

Response to Tamino on arctic temperatures.

In my post in ICECAP that Anthony extracted from, we presented a case for cyclical, natural arctic changes. Here are some of the key points made:

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](#).

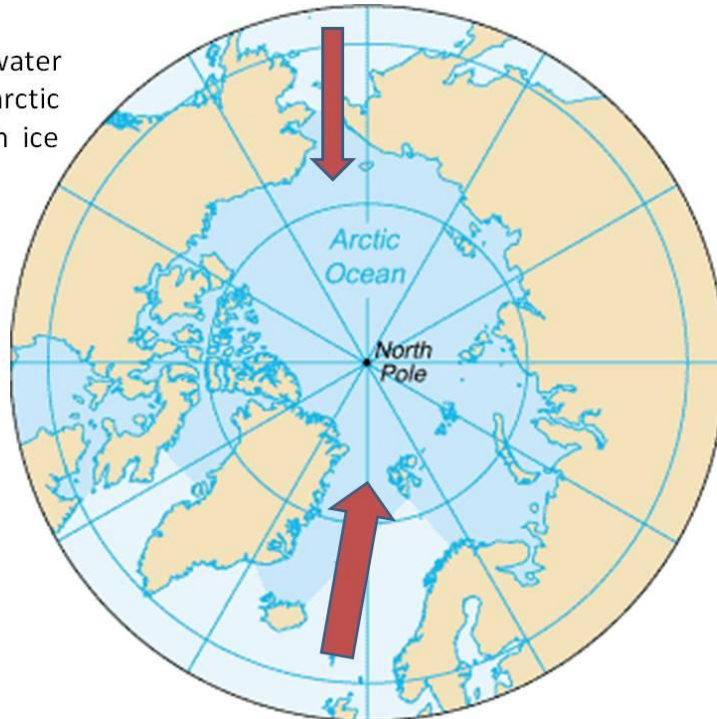
We agree. And indeed both oceans play a role. In the record-setting (since satellite monitoring began in 1979) summer melt season of 2007, NSIDC itself before funding opportunist Mark Serreze took over editorial control, noted the importance of both oceans in the arctic ice.

"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."

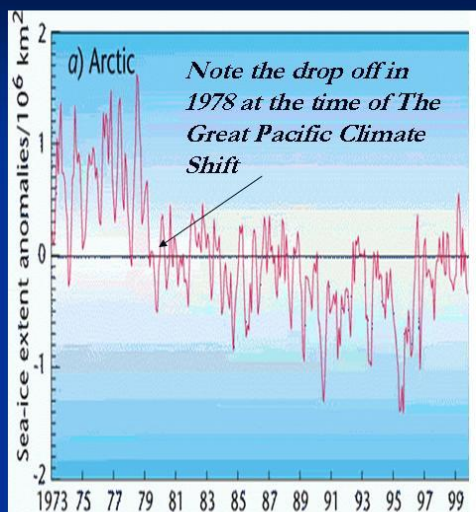
Kevin Trenberth reported in a 1994 paper that during El Ninos, warm water can enter the arctic through the Bering Straits and enhance melting.

Warm water enters arctic beneath 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

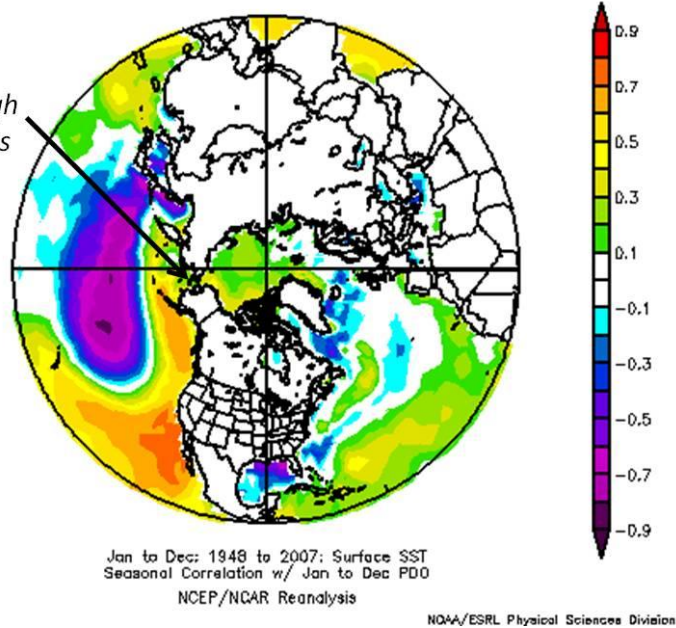


USGRCP, June 2000

- 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.

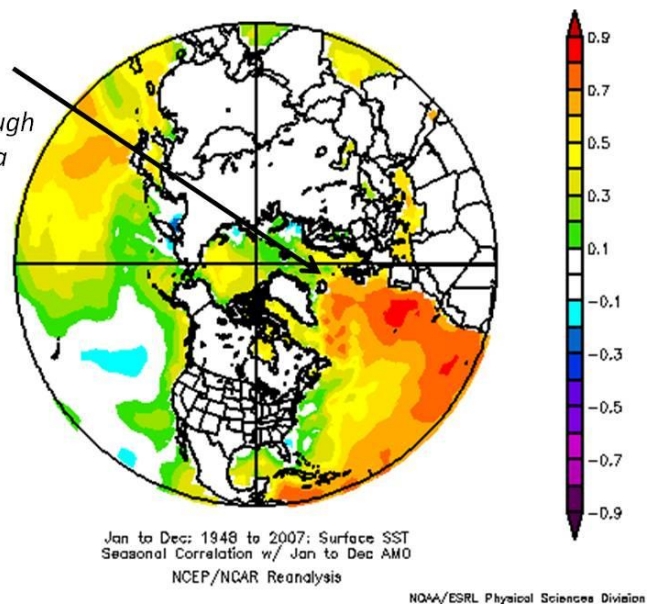
A correlation of SSTs with the annual PDO state shows a positive correlation of SSTs off Alaska. In the positive warm PDO as we saw from 1977 to 1998, this meant warm water that could leak into the arctic.

Positive PDO leads to warm water intrusions into the arctic through the Bering Straits

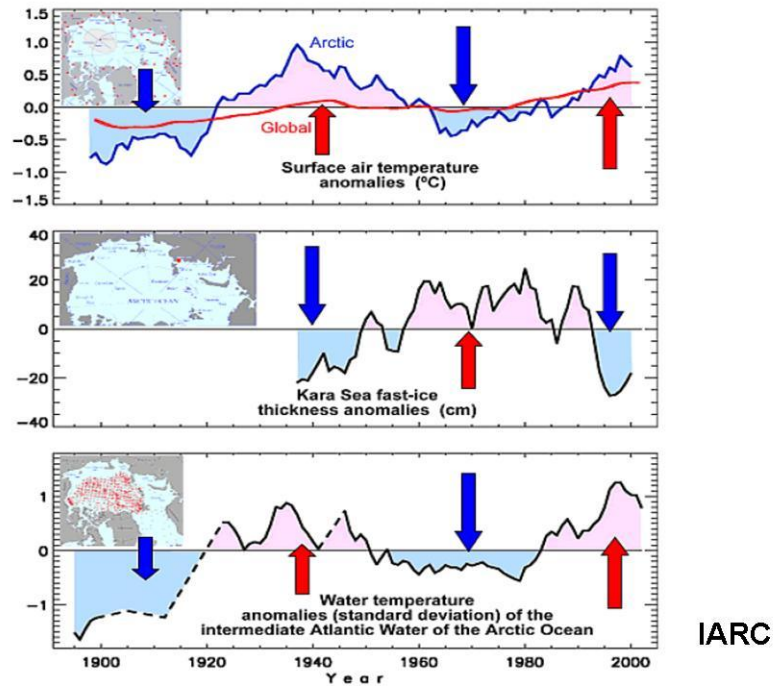


Frances et al. (GRL 2007) showed how the warming in the arctic and the melting ice was related to warm water (+3C) in the Barents Sea moving slowly into the Siberian arctic and melting the ice. She also noted the positive feedback of changed "albedo" due to open water then further enhances the warming.

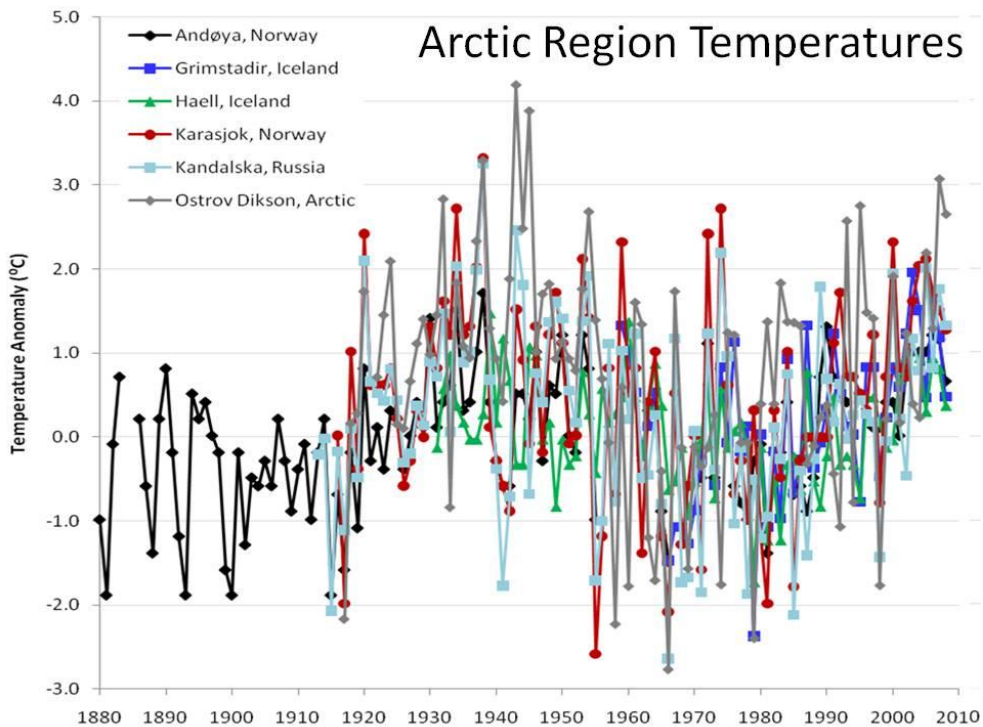
Positive AMO leads to warm water intrusions into the arctic through the Barents Sea



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.



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

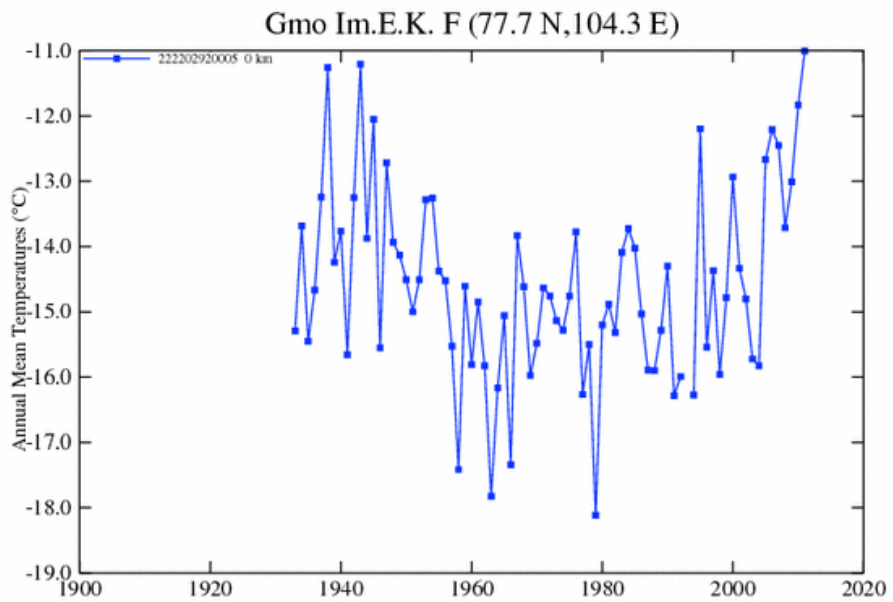
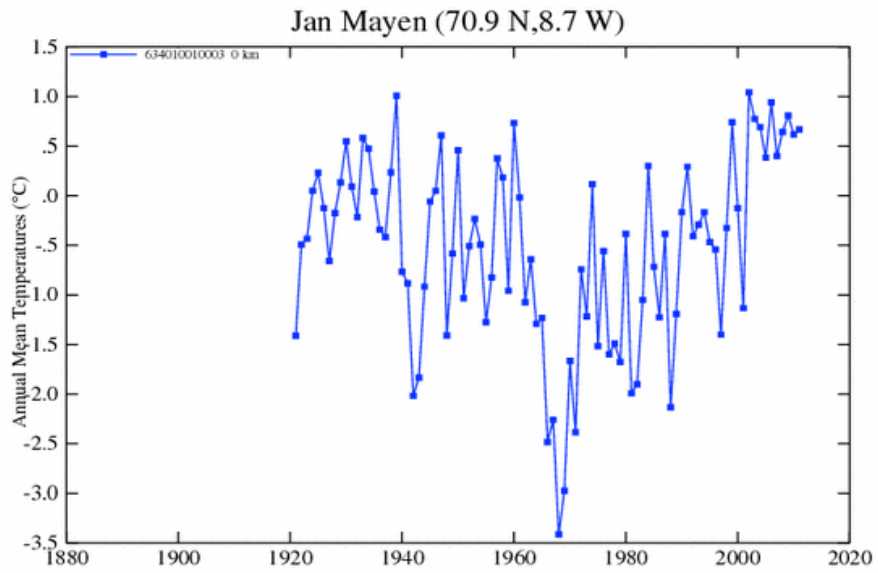
See this listing of stations for the western Arctic from the [NASA GISS temperature map](#). See how the years of observation all vary. Very few are long enough to see the 1930s/1940s peak and the most recent one, It is hard to find long term stations in arctic that don't have a lot of missing data that calls into question the assessment for that year. He is one such set.

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

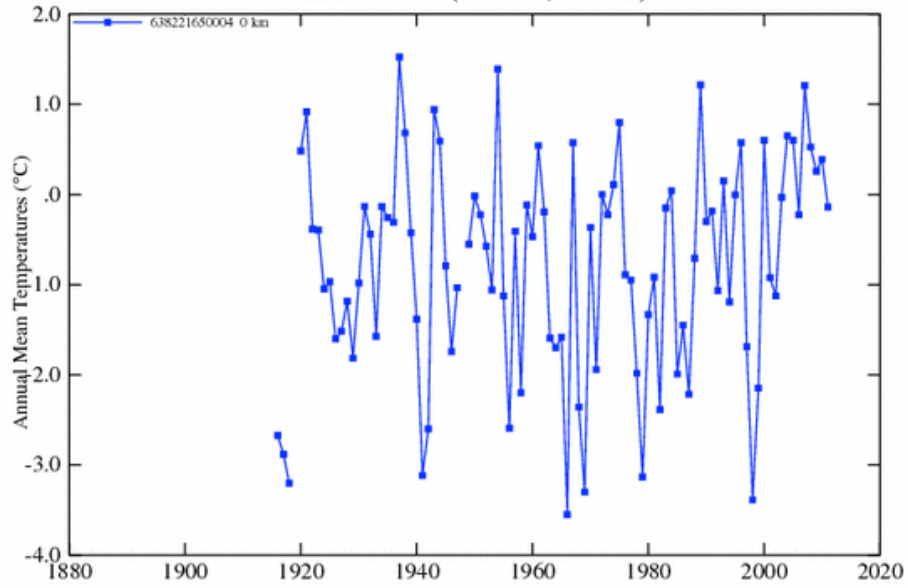
984 km (*)	Inuvik,N.W.T.	68.3 N 133.5 W	403719570006	< 10,000	1957 - 2011
1005 km (*)	Shingle Point	69.0 N 137.2 W	403719680000	< 10,000	1957 - 1989
1022 km (*)	Komakuk Beach A,Yt	69.6 N 140.2 W	403719680020	< 10,000	1958 - 1989
1023 km (*)	Aklavik A,Nw	68.2 N 135.0 W	403719570030	< 10,000	1926 - 1989
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 regions.

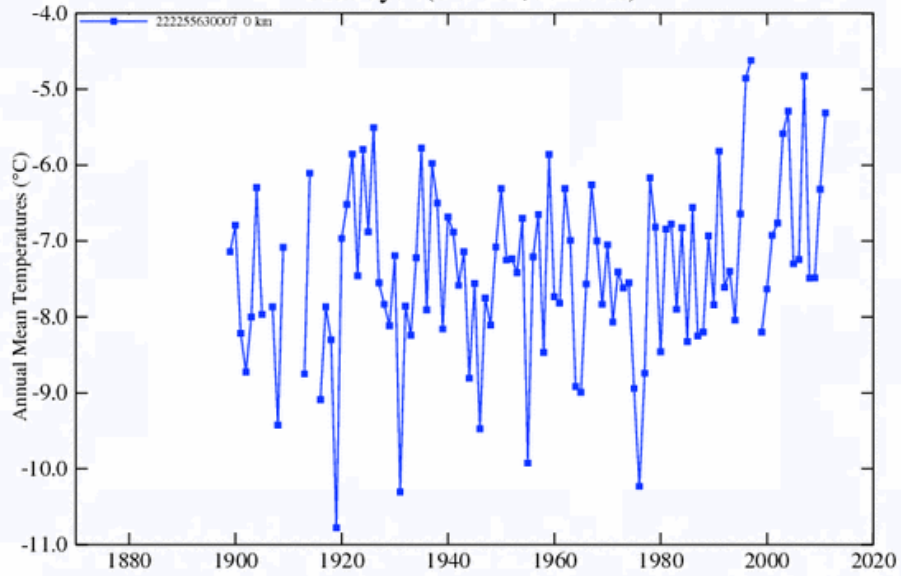
Jan Mayen Island in the arctic is further north and clear from continental influences. Here is the plot followed by some other stations scattered around the arctic.

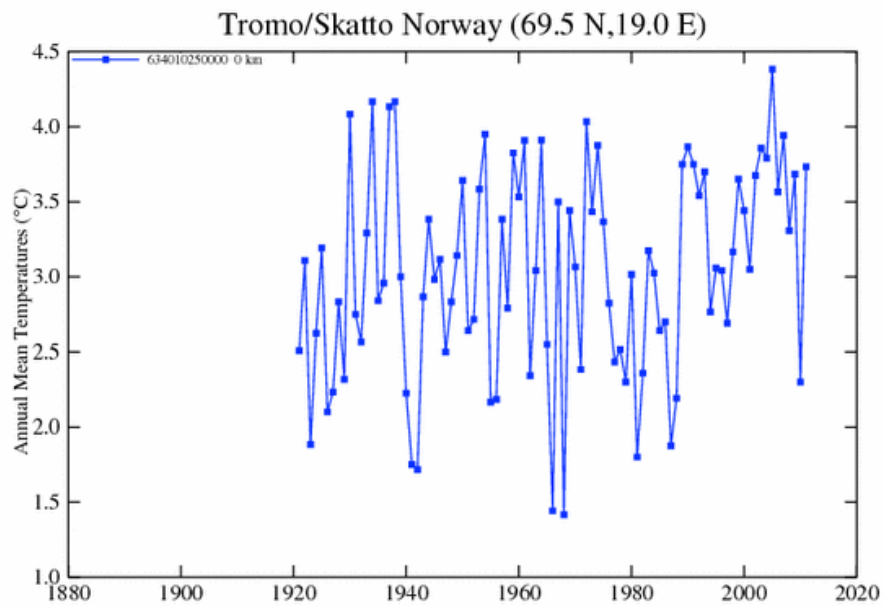
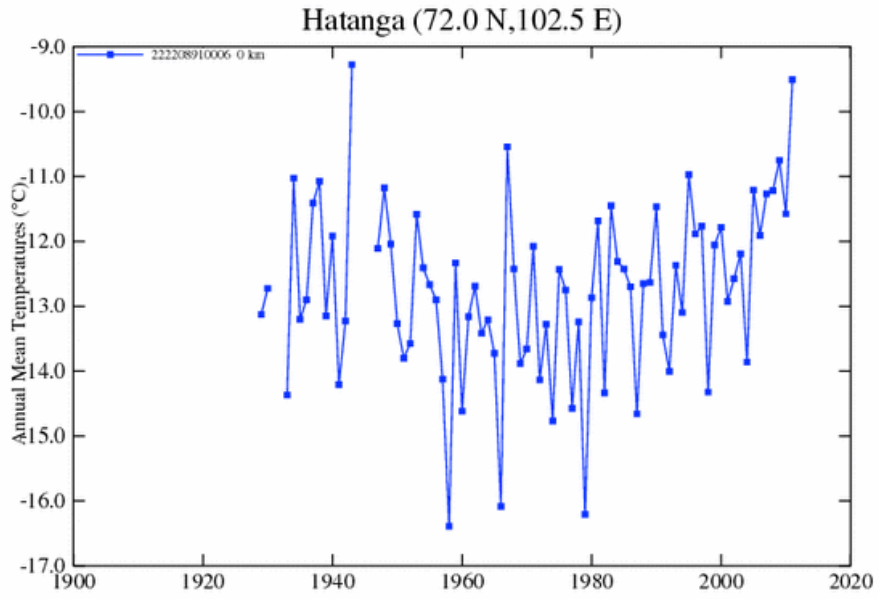


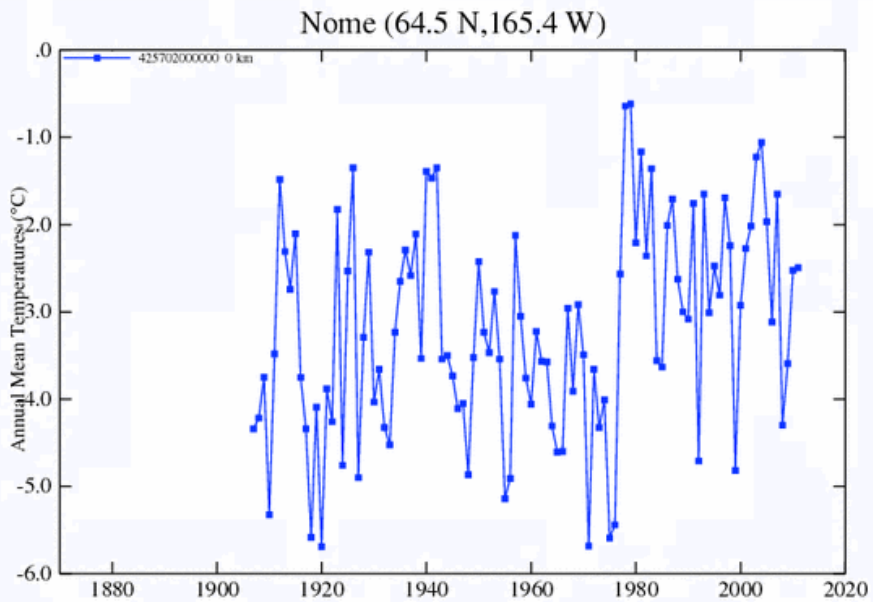
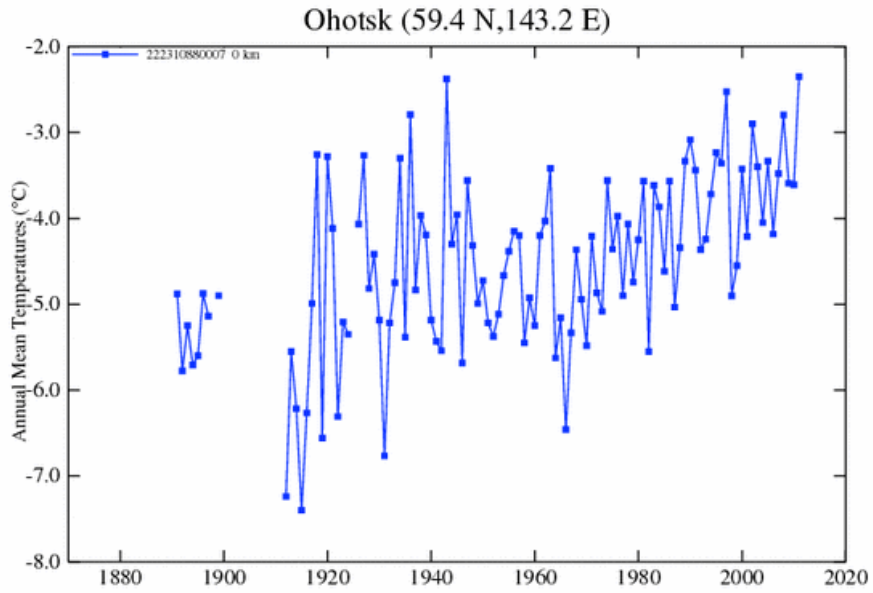
Kanin Nos (68.7 N,43.3 E)



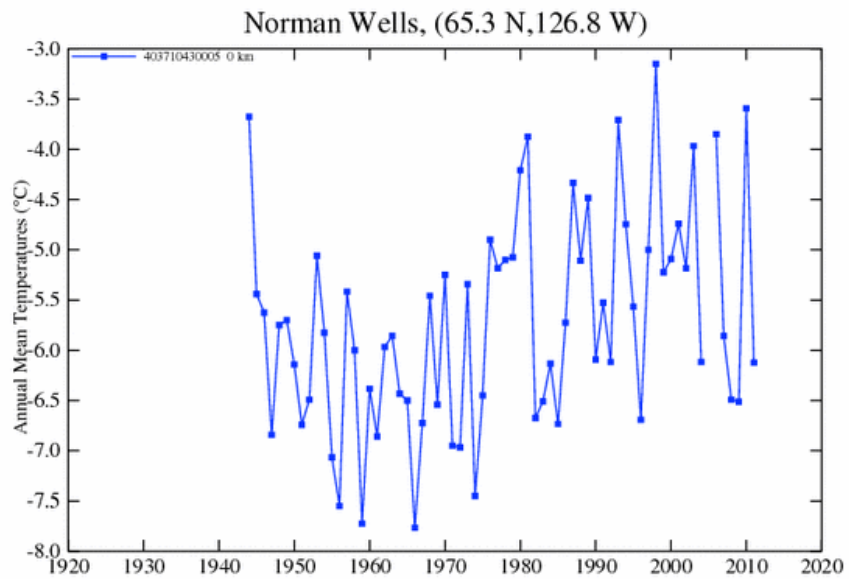
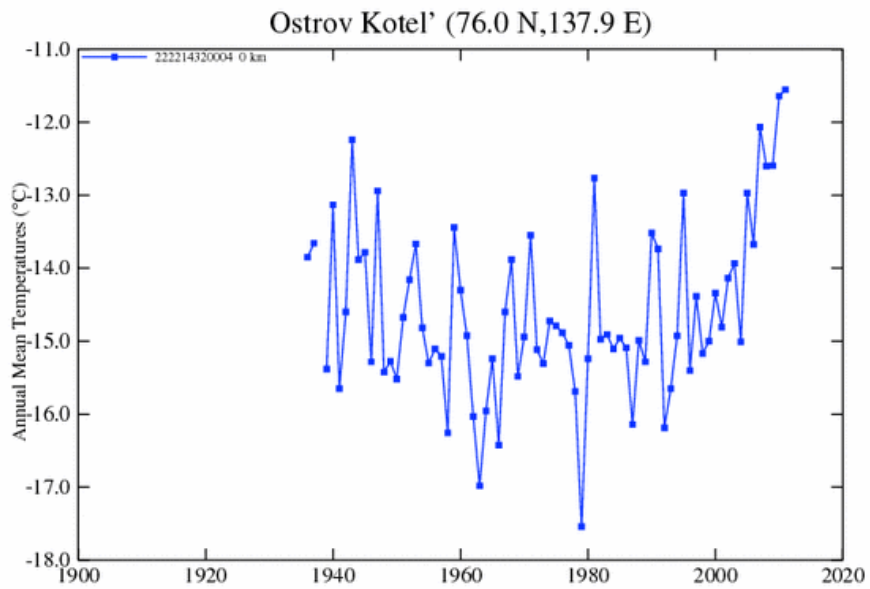
Anadyr' (64.8 N,177.6 E)



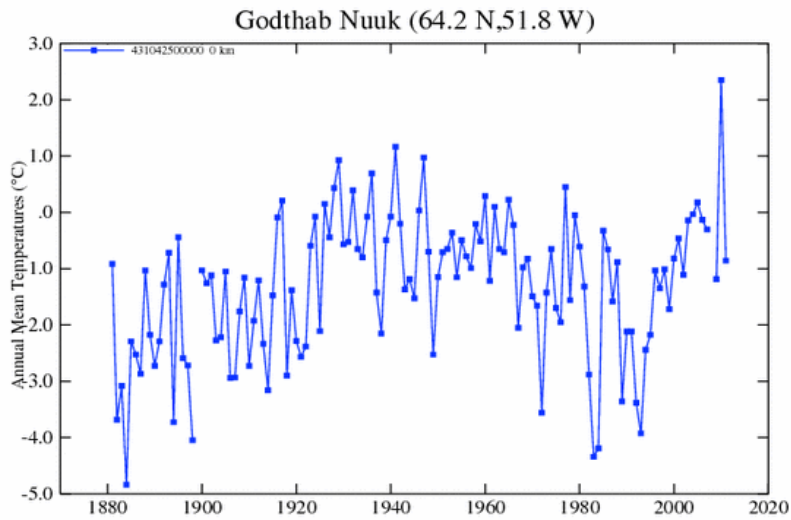




Nome's population quadrupled since the 1920s.

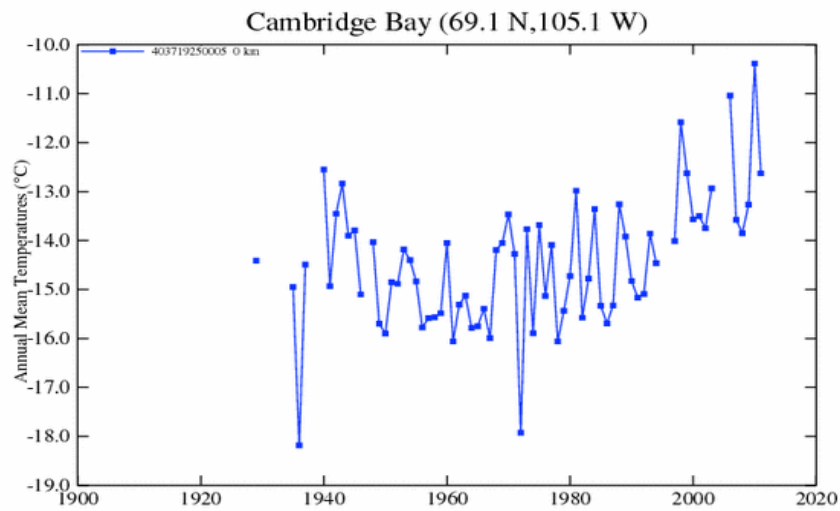


Both these stations above start after the warm 1930s though Norman Wells does catch one of those years.



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](#)) which shows that the summer of 1930 was the warmest summer in the 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.



Again we are not saying the arctic has not warmed but that this warming has occurred before. 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 [here](#).

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

<i>Inning</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>Final</i>
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).

By the way, what Verity and I did was not cherry picking. Cherry picking is what Mote etal did in BAMS starting their trends for western North America snowpack in 1950 which led to public policy changes in the northwest or NCAR starting their assessment of heat waves in 1950 claiming records were not complete before then (ignoring the warm 1930s where most of the state and city records still hold).