

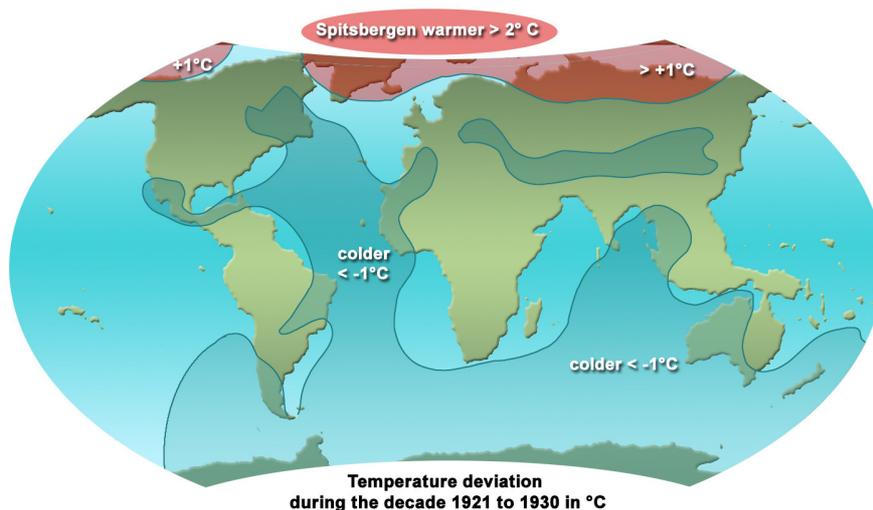
Chapter 1

Reviewing the past to understand the future - An Introduction

A. Arctic Warming – What Warming?

The claim that the summer of 2007 was apocalyptic for Arctic sea ice has recently gone around the globe, because the coverage and thickness of the sea ice in the Arctic has been declining steadily over the past few decades¹. For many scientists this situation appears to be related to global warming (Brönnimann, 2008). In 2003 a USA research center formulated it this way already: “Recent warming of Arctic may affect worldwide climate”² Not everyone agreed but quarrel: What Arctic Warming?³

Although there is hardly a convincing reason to neglect the recent warming in the Arctic and the extent of ice melt during the summer season, it is not necessarily clear yet, whether the current discussion is based on a sound and comprehensive assessment. Climate research should not only deal with Arctic warming based on observations made during the last few decades, but at least be extremely interested in other climatic events that occurred in modern times, especially if somehow in connection with the situation in the Arctic. Why?



Data source: R. Scherhag (1936) by approximation.
2009/www.arctic-warming.com

¹ Realclimate (web log); david: “Arctic sea ice: is it tipped yet”, the 13th of December 2007. <http://www.realclimate.org/index.php>

² NASA; 23 Oct. 2003; <http://www.nasa.gov/centers/goddard/news/topstory/2003/1023esuiice.html>

³ Milloy, Steve, 13 Oct. 2005; <http://www.foxnews.com/story/0,2933,172188,00.html>

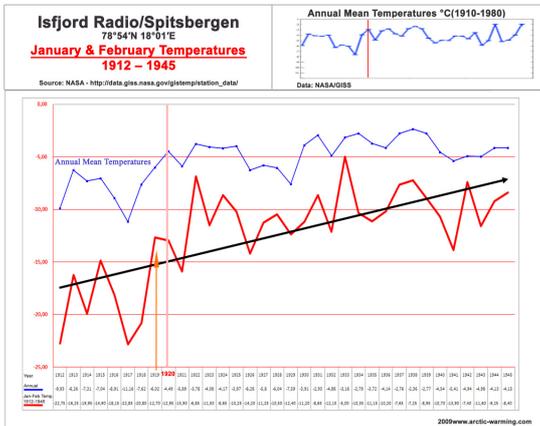


Graversen et al., 2008, on: Vertical structure of recent Arctic warming

Rune G. Graversen, T.Mauritsen, M.Tjernström, E.Källén, G.Svensson; Nature, 3 January 2008, 451, p. 53-56

How much contributes this study on the “structure of recent Arctic warming” to understand the ‘climatic revolution’ (Ahlman, 1946) during the first half of last Century? Rune G. Graversen et al.’s article in the first 2008 issue of NATURE¹ got immediate attention world wide. The authors conclude: “We regress the Arctic temperature field on the atmospheric energy transport into the Arctic and find that, in the summer half-year, a significant

proportion of the vertical structure of warming can be explained by changes in this variable. We conclude that changes in atmospheric heat transport may be an important cause of the recent Arctic temperature amplification.” Some understood this immediately as confirmation that nature is pushing the Arctic to the edge, too. The study confirms according Seth Borenstein (AP²) that “There’s is a natural cause that may account for much of the warming”. ‘Climate Feedback’³ disagreed: Graversen conclusion only means: “Changes in the circulation in the atmosphere might have had a much larger effect than previously thought, but these changes may also have been induced by greenhouse gases”. Does the explanation explain anything? Already back in the year 1938 C.E.P. Brooks asked: to account for the change in circulation.



“Water is the driver of nature”, Leonardo da Vinci (1452-1519)

Theses from Stockholm University, 2008, R. G. Graversen: „On the recent Arctic Warming”

Extract from: <http://www.arctic-warming.com>, 22 April 2008

Rune Grand Graversen’ Doctor Thesis assumes⁴ that: „A major topic is the linkage between the midlatitude circulation and the Arctic warming. It is suggested that the atmospheric meridional energy transport is an efficient indicator of this linkage“. When Graversen concludes that the snow and ice-albedo feedbacks are a contributing but not dominating mechanism behind the Arctic amplification, and that a coupled climatemodel experiment with a doubling of the atmospheric CO₂ concentration reveals a considerable Arctic surface-airtemperature amplification in a world without surface-albedo feedback, one is left to wonder, why such a thesis ignores completely the extreme winter warming from 1918 to 1922 which lasted until 1940. In this scenario CO₂ is presumably the weakest mean to influence surface temperatures, and climate modeling is hardly a helpful tool, as long as not more distinctions between the sunless winter season and summer time is made.



¹ Rune G. Graversen, T.Mauritsen, M.Tjernström, E.Källén, G.Svensson; Nature, 3 January 2008, 451, p. 53-56

² Pioneer Press, 02.Jan. 2008; Nature giving global warming a nudge in Arctic, scientist says

³ http://blogs.nature.com/climatefeedback/2008/01/arctic_amplification_1.html#more

⁴ Theses from Stockholm University: <http://www.divaportal.org/su/theses/abstract.xsql?dbid=7473>.

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On the 2nd of November 1922, The Washington Post published the following story: Arctic Ocean Getting Warm; Seals Vanish and Icebergs Melt”. The corresponding report in the Monthly Weather Review of November 1922 had also stated that the ice conditions in the Northern North Atlantic were exceptional; in fact, so little ice has never before been noted⁴. Only 16 year later the meteorologist C.E.P. Brooks thought it necessary to explain the situation more complex:

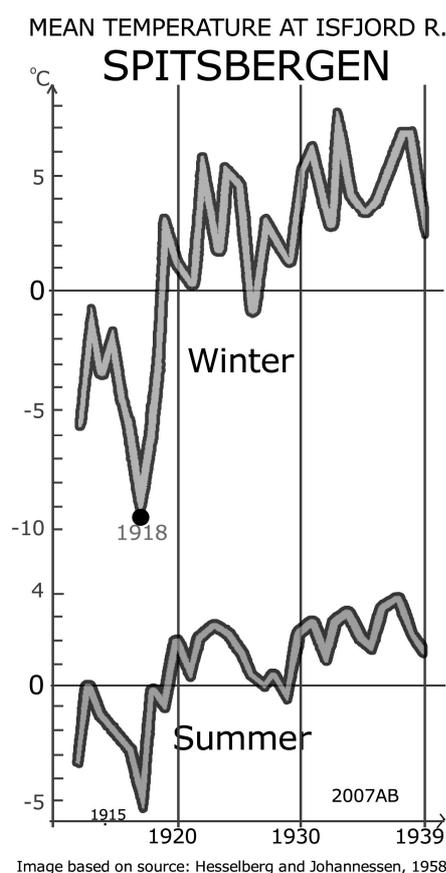
In recent years attention is being directed more and more towards a problem which may possibly prove of great significance in human affairs, the rise of temperature in the northern hemisphere, and especially in the Arctic regions. (Brooks, 1938)

At the time of the writing of these lines in 1938, the Arctic had got as warm as in the first decade of the 21st Century. How much do we know about the mechanism that caused the previous arctic warming? Not very much, as Brönnimann et al. acknowledged: “*Our understanding of the climate mechanism operating in the Arctic on different timescales is still limited*” (Brönnimann, 2008). Is it reasonable and fair to dramatize the shrinking sea ice during a recent time period, if one is not fully aware of what happened in the early years of the last century?

Before the next chapter, we will insist on the question: why climatology should be able to explain the earlier arctic warming. Some phrases currently used are briefly presented in order to keep a context between the two warming periods, although this book primarily deals with the warming that The Washington Post reported already in 1922. Because the Where, When, and Why are still quite open, and by far not settled. One could actually describe the purpose of the book to answer a question that V.F. Zakharov (1997) submitted a decade ago:

- *Why are the maximum climate fluctuations confined to the Atlantic sector of the Arctic?*
- *Why are these fluctuations pronounced, first of all, right here?*
- *Should the Atlantic sector of the Arctic be considered as a center of some kind, a source of climate change over the Hemisphere?*

The focus is clear: What role did the ocean play? The investigation will prove that it had been substantial, by time, intensity and duration. But once these aspects have been thoroughly elaborated, the discussion will be extended to the question: Why? After all, the first arctic warming began at the end of the World War One in the winter of



⁴ Ifft; George N., 1922, „The Changing Arctic”, Monthly Weather Review, Nov 1922,

1919

Arctic Warming started – 90 years ago – January 1919 - Does the Arctic scream, and why?

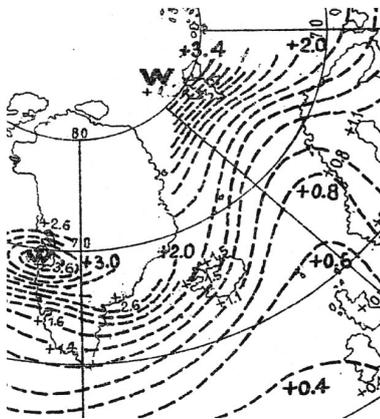
By <http://www.oceanclimate.de>, 10 January 2009



Suddenly, in January 1919, Spitsbergen a remote archipelagos between the North Cape in Norway and the North Pole had corresponding mean temperatures during January as 2000 km further south in Oslo, mere -5°C . That was a climatic 'bang'. It meant that the temperature differences between the two pre and post WWI January was 16° (sixteen) degrees¹. The extraordinary situation during this months went unnoticed. The event itself not.

Soon the Arctic started to warm. In 1930 the Norwegian scientist B. J. Birkeland² regarded the rise as possibly the biggest ever observed at a single place. Presumably Birkeland could repeat the claim today again with justification. In 1932 the New York Times reported: "Next great deluge forecast by scientists – Melting polar ice caps to raise the level of the seas and flood the continents"³. Only three decades after January 1919 the developments in the Arctic had been called: a climatic revolution⁴.

How dramatic the rise was is possibly best illustrated with few graphics, which indicate the extraordinary temperature jump. Particularly explanatory is the image showing the global situation in the years after the event from 1921 –1930, and how the temperature situation effected the Arctic and Europe toward the end of the 1930s, just before the warming ended and a three decade long cooling phase stated with WWII in winter 1939/40.



**Spitsbergen with a plus of 3.4°C
in winter 1921-1930**

The question today is, what do we know about the January 1919 Spitsbergen event? Do we have any information whether the early Arctic warming from 1919 to 1940 has been in any way a source of the dramatic sea ice melting in the Arctic over the last few years? Unfortunately not. Science has shown little interest to provide explanation. Instead we are told that this is "one of the most puzzling climate anomalies of the 20th century"⁵.

Neither helpful is this explanation either: "The recent dramatic loss of Arctic sea ice appears to be due to a combination of a global warming signal and fortuitous phasing of intrinsic climate patterns"⁶

Recently a scientist said: "The Arctic is screaming"⁷. Presumably the Arctic is wondering why the Spitsbergen event in January 1919 and subsequent warming is not understood and explained after 90 years.

Graphic: Cut-out from 'Tafel 58'; Decade 1921-1930; Deviation of winter temperature (Nov-March) from long-term mean; R. Scherhag, (1936/Sept); Ann. Hydrologie & Maritimen Meteorologie, Sept. 1936, p. 397-407.

¹ The January temperature at Spitsbergen : 1917 -20.4; 1918-24.4; (mean: 22.4°C); and 1919 -5.7, 1920 -10.5 (mean: -8.1°C); <http://data.giss.nasa.gov/work/gist/emp/STATIONS/tmp.634010050010.1.1/station.txt>

² Birkeland, B. J. (1930) , Temperaturvariationen auf Spitzbergen, Meteorologische Zeitschrift, Juni 1930, p. 234-236.

³ New York Times; May 15, 1932.

⁴ Ahlmann, H. W. (1946); "Research on Snow and Ice, 1918-1940", The Geographical Journal, 1946, p.11-25

⁵ Bengtsson, et al (2004), The Early Twentieth-Century Warming in the Arctic—A Possible Mechanism, Journal of Climate, page 4045-4057.

⁶ Overland, J. E. (2008); M. WANG & S. SALO, "The recent Arctic warm period", Tellus, 2008, 60A, p.589-597

⁷ This was widely reported, e.g. Associated Press; 12 Dec.2007 by Seth Borenstein; "Ominous Arctic Melt Worries Experts".

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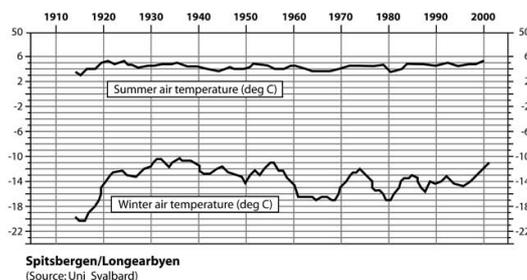
1918-19, and died away when the Second World War began on the 1st of September 1939. That is worth a discussion, even if it is not the purpose of this paper to offer conclusive evidence in this respect

B. The Arctic Is Screaming?

The world should know: The Arctic is Screaming noted newspapers recently. No one had heard the Arctic crying, but was there something that should have signalled horror? It is true; the annual arctic sea ice cover had been decreasing during the summer season for a couple of years. The remaining minimum ice cover around September produced record after record: the record from 2005 was beaten by 2006, which was beaten by 2007. That was the point when the émigré in polar science Mark Serreze informed the press: "The Arctic is screaming"⁵. As a senior scientist at the government's snow and ice data Center in Boulder, Colorado, Mark Serreze should know what he is talking about, or had it been his scream? At least the time for setting a scream was timely. Special legislation for polar bears was already on the way, as it was assumed that the dwindling sea ice would not leave the bears without ice floats but affecting wildlife widely.

"Greenland's ice sheet melted nearly 19 billion tons more than the previous high mark, and the volume of Arctic sea ice at summer's end was half what it was just four years earlier⁶. At this rate, the Arctic Ocean could be nearly ice-free at the end of summer by 2012, much faster than previous predictions", the NASA climate scientist Jay Zwally was cited. But even this prediction could be topped by arctic experts claim to a conference meeting that, if the Arctic sea ice was melting so rapidly, as it recently did, than any sea ice throughout the Arctic Ocean could have entirely disappeared by the summer of 2040.

In this context, the CNN could observe that scientists have been asking themselves these questions: Was the record melt seen all over the Arctic in 2007 a blip amid relentless and steady warming? Or has everything sped up to a new climate cycle that goes beyond the worst case scenarios presented by computer models? Nobody has given any answer. But Mark Serreze says: the Arctic is screaming. Is it impossible to find out?



It should not be impossible, as the present arctic warming since 1980 is not the only one. There was another warming period for the region north of 62° North since 1920 until 1945, for which the high-latitude temperature increase was stronger in the late 1930s early 1940s than in recent decades (Polyakov, 2002). The first Arctic warming started 90 years ago, from about 1920 to 1940⁷. In winter 1918-19 the air temperatures exploded at the remote archipelagos Spitsbergen, which the Norwegian call: Svalbard. In 1930 the Norwegian scientist .B. J. Birkeland⁸ regarded the rise as maybe the biggest ever observed in one place. Birkeland could presumably repeat the claim today with justification. But would he or his colleagues come up with the

⁵ This was widely reported, e.g. Associated Press; 12 Dec.2007 by Seth Borenstein; "Ominous Arctic Melt Worries Experts".

⁶ CNN; 11th of December 2007: <http://www.cnn.com/2007/TECH/science/12/11/arctic.melt.ap/index.html>

⁷ M. Serreze (Serreze, 2006) acknowledges that "Substantial high-latitude warming from about 1920 to 1940 was followed by cooling until about 1970, then another period of marked warming that extends through the present", but makes little effort to understand the early warming in the first place, but provides as conclusion: "One important piece of evidence supporting an enhanced GHG (Green House Gas) contribution is that while the earlier 20th century warming is only seen at higher latitudes, indicative of natural variability in the climate system, the recent warming is apparent in all latitude zones." Concerning 'the piece of evidence' Serreze sees now, a couple of years ago he and some colleagues claimed the opposite (Kahl, 1993).

⁸ Birkeland, B.J. (1930) , Temperaturvariationen auf Spitzbergen, Meteorologische Zeitschrift, Juni 1930, p. 234-236.

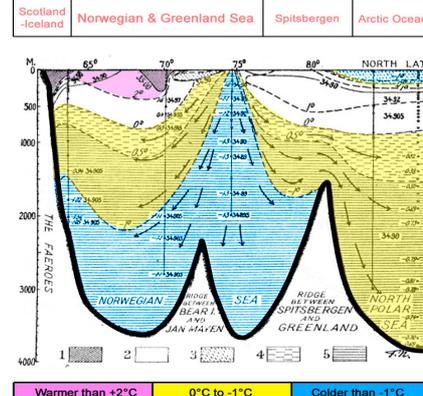
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exclamation the Arctic is screaming today? Definitely not, although he and his colleagues might wish to scream: How could it be that you know so little about “our arctic warming” to understand “your arctic warming”.



In winter 1918/19 the temperatures exploded at the remote island Spitsbergen, laying at the edge between the Northern North Atlantic and the Arctic Ocean. The temperature rise continued until 1939. Why did it happen?
www.arctic-warming.com

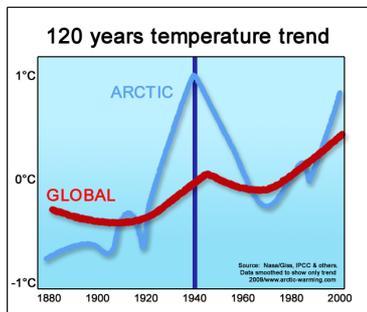
Fridtjof Nansen - 1928
"The Oceanographic Problems of the still unknown Arctic regions"
in: W.L.G. Joerg(ed); Problems of Polar Research, American Geographical Society, No. 7



Atlantic water running over the ridge off Spitsbergen into the Arctic Ocean

C. Tipping Point, Climatic Revolution, Apocalypse Now

Few years ago scientists called for “cutting emissions now to avoid climate tipping point”⁹. The phrase has reached the Arctic. The phrase actually refers to the fact that in physics, if a small amount of weight is added to a balanced object, it can topple the balance completely and very suddenly. After the ice season in September 2007 had been the lowest since the Little Ice Age around 1850. Is the decreasing seasonal sea ice extent during the summer season the tipping point? At least it could be the imminent example of a tipping point in the climate system that has been argued¹⁰.



The Russian Revolution took place 90 years ago. At a tipping point communism replaced the monarchy. Only one year later a pronounced warming started in the Atlantic-Arctic region, lasting for two decades. Its impact on temperatures, sea ice and glaciers had been so significant that the Norwegian scientist Ahlmann estimated that this warming period had been a ‘climatic revolution’ (Ahlmann, 1946). Which of the phrases is more serious? We do not know? We know too little about the earlier warming. We do not know whether the earlier warming of the Arctic is a precondition for the situation in the Arctic now. In one

⁹ The Guardian/UK, 2005, Ian Sample, “Warming hits ‘tipping point’”, Thursday, the 11th of August 2005

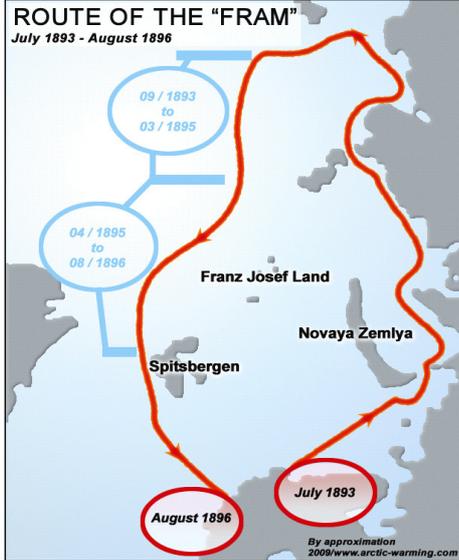
¹⁰ Realclimate (web log); David: “Arctic sea ice: is it tipped yet?”, the 13th of December 2007.

1928

Fridtjof Nansen – 1928
The Oceanographic Problems of the Still unknown Arctic Region¹
 Extract from section: Circulation of the Water

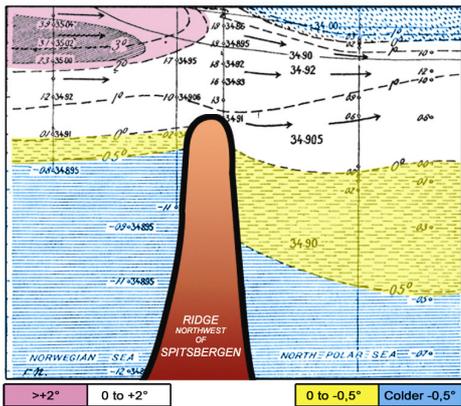


A methodical study of the water layers and their movements in the still unknown regions of the North Polar Sea will be of much interest. As was discovered during the FRAM expedition of 1893 – 1896, this sea is covered by a layer, 150 to 200 meters thick, of cold water with temperatures between 0°C and –1,9°C and a comparatively low salinity owing to the admixture of fresh water, chiefly river water from Siberia, Alaska, and Canada. Below this surface layer there is a layer, some 600 to 700 meters thick, of warmer and saltier water, with temperatures above 0°C. and salinities approaching 35 per mille. This is Atlantic water which is carried into the Arctic Basin chiefly by the small branch of the Atlantic Current (“Gulf Stream”) running northwards along the west coast of Spitsbergen. Below this warmer water there is again colder water filling probably the whole basin to the bottom; its temperatures between 0°C. and –0,8°C and its salinity 34.90 per mille. This cold deep-water originates in the northern part of the Norwegian Sea, north-northeast of Jan Mayen, where it sinks down from the surface, which is cooled by the radiation of heat during the winter and spring. The thus cooled water runs into the Arctic Basin across the probable submarine ridge between Spitsbergen and Greenland. A study of the condition of these various water layers and their distribution in the various parts of the North Polar Sea would be of much value.



While we drifted with the FRAM across the Arctic Basin our deep-sea observations showed that the boundaries between the water layers, especially between the cold surface layer and the warmer underlying water, were subjected to considerable vertical oscillations. By later observations we have found that such vertical oscillations, due to surface boundary waves, often of very considerable dimensions, probably are quite common phenomena in the ocean; but they have not yet been sufficiently studied methodically. From the drifting ice movements of the water – the horizontal currents as well as these vertical oscillations of the layers – may be continually and carefully studied at all depths in an ideal manner which is not possible in the open ocean; and many of the greatest problems of oceanography may thus be solved.

Fridtjof Nansen - 1928
 "The Oceanographic Problems of the still unknown Arctic regions"
 in W.L.G. Joerg(ed); Problems of Polar Research, American Geographical Society, No. 7

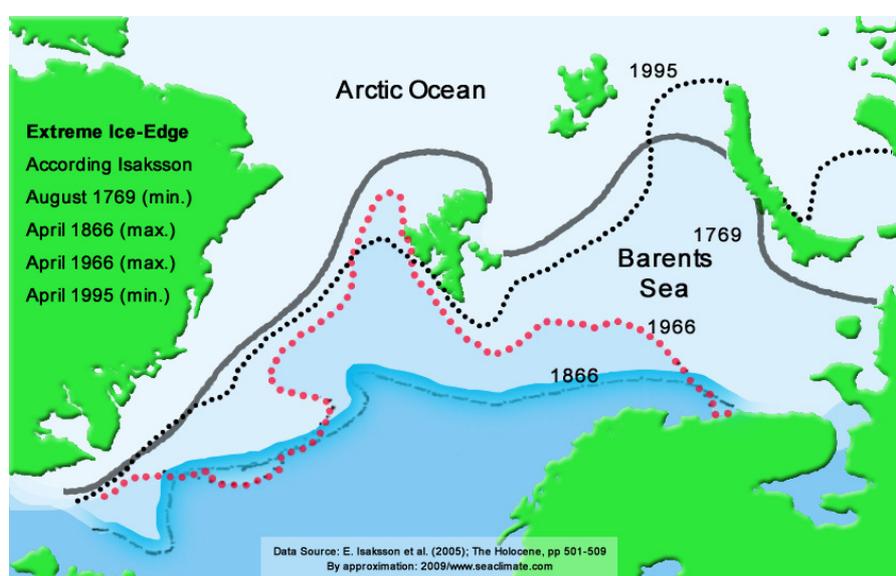


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way or another, it will be the case, and therefore the identification of any tipping point in the previous arctic warming is as much required as talking about the recent situation.

Also the NASA scientist James Hansen suggests that the Earth may have hit the tipping point, which, according to his interpretation, means: “We have not passed a point of no return. We can still roll things back in time – but it is going to require a quick turn in direction”¹¹. To Hansen, who is regarded as the godfather of global warming since he presented the subject to the US Senate in 1988: “the ‘point of no return’ is in being, when climate reaches a point with unstoppable irreversible climate impacts (irreversible on a practical time scale)” as he explained recently at a presentation¹² that Hansen exemplifies with the disintegration of large ice sheet in the Arctic.

Is the “Tipping Point” in the Arctic? Not necessarily, but according to some commentators’ view after saying: “The summer of 2007 was apocalyptic for Arctic sea ice”. It was not for the first time that the phrase had been used in climate research, but it is of a recent date. In 2005 a newspaper story was entitled: “Apocalypse Now: How Mankind is Sleepwalking to the End of the Earth Floods, storms and droughts. Melting Arctic ice, shrinking glaciers, oceans turning to acid. The world’s top scientists warned last week that dangerous climate change is taking place today, not the day after tomorrow. You don’t believe it?”¹³.



Although the ‘climatic revolution’ is on record for more than 80 years, the current knowledge on: Where, When, and Why, is rather limited, as recently acknowledged that “one of the most puzzling climate anomalies of the 20th century” (Bengtsson, 2004), while other offer merely the conclusion “that the earlier warming was natural internal climate-system variability” (Johannessen, 2004).

¹¹ The Associated Press: Ominous Arctic Melt Worries Experts, by Seth Borenstein, the 12th of December 2007.

¹² Hansen in his: Bjerknes Lecture, to the American Geophysical Union, San Francisco, the 17th of December 2008; PowerPoint slide 26.

¹³ Independent/UK, the 6th of February 2005; by Geoffrey Lean

1990	J.T.Houghton, et al. (ed), 1990, Climate Change The IPCC Scientific Assessment, Chapter 7, Observed Climate Variation and Change, Cambridge 1990, p. 223
	<p>Even the upper few meters of the ocean can store as much heat as the entire overlying atmospheric column of air. Scientists have long recognized that the ocean could act to store large amounts of heat, through small temperature changes in its sub-surface layers, for hundreds or thousand of years. When this heat returns to the atmosphere/cryosphere system it could also significantly affect climate.</p> <p>The magnitude and extent of the observed changes in the temperature and salinity of the deep North Atlantic are thus large enough that they cannot be neglected in future theories of climate change.</p>
2007	The Arctic in the Eyes of the Intergovernmental Panel on Climate Change Fourth Assessment Report 2007 (Abstract; References not shown)
	<p>IPCC; Summary for Policymakers (p.7) Average arctic temperatures increased at almost twice the global average rate in the past 100 years. Arctic temperatures have high decadal variability, and a warm period was also observed from 1925 to 1945.</p> <p><u>Chapter 5; Observations: Oceanic Climate Change and Sea Level</u> 5.3.2.2 Arctic Ocean</p> <p>Climate change in the Arctic Ocean and Nordic Seas is closely linked to the North Atlantic sub polar gyre. Within the Arctic Ocean and Nordic Seas, surface temperature has increased since the mid-1980s and continues to increase. In the Atlantic waters entering the Nordic Seas, a temperature increase in the late 1980s and early 1990s has been associated with the transition in the 1980s towards more positive NAO states. Warm Atlantic waters have also been observed to enter the Arctic as pulses via Fram Strait and then along the slope to the Laptev Sea; the increased heat content and increased transport in the pulses both contribute to net warming of the arctic waters. Multi-decadal variability in the temperature of the Atlantic Water core affecting the top 400 m in the Arctic Ocean has been documented. Within the Arctic, salinity increased in the upper layers of the Amundsen and Makarov Basins, while salinity of the upper layers in the Canada Basin decreased. Compared to the 1980s, the area of upper waters of Pacific origin has decreased. During the 1990s, changed winds caused eastward redirection of river runoff from the Laptev Sea (Lena River, etc.), reducing the low-salinity surface layer in the central Arctic Ocean, thus allowing greater convection and heat transport into the surface arctic layer from the more saline subsurface Atlantic layer. Thereafter, however, the stratification in the central Arctic (Amundsen Basin) increased and a low salinity mixed layer was again observed at the North Pole in 2001, possibly due to a circulation change that restored the river water input. Circulation variability that shifts the balance of fresh and saline surface waters in the Arctic, with associated changes in sea ice, might be associated with the NAM, however, the long-term decline in arctic sea ice cover appears to be independent of the NAM. While there is significant decadal variability in the Arctic Ocean, no systematic long-term trend in subsurface arctic waters has been identified.</p>
1990	J.T.Houghton, et al. (ed), 1990, Climate Change The IPCC Scientific Assessment, Chapter 7, Observed Climate Variation and Change, Cambridge 1990, p. 233
	<p>The rather rapid changes in global temperature seen around 1920 –1940 are very likely to have had a mainly natural origin.</p>

2008

**Missing the Point on Arctic Warming,
Ø. Nordli, IPCC, NASA ?**

By <http://www.arctic-warming.com>, August 2008



“The Arctic ocean is warming up, icebergs are growing scarcer and in some places the seals are finding the water too hot”, reported the The Washington Post, on November 2nd, 1922. B.J. Birkeland (1930) saw the temperature rise, as “*probably be the greatest yet known on earth*”, and few years later A. W. Ahlmann (1946) called the event a ‘climatic revolution’¹. This site explains this sudden warming since winter 1918/19 in a detailed step-by-step approach (<http://www.arctic-warming.com>).

Since about the 1980th it is evident that the arctic is warming, after a colder period over four decade again. It

SPITSBERGEN, 1912 TO 1926
Temperature deviation of monthly mean from a 15-year average

Year	Jan.	Febr.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly
1912	-8.4	-7.3	-3.4	-6.2	-1.2	-0.1	-1.3	-2.0	-2.9	-2.9	-1.2	+1.8	-3.1
1913	+0.3	-1.7	+0.7	+3.8	-0.4	-1.8	-0.8	+0.6	+0.6	-2.8	+4.0	+1.1	+0.2
1914	-5.7	-4.9	-1.4	+3.0	-0.4	-0.2	-0.5	+0.2	-1.0	+1.2	-1.5	-3.6	-1.3
1915	+1.8	-0.5	-3.1	+2.5	-4.0	-0.4	-1.5	-1.0	-0.6	+0.9	-0.0	-8.3	-2.0
1916	-8.6	+2.1	-2.3	-3.0	-1.2	+0.4	-0.4	-0.9	-0.2	-1.3	-5.9	-8.4	-2.5
1917	-7.4	-10.3	-8.7	-9.2	-4.8	-1.4	-2.1	-2.3	-2.8	-2.7	-2.6	-5.4	-5.0
1918	-10.1	-0.4	-0.1	+0.8	+2.4	+0.8	+1.9	-0.1	-0.4	-1.8	+0.9	+7.4	+0.1
1919	+8.6	-4.7	-6.9	-6.3	+3.3	+0.7	-1.1	+0.2	-0.6	+1.0	-4.0	+0.8	-0.8
1920	+3.8	+1.4	+8.9	+0.8	+1.9	-0.5	-0.5	+0.7	+0.4	+3.5	+4.3	+3.8	+2.3
1921	-0.8	+0.1	+2.3	+2.5	-0.2	+0.5	+1.0	+1.2	-0.9	-2.1	+1.3	+2.5	+0.6
1922	+10.5	+6.9	+0.1	-0.5	+1.1	+1.7	+2.1	+1.2	+1.4	+1.8	+5.0	-0.9	+2.5
1923	+3.3	+4.8	+5.9	+3.8	+2.3	-0.1	+1.4	+1.5	+1.5	+3.0	+3.9	+4.5	+2.9
1924	+5.7	+8.1	-1.9	+2.3	+2.6	+0.6	+2.1	+0.8	+0.9	+2.3	+3.1	+5.3	+2.5
1925	+4.3	+6.3	+7.7	+2.1	-0.9	+1.4	+0.1	+1.4	+3.1	-0.7	+1.7	-3.1	+1.9
1926	+2.2	+0.5	+1.5	+4.0	-0.8	-0.5	+0.1	-0.8	+1.5	+0.1	-0.7	+2.5	+0.8

Source: B.J. Birkeland, Meteorologische Zeitschrift, June 1930, p. 234

is good that this trend receives attention since recently. IPCC has little problems to assert²: *The Arctic is expected to experience the greatest rates of warming compared with other world regions*. However, the early warming is not explained, and the little they say is inaccurate³. Other title it in this way: “NASA’s Earth scientists think ice is hot - a hot topic, that is⁴”, but fail to explaining anything either.

That is a big surprise as there are few, but reasonable data documented. Ø. Nordli, a scientist at the Norwegian Meteorological Institute, confirms the reliability of the data

taken at Spitsbergen⁵, stating: *An abrupt change of temperature occurred at the end of the 1910s transforming the Svalbard climate from a cold phase (1911-1919) to a warm phase (1920-1930)*. Evidently Spitsbergen saw a temperature increase of more than 10 degrees Celsius from winter 1916 & 1918 to winter 1922/23. Despite this fact, Ø. Nordli made a statement concerning the period 1911 - 2004⁶: “During winter (DJF) no significant trend in the data is seen, whereas in spring the trend is highly significant, 0.42 °C per decade.” It seems Ø. Nordli missed the most interesting and important point: What cause the temperatures to ‘explode’ in winter 1918/19?

Also IPCC is too superficial in this respect (see above). At least they should have paid attention to the advise, V.F. Zakharov submitted to the World Meteorology Organization (WMO) in 1997⁷, asking:

- (1) *Why are the maximum climate fluctuations confined to the Atlantic sector of the Arctic?”;*
- (2) *Why are these fluctuations pronounced, first of all, right here?”;*
- (3) *Should the Atlantic sector of the Arctic be considered as a center of some kind, a source of climate change over the Hemisphere?”*

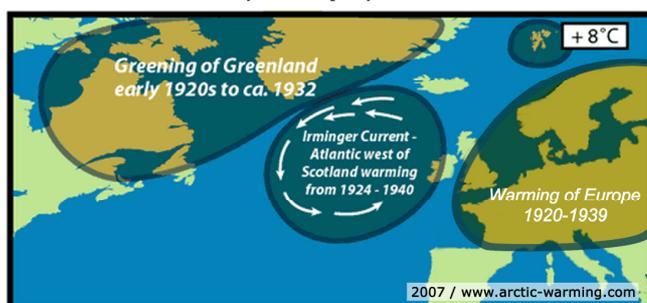
Also a work from Sergey V. Pisarev (1997)⁸ indicates that the impact of the sea may require more attention. Actually, this site is carefully elaborating the reasons for the sudden commencement of the arctic warming since winter 1918/19, concluding, that the source had been the seas around the Spitsbergen archipelagos as far as not covered by sea ice according the seasons. When Ø. Nordli observes: “*The cold phase was characterized by clear sky and pronounced inversions, whereas the warm phase was characterized by overcast sky and weaker and rarer inversions*”⁹, the answer is easy, for the winter season at least: It is the sea.

¹ See Chapter A. Introduction, <http://www.arctic-warming.com/introduction-the-scope-of-this-investigation.php> .
² IPCC, 2007a: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning (eds.)].
³ Diito: Average Arctic temperatures increased at almost twice the global average rate in the past 100 years. Arctic temperatures have high decadal variability, and a warm period was also observed from 1925 to 1945.
⁴ http://www.nasa.gov/vision/earth/environment/Arctic_Warming_ESU.html ;
⁵ Øyvind Nordli, Year ?, “Temperature variations at Svalbard during the last century” at: <http://www.nordicspace.net/PDF/NSA106.pdf>.
⁶ Øyvind Nordli, 2005, “Long-term Temperature Trends and Variability at Svalbard (1911 – 2004)”, Geophysical Research Abstracts, Vol. 7, 06939, 2005.
⁷ Zakharov, V.F.; 1997, ‘Sea Ice in the Climate System’, Arctic Climate System Study, WMO/TD-No. 782, in the section “On the nature of ‘polar forcing’”, p. 71.
⁸ Sergey V. Pisarev , 1997, “Arctic Warming” During 1920-40: A Brief Review of Old Russian Publications, http://mclean.ch/climate/Arctic_1920_40.htm
⁹ Øyvind Nordli, 2005, “Long-term Temperature Trends and Variability at Svalbard (1911 – 2004)”, Geophysical Research Abstracts, Vol. 7, 06939, 2005.

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That seems too little and too superficial to deal with an unprecedented ‘climatic revolution’. Much worse is the behaviour of Oscar price winner Al Gore with his claim that men have put so much carbon dioxide in the thin shell of air surrounding the world that literally the Earth heat has been changed, causing a universal threat of cosmic in scale¹⁴. Back in the late 1910s men released only a small amount of greenhouse gases into the atmosphere. Here is certainly not the place to challenge the greenhouse thesis, respectively assessing its possible impact, but discussing the climate change issue in Al Gore’s way seems irresponsible as long as a ‘climatic revolution’ that occurred under the eyes of modern meteorology has not thoroughly analyzed and the causation has been convincingly explained.

Winter temperature jump in 1919-1940



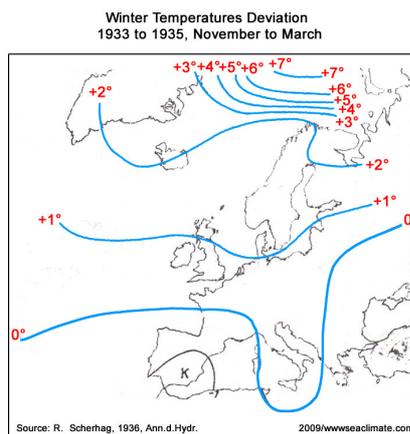
To put it clear, raising any reasonable concern on matters affecting human welfare, whether by tipping point or apocalyptic images is one thing, but sleepwalking the profound arctic warming during the early years of the last century is irresponsible. As long as this event is not well understood, any apocalyptic or tipping point talking is reckless and not very helpful.

D. Natural Variables versus Anthropogenic

The last 100 years are marked by the changeover of a climate system dominated by natural forcing to a climate system dominated by anthropogenic influences (Brönnimann 2008). This shall be understood as attributing the warming trend before the 2. World War to “natural variability” and the subsequent warming after the war to anthropogenic forcing, particularly due to the increasing release of carbon dioxide (CO₂). This is so easily said and if we look thoroughly at every aspect, this may prove worthless.

For example, try to find a founded explanation for the meaning of ‘natural climate variability’, respectively corresponding phrases. The glossaries of the leading international organizations as WMO and UNFCCC secretariat are blank on this subject. The AMS however provides the following¹⁵:

climate variability — temporal variations of the atmosphere– ocean system around a mean state. Typically, this term is used for timescales longer than those associated with synoptic weather events (i.e., months to millennia and longer). The term “natural



¹⁴ Al Gore, Moving Beyond Kyoto, The New York Times, July 1, 2007, WK 13.

¹⁵ Glossary of Meteorology, 2000, 2nd ed.; by the American Meteorological Society (AMS).

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climate variability” is further used to identify climate variations that are not attributable to or influenced by any activity related to humans.

But it can come along even more confusing¹⁶:

The relatively short instrumental record of climate (the last 50 to 100 years), which reflects anthropogenic change as well as natural variations, does not represent a stationary or steady record. Instead, climate fluctuations over the past few millennia or so will need to be analyzed to establish a baseline of natural variability against which future (and present) variations can be gauged.

With reference to other work elsewhere that discusses the definition crux in meteorology in detail¹⁷, the subject is circumvented here, to concentrate on the first arctic warming, but if deemed useful the matter will be raised again.

All this talking about ‘natural variability’ says nothing of substance about the mechanism and causation of the first arctic warming in modern times. It even makes little effort to ensure a full assessment and understanding about the earlier event. One may only recall a report by the New York Times in 1932 to realize what it could mean when the substance of claims are not clear: “Next great deluge forecast by scientists – Melting polar ice caps to raise the level of the seas and flood the continents”¹⁸. Is that very different from current claims? At least, C.E.P. Brooks (1938) had that to say with regard to this warming period: “There have been great climatic oscillations before this, even since the last Ice Age, about the causes of which we are quite ignorant”. It seems little has changed when now confronted with the mere allegation, that the warming the NYT and Brooks are talking about has been due to natural variability, even without explaining which part of nature did something, and which did not.

But the phrase ‘natural variability’ seems not to be the end of terms which may cause more confusion than clarification as this example may illustrate: “The recent dramatic loss of Arctic sea ice appears to be due to a combination of a global warming signal and fortuitous phasing of intrinsic climate patterns” (Overland, 2008). How to make sense out of this?

The following investigation will show that the 1st Arctic warming was not understood in the 1930s, and that little has changed to better at the end of the first decade of the 21st century, about seven decades later. What is needed is a better understanding of what had happened almost a century ago in the high northern hemisphere, and this work does not agree with NASA expert Waleed Abdalati notion: “The first step in understanding why things happen is observing what is happening”¹⁹. It is the other way around. Without understanding the mechanism of the warming almost a century ago one might delay the understanding of the current ice melting. Even more, understanding the first arctic warming would definitely provide many hindsight for better assessing and handling the entire climate change issue.

¹⁶ CGER (1995) Commission on Geosciences, Environment and Resources; “Natural Climate Variability on Decade-to-Century Time Scale”; http://books.nap.edu/openbook.php?record_id=5142&page=601

¹⁷ <http://www.whatisclimate.com/>

¹⁸ New York Times; the 15th of May 1932

¹⁹ Cited by: Stofer, Kati, (23rd of October 2003), “Seasons of Change: Evidence of Arctic Warming Grows”, http://www.nasa.gov/vision/earth/environment/Arctic_Warming_ESU.html