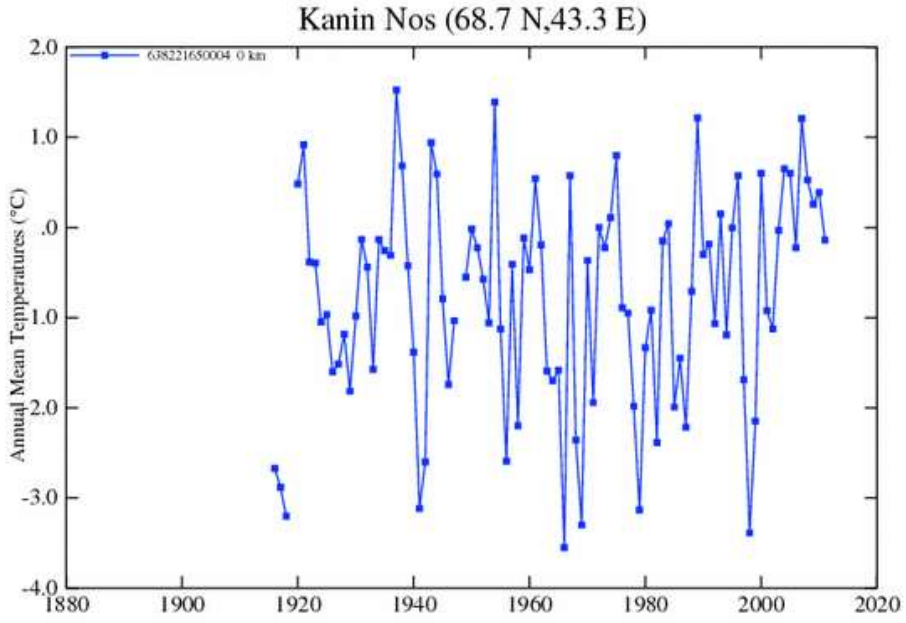
1022 km (*)	Komakuk Beach A,Yt	69.6 N	140.2 W	403719680020	< 10,000	1958 - 1989
1023 km (*)	Aklavik A,Nw	68.2 N	135.0 W	403719570030	< 10,000	1926 - 1989
1032 km (*)	Port Radium,Nw	66.1 N	118.0 W	403710600010	< 10,000	1937 - 1974
1045 km (*)	Shepherd Bay,	68.8 N	93.4 W	403719110000	< 10,000	1957 - 1989
1067 km (*)	Barter Island	70.1 N	143.6 W	425700860000	< 10,000	1947 - 1990
1097 km (*)	Fort Mcpherson,Nw	67.4 N	134.9 W	403719570020	< 10,000	1892 - 1977
1101 km (*)	Fort Good Hope Canada	66.3 N	128.6 W	403710430020	< 10,000	1898 - 1989
1114 km (*)	Contwoyto Lake,Nw	65.5 N	110.4 W	403714960010	< 10,000	1959 - 1981
1171 km (*)	Pelly Bay,Nw	68.4 N	89.7 W	403719110010	< 10,000	1958 - 1989
1177 km (*)	Pond Inlet,Nw	72.7 N	78.0 W	403710950010	< 10,000	1922 - 1960
1186 km (*)	Norman Wells,	65.3 N	126.8 W	403710430005	< 10,000	1943 - 2011
1192 km (*)	Old Crow A,Yt	67.6 N	139.8 W	403719680010	< 10,000	1951 - 1989

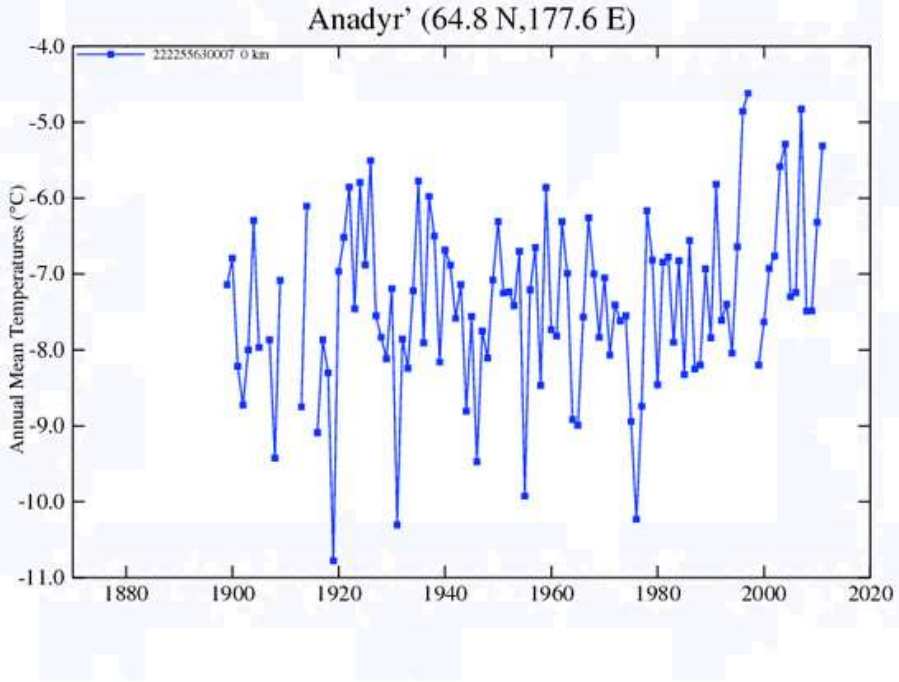
But I did find some longer term stations in the arctic among the various regions. Here are a few.

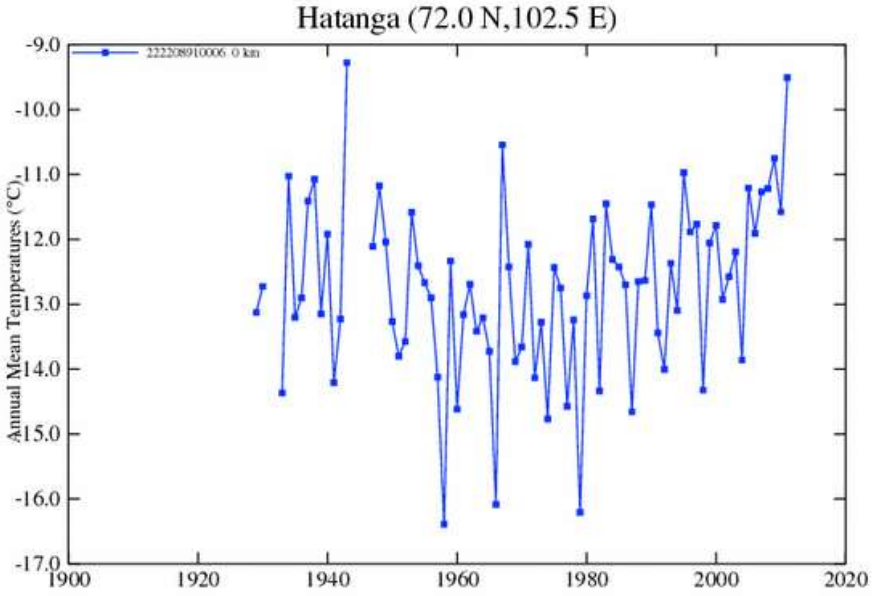
Jan Mayen Island in the arctic is further north and clear from continental influences. Here is the plot followed by some other stations scattered around the arctic.

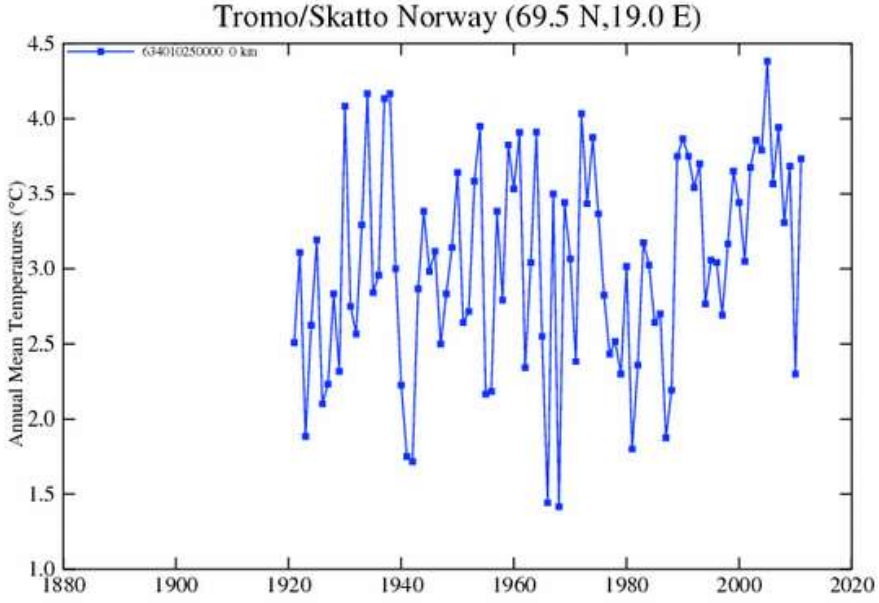

Jan Mayen (70.9 N,8.7 W)
63401001000 0 km
Annual Mean Temperatures (°C)
1.5
1.0
.5
.0
-.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
1880
1900
1920
1940
1960
1980
2000
2020

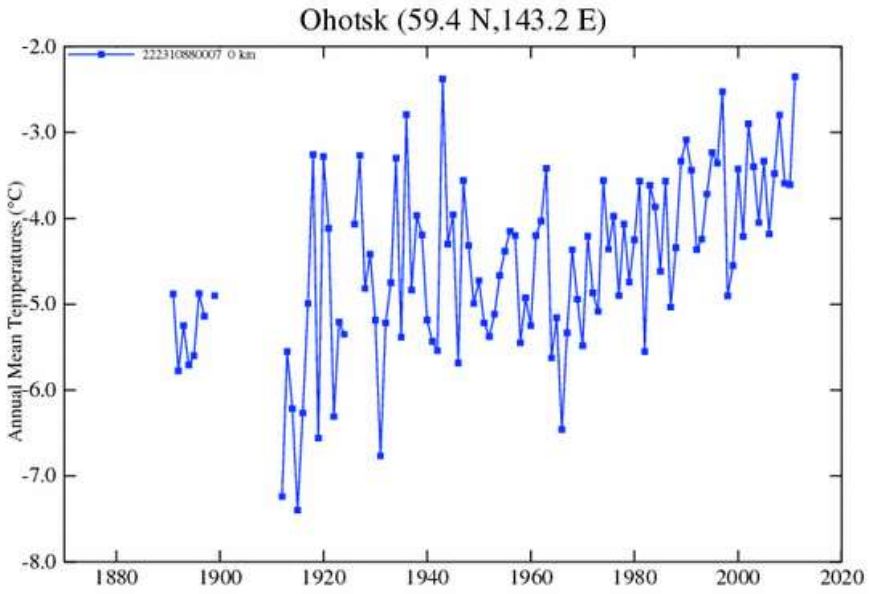

Gmo Im.E.K. F (77.7 N,104.3 E)
22220292000S 0 km
Annual Mean Temperatures (°C)
-11.0
-12.0
-13.0
-14.0
-15.0
-16.0
-17.0
-18.0
-19.0
1900
1920
1940
1960
1980
2000
2020

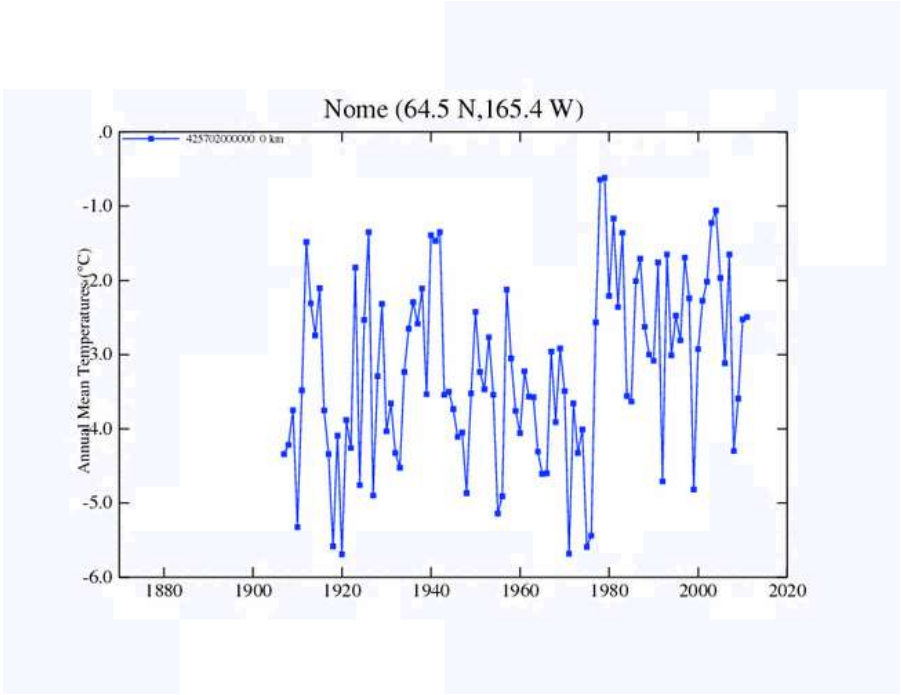

Kanin Nos (68.7 N,43.3 E)
638221650004 0 km
Annual Mean Temperatures (°C)
2.0
1.0
.0
1.0
2.0
-3.0
-4.0
1880
1900
1920
1940
1960
1980
2000
2020


Anadyr' (64.8 N,177.6 E)
222255630007 0 km
Annual Mean Temperatures (°C)
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
-11.0
1880
1900
1920
1940
1960
1980
2000
2020

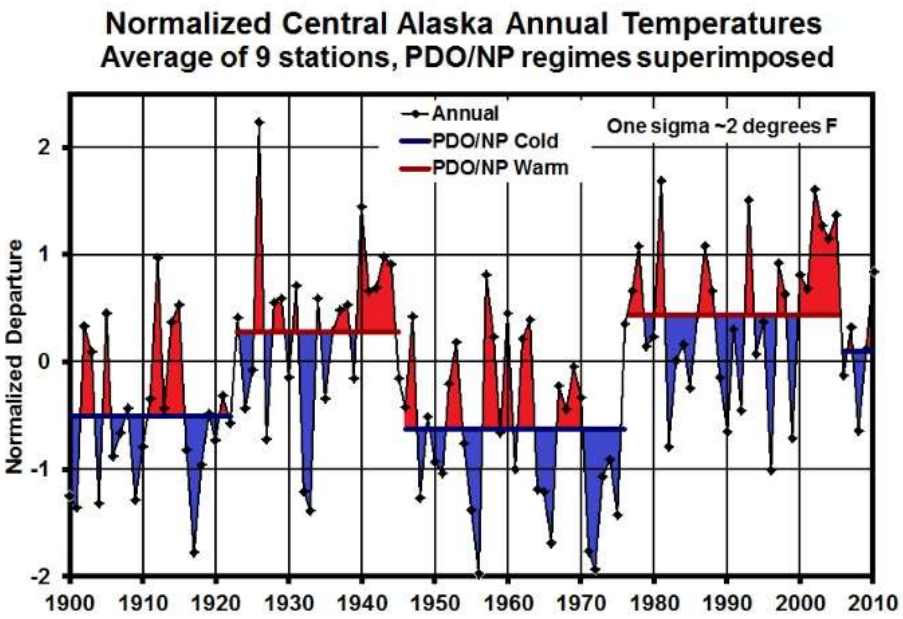

Hatanga (72.0 N,102.5 E)
222208910006 0 km
Annual Mean Temperatures (°C)
-9.0
-10.0
-11.0
-12.0
-13.0
-14.0
-15.0
-16.0
-17.0
1900
1920
1940
1960
1980
2000
2020

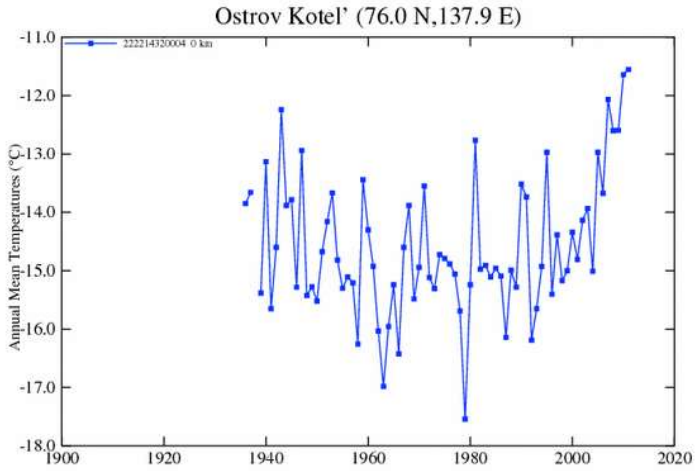

Tromo/Skatto Norway (69.5 N,19.0 E)
634010250000 0 km
Annual Mean Temperatures (°C)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
1880
1900
1920
1940
1960
1980
2000
2020



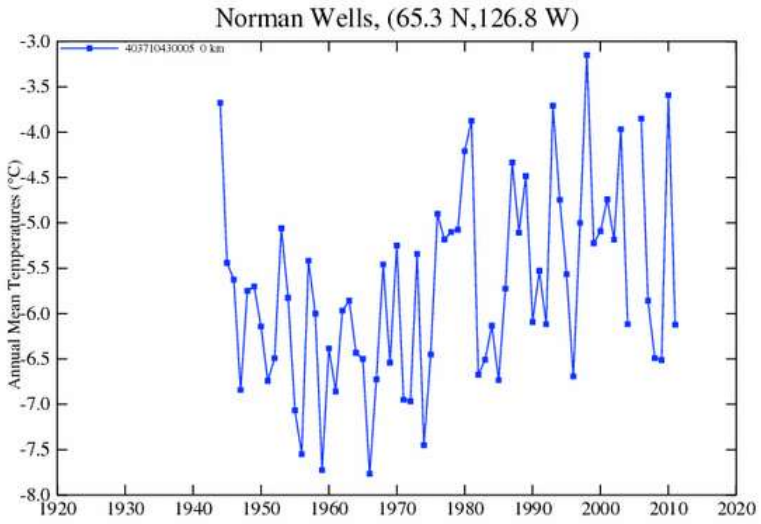


Nome's population quadrupled since the 1920s. Also like we saw for other Alaska there was a step change with the PDO flip to warm in the late 1970s. Recall this step behavior had been shown by Keen here back to 1900.

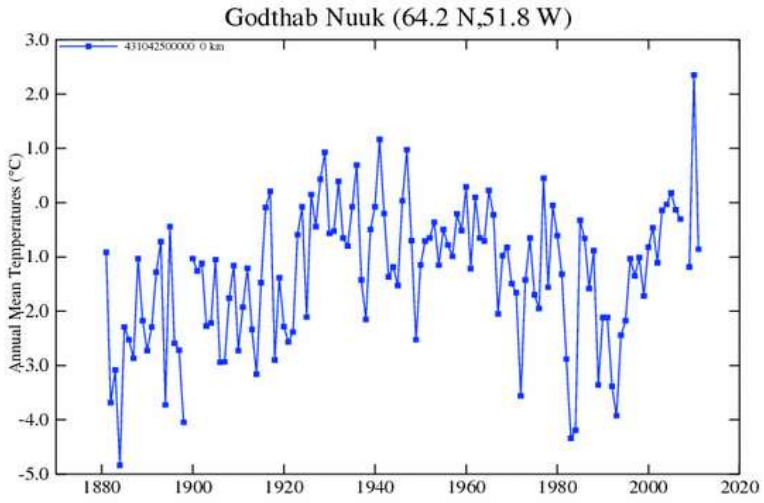




The record at Norman Wells starts **after** the warm 1930s and 1940 warm spike though it does catch one of those years.

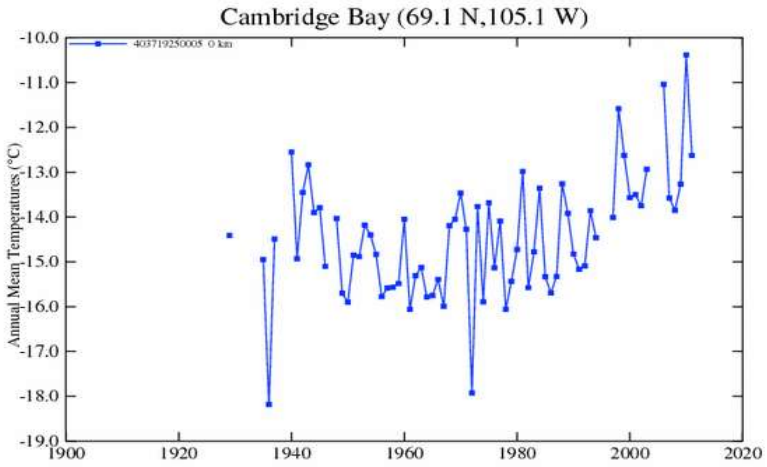


Outlier years are shown in the record and often relate to strong AO or NAO events of both signs (strong polar vortex or blocking).



Godthab Nuuk in Greenland showed the one year spike with the record blocking in 2010. Otherwise the 1930s and 1940s were warmer.

One that has scattered data back to 1920s Cambridge Bay that seems to show what Tamino claims. But look at all the missing data in the early record. The link shows that the summer of 1930 was the warmest summer in the entire record, but the missing data in other months made it impossible to compute an annual number.



So I am not accused of cherry picking regionally, here is a map with the stations plotted. By the way, Hansen interpolates from fringe stations to fill in the huge data void in the central Arctic. Hadley makes the right decision to stick to regions with data. UAH doesn't see the high Polar Regions.

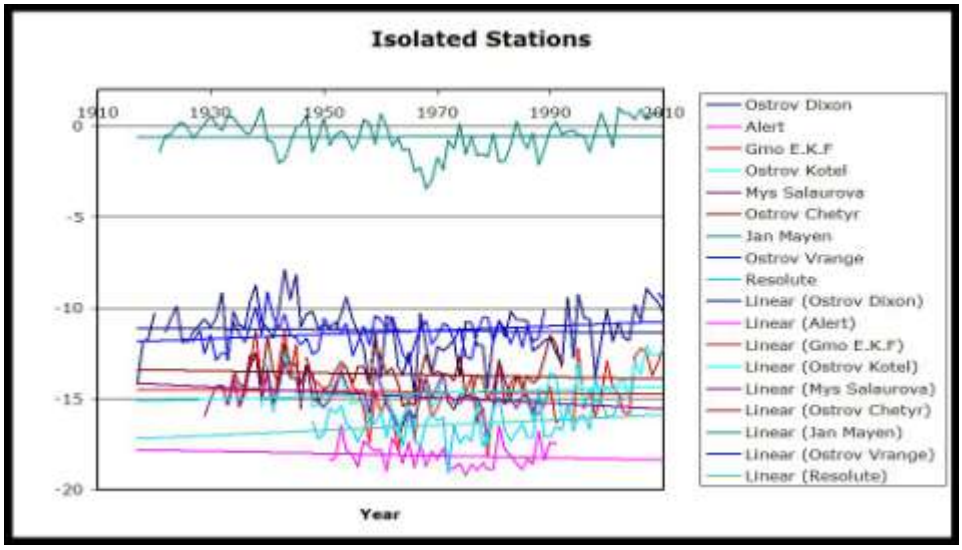
Ed Caryl in No Tricks Zone. Did an excellent overview and compilatiion of arctic data. **He looked at the** isolated stations to avoid UHI which can be significant for even small settlements (Hinkel et al 2003).

He notes: One important thing to note about these isolated stations... Detailed descriptions of these stations are listed in the annex at the end of his report.

16. Alert,N.W.T.(82.5 N,62.3 W), Canada
17. Resolute,N.W. (74.7 N,95.0 W), Canada
18. Jan Mayen (70.9 N,8.7 W), Norway
19. Gmo Im.E. K. F (77.7 N, 104.3 E), Tamyr Peninsula, Russia
20. Ostrov Dikson (73.5 N,80.4 E, Russia
21. Ostrov Kotel' (76.0 N,137.9 E), Russia

22. Mys Salaurova (73.2 N,143.2 E), Russia
23. Ostrov Chetyr (70.6 N,162.5 E), Russia
24. Ostrov Vrange (71.0 N,178.5 W) , Russia

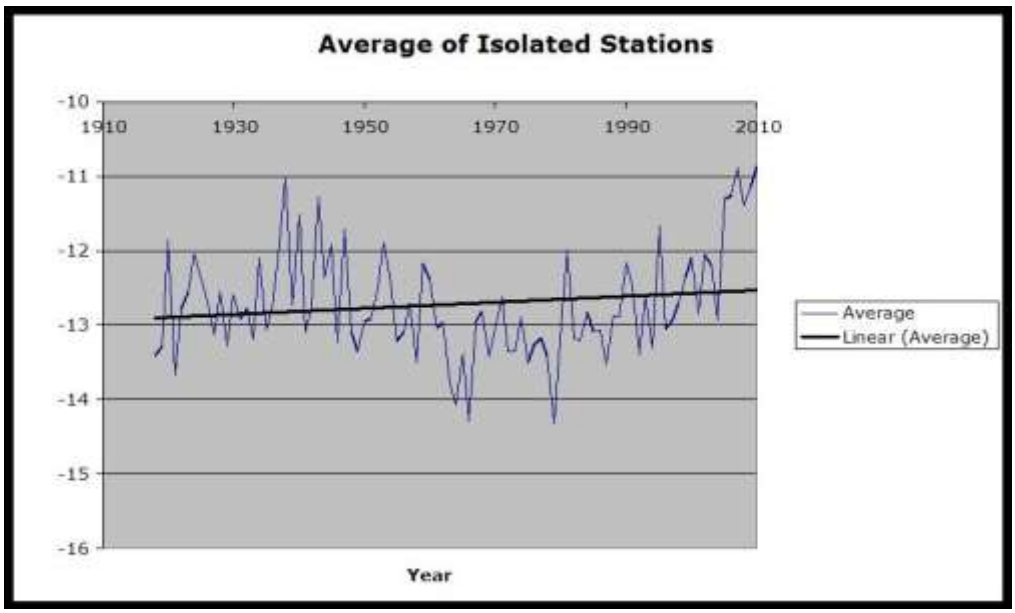
Now here is the **chart of the temperatures of these isolated stations,** not subjected to manmade structures or heat sources.



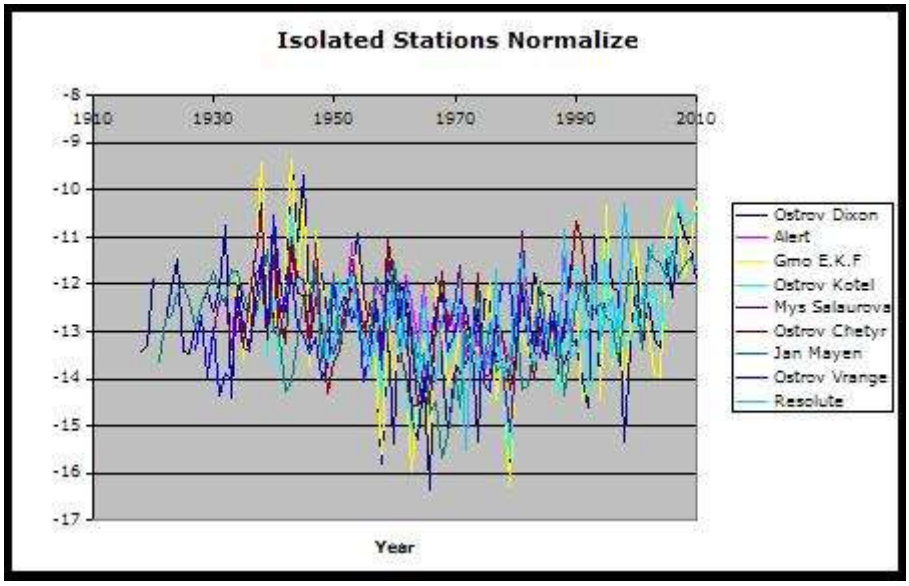
Isolated Stations:

Note that most of the trends are flat or decreasing. Only Resolute and Ostrov Vrange are increasing slightly. Both of those might be slightly influenced by UHI. The longest records clearly show warming in the late 1930's and 40's, and cooling in the 1960's, and none show a hockey stick. The GISS data for Alert ends in 1991, though the weather station is still there, and still reporting. Data for Mys Salaurova and Ostrov Chetyr also ends at about that time, probably due to the fall of the Soviet Union.

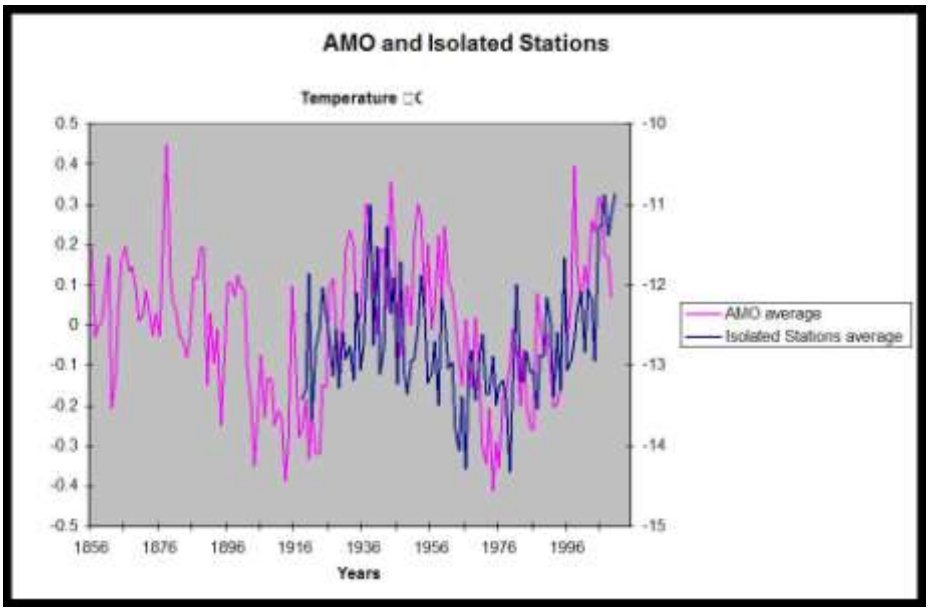
Here is an average of all the isolated stations:



Note that the peak-to-peak trend is nearly zero. The linear trend is about 0.4°C/century, but the R^2 value (the statistical significance for the trend) is very low, 0.023.



Here is a plot of the AMO versus the average temperature of the isolated stations.



The temperature as measured at stations isolated from any UHI is simply tracking the AMO.

Looks like an awfully good fit. There is very little, if any, global warming. We need to wait until the bottom of the next AMO cycle to get a decent reading of global temperature change. That will be in about 2050 if the AMO cycles as it has since 1850.

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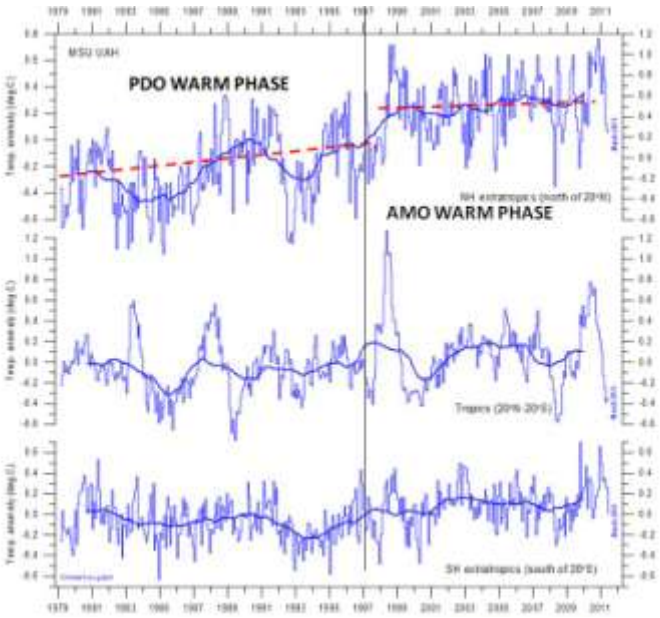
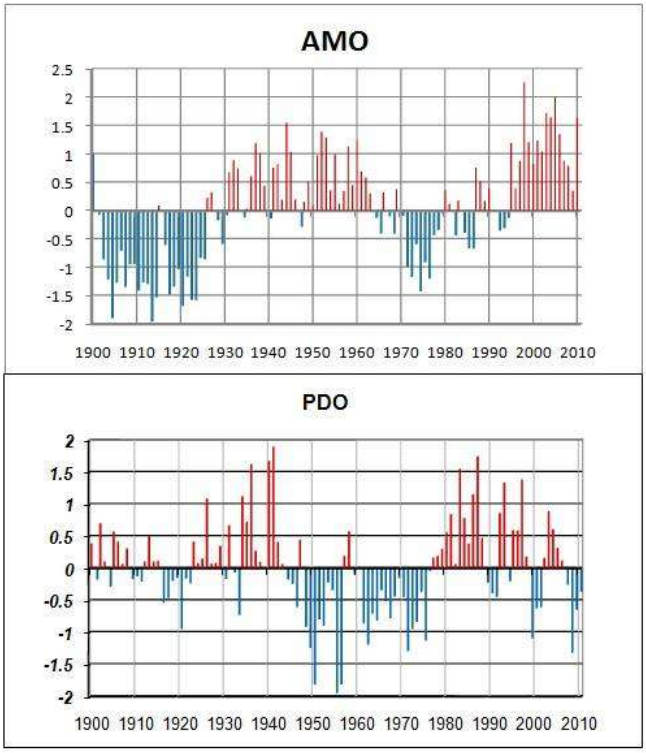
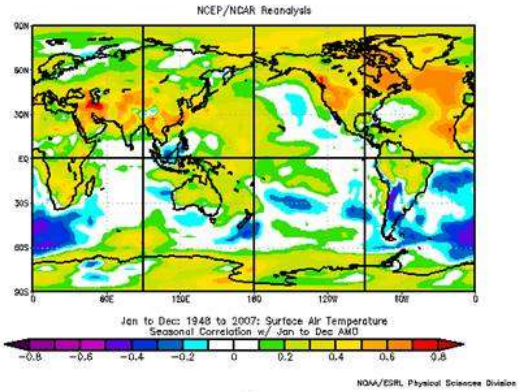
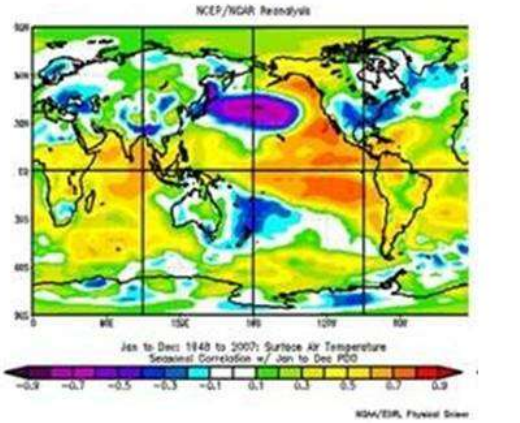
In the UAH data set you see the effects of more El Ninos in the PDO warm phase to 1998 and then the warming of the AMO.



You can see the correlation (NOAA CDC Reanalysis) between the positive PDO and AMO phases. Note how both warm phases favor arctic warmth.



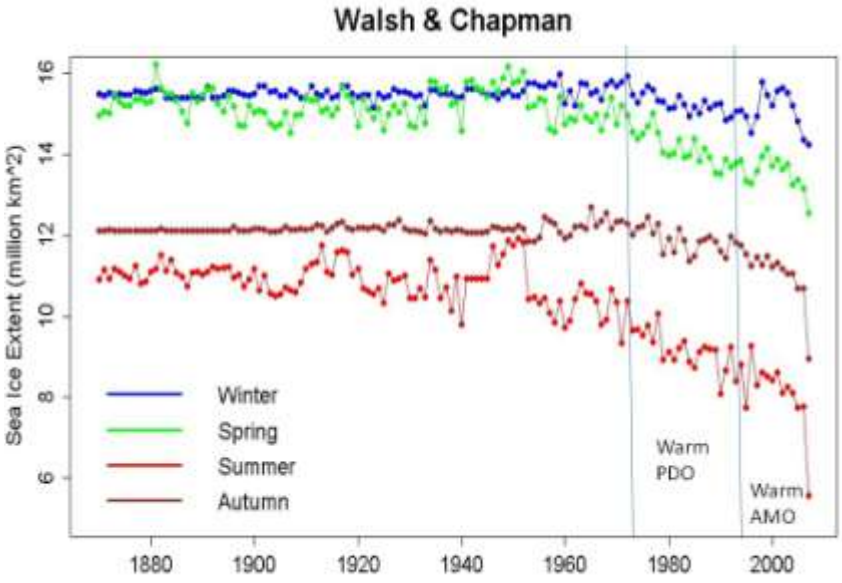


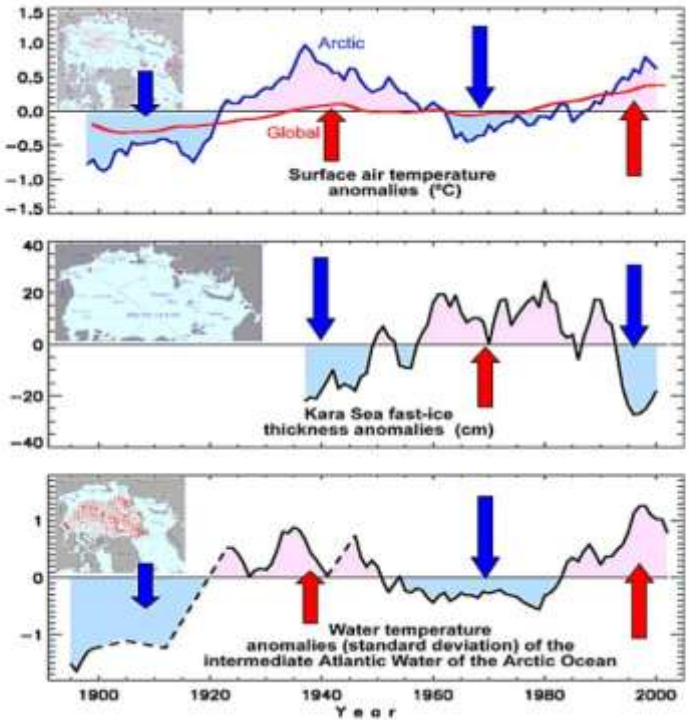


Again we are not saying the arctic has not warmed but that this warming has occurred before and the changes correlate well with changes in the ocean. In fact Russian fisherman and oceanographers reported in the mid 1800 warm period, they were catching cod fish off the Siberian arctic coast.

See evidence of the mid 20th century warming in the media archives compiled by Steve Goddard here.

As for the inverted Hockey Stick of Walsh and Chapman, although I applaud the attempt, I question the flatlining before the 1950s given the anecdotal reports Steve has shown and the data compiled by IARC for the Kara Sea.





IARC

The arctic problem is just the tip of the iceberg (no pun intended) The data for the whole world is compiled from many short interval observations or observations for sites that changed location/instrumentation or had land use changes (like shifts to airport locations) that causes discontinuities or at least creates uncertainty.

Trying to patch it together for single sites when data is missing is often ignored.

It is a little like trying to pick a winner in a ballgame when you only have partial inning data

Inning	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***Final***
Team A	1	0			3	1				
Team B	0	2		1	1		1			

How do you determine the winner? Do you interpolate between innings? Do you look at other teams in the division and average their scores for the missing innings? This is the MLB equivalent of met world homogenization.

The global data is a mess. The idea we can determine temperatures never mind long term trends to a tenth of a degree is ludicrous. The only reliable data set is the satellite UAH and RSS data but it doesn't go back before 1979. The USHCN V1 was the best data set but Anthony and his volunteers have shown siting issues and they removed UHI adjustment in V2. It is still probably better than most global land regions and the oceans.

You should spend some time wandering through the world on the GISS data site (uses GHCN v2) looking at the different regions and the data available. See the widely varying periods of record. The after picking a site to see graph, go to bottom left and click on show as text and see how many missing months there are (-999.9).