

Arctic Warming 1919-1939

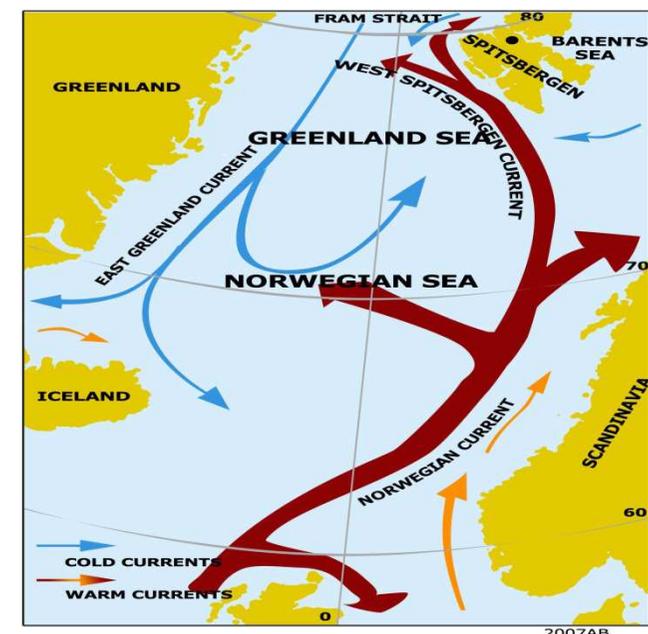
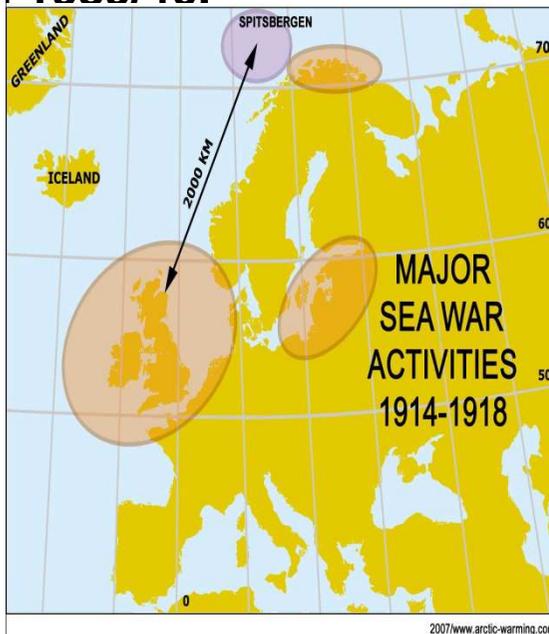
Did Four Years
Naval War Start It?

By Dr Arnd Bernaerts

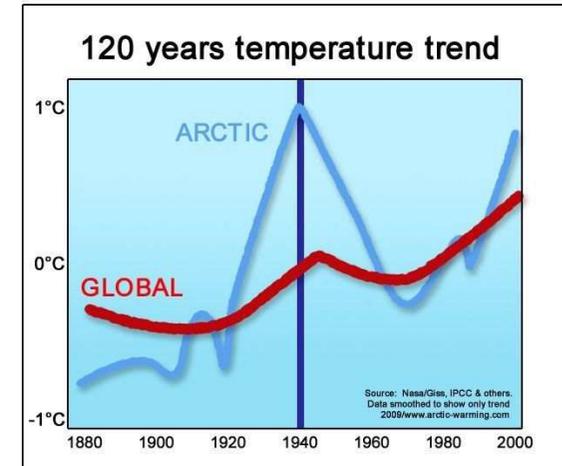
Data Source: R.Scherhag 1936

Nov. 2013/Subject to Changes

- A devastating naval war is fought around Great Britain, up to Murmansk and in the Baltic from August 1914 to November 1918.
- All water around Great Britain ends up in the Arctic region within a couple of weeks or months.
- A few months after a huge arsenal of new weapons reached the navies since summer 1916, Great Britain experienced the third coldest winter during the last century.
- When Great Britain lost in spring 1917 up to ten merchant vessels every day, the Northern North Atlantic was covered with sea ice until July 1917, presumably for the first time since the end of the Little Ice Age around 1850.
- Only a few weeks after WWI ended winter air temperatures at Spitsbergen and in the North Atlantic Arctic sector exploded, and increased steadily until winter of 1939/40.



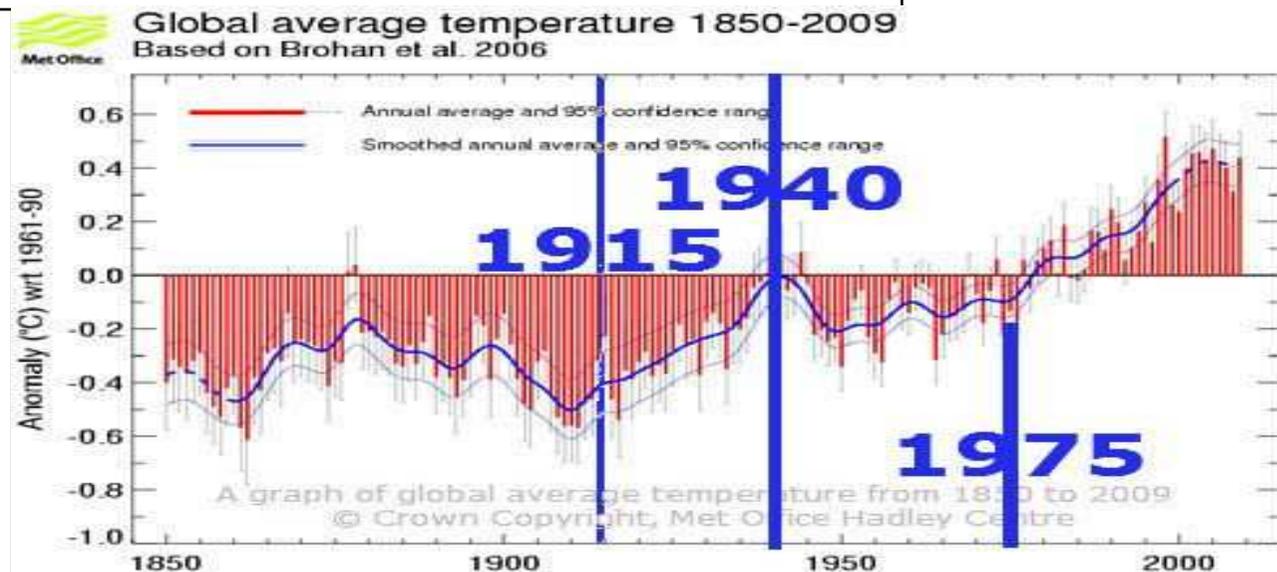
A sensational climatic shift occurred in winter 1918/19; at least the most pronounced since 1850!



Winter warming occurs first at Spitsbergen and the Fram Strait, then in the Arctic/North Atlantic sector, and subsequently only in the Northern Hemisphere:

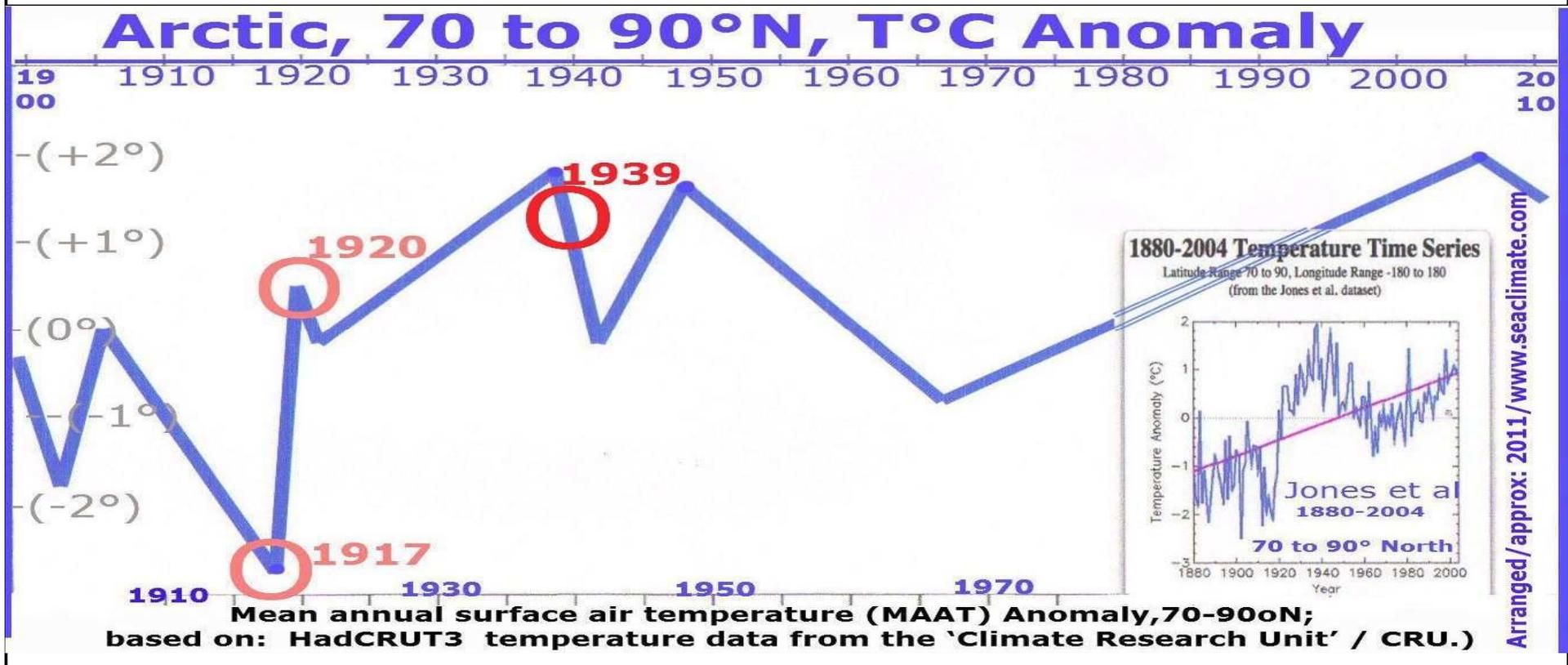
- lasting until 1933 in North America,
- and until 1939 in Europe

- The global situation since 1850: slight cooling until 1915, and significant warming after WWI.



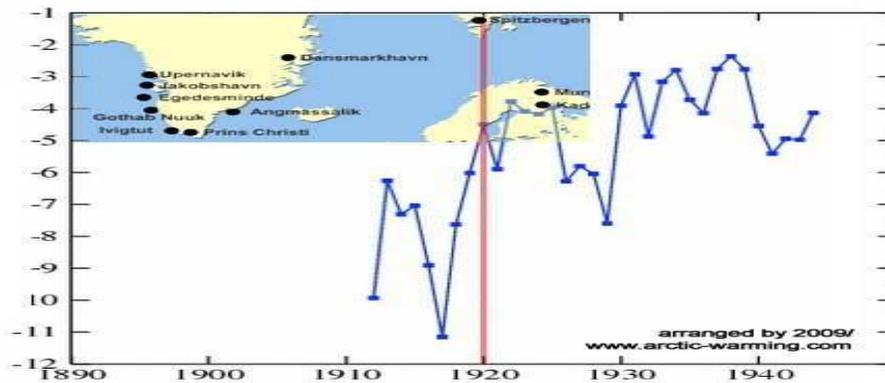
To realize naval war linked to a climatic shift since winter 1918/19 we start with a four step approach:

1. The extraordinary annual Arctic T°C increase (below);
2. which commenced at the Fram Strait region; and
3. most pronounced during the winter season,
4. indicating that is was primarily an oceanic issue.

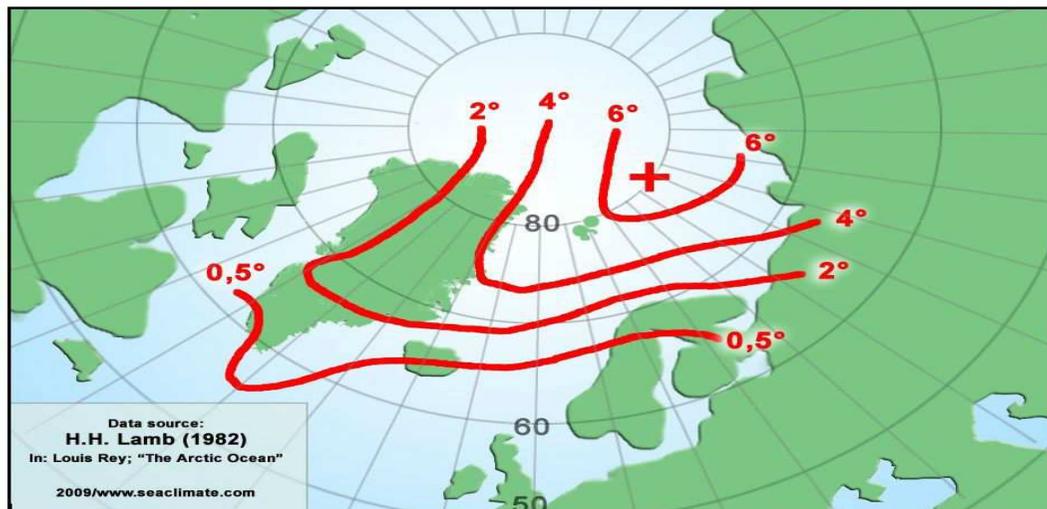


- 2. which commenced at the Fram Strait region
- 3. most pronounced during the winter season,

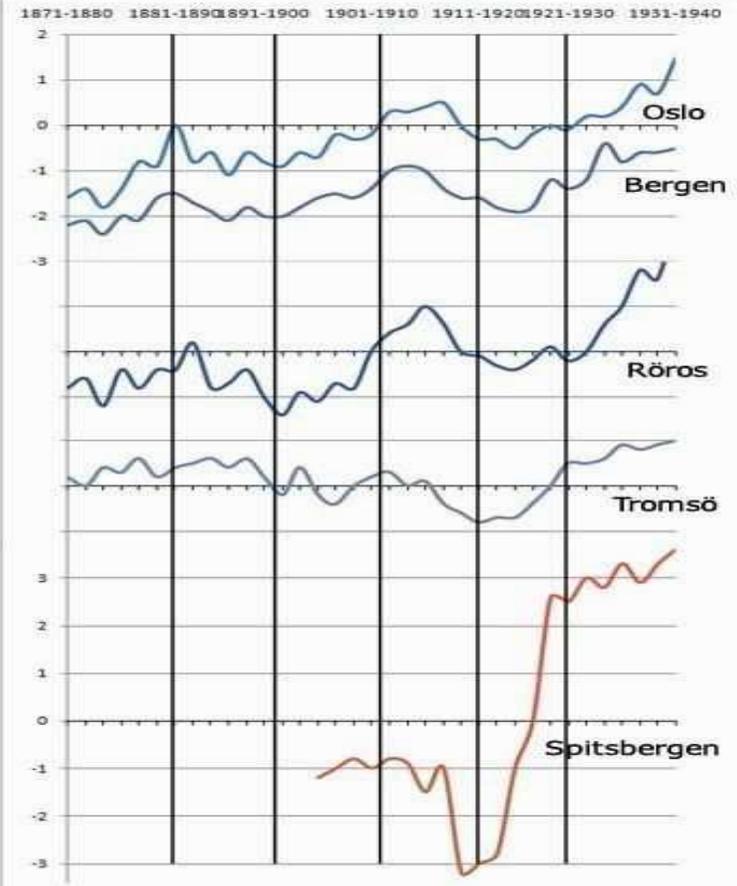
Isfjord Radio - Spitsbergen
Annual mean temperatures °C
 Source: NASA-GISTEMP - <http://data.giss.nasa.gov>



Arctic Temperature Differences during Winters 1921-1930 minus those for 1911/20



1871-1938, Changes in the ten-yearly winter mean temperatures
 in Norway and Spitsbergen

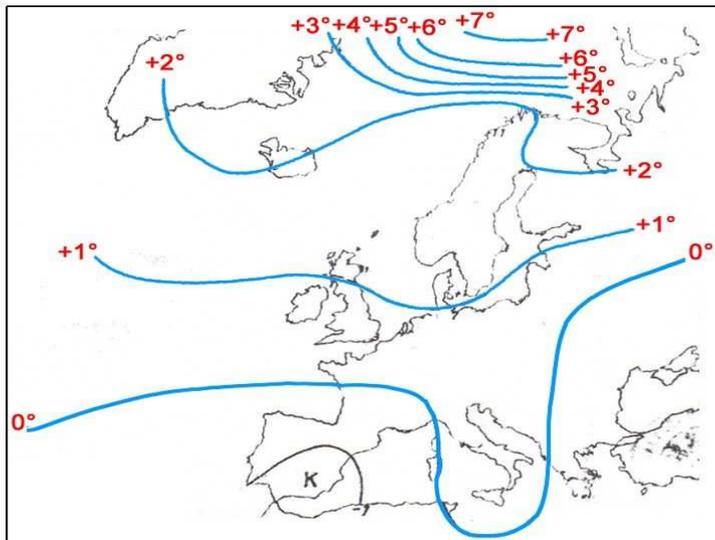


Source of b/w graph: Gordon Manley
 Q. Jour. Royal Met. Soc. Vol. 73, 1944, p. 197- 219;
 With reference to: H.W. Ahlmann, Ymer, 81, 1941.
 Here: by approximation only and in color, 2007AB.

3. most pronounced during the winter season,

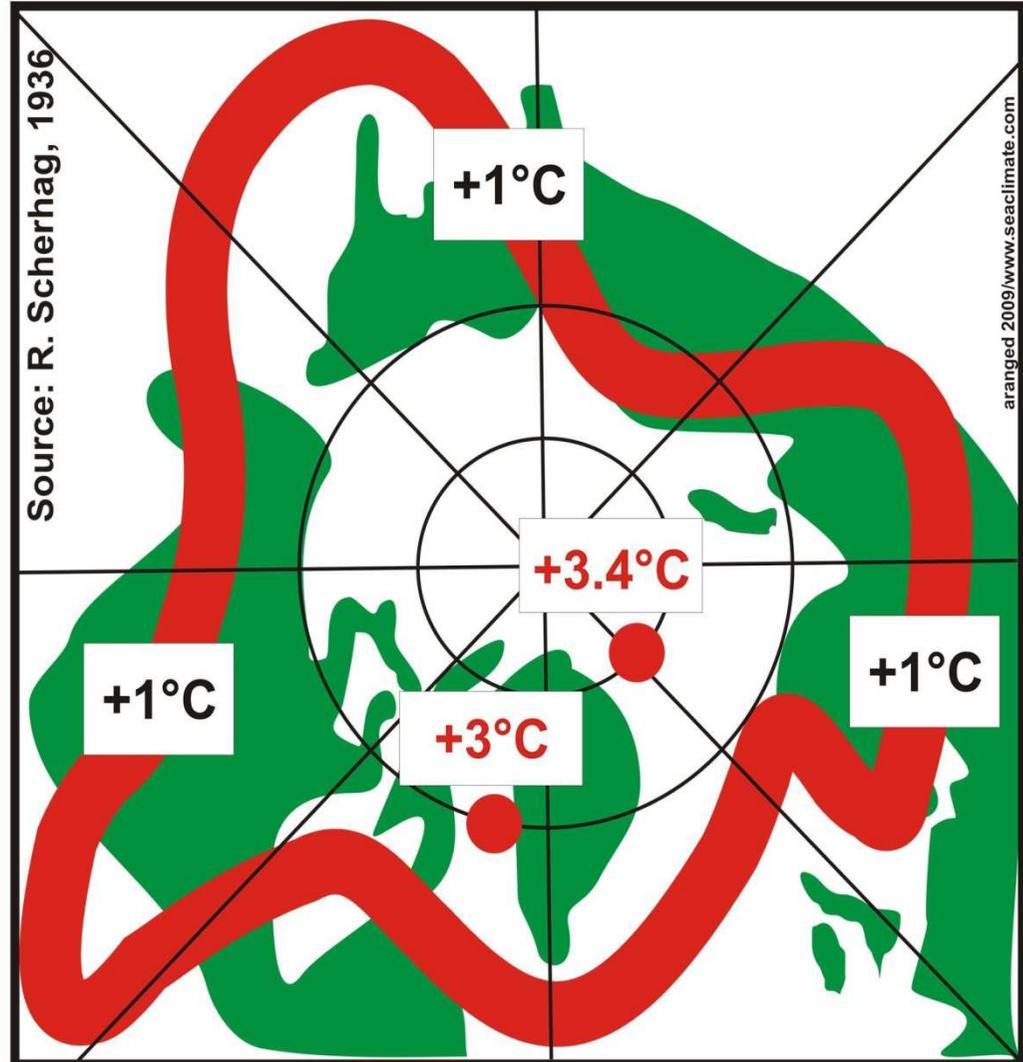
4. indicating that it was primarily an oceanic issue.

Winter Temperatures Deviation
1933 to 1935, November to March



Source: R. Scherhag, 1936, Ann.d.Hydr.

2009/wwwseacimate.com



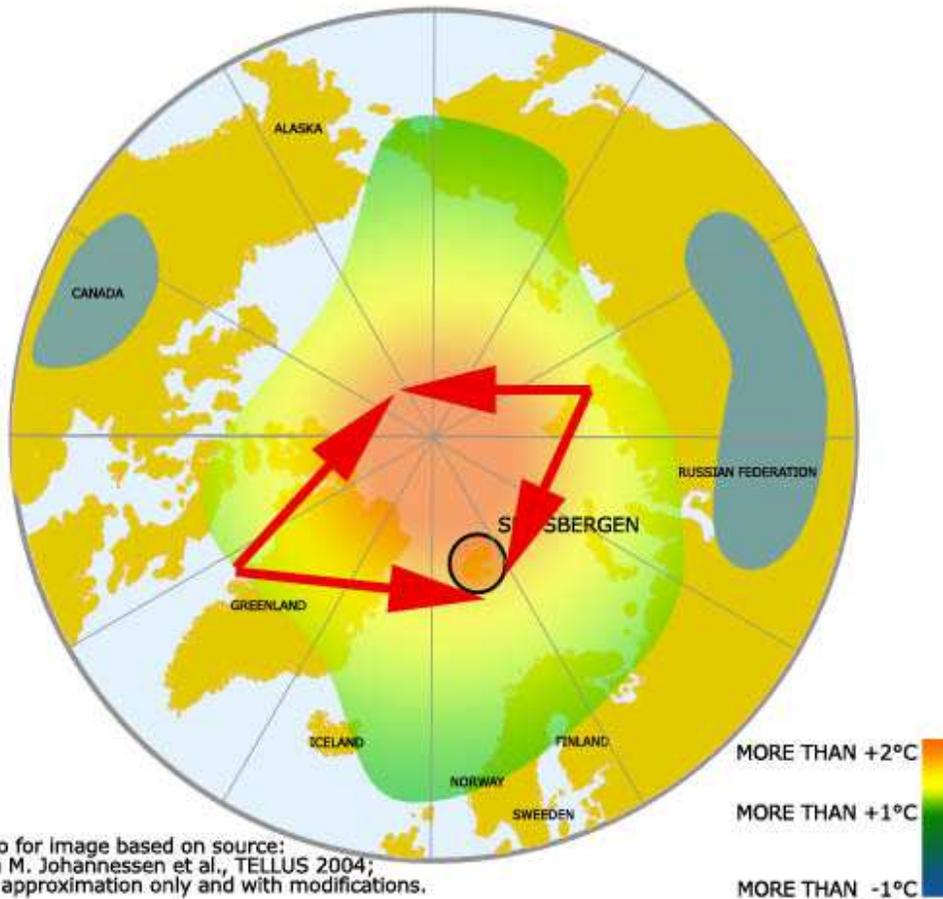
Source: R. Scherhag, 1936

arranged 2009/www.seacimate.com

Arctic winter temperature deviation 1920 - 1930

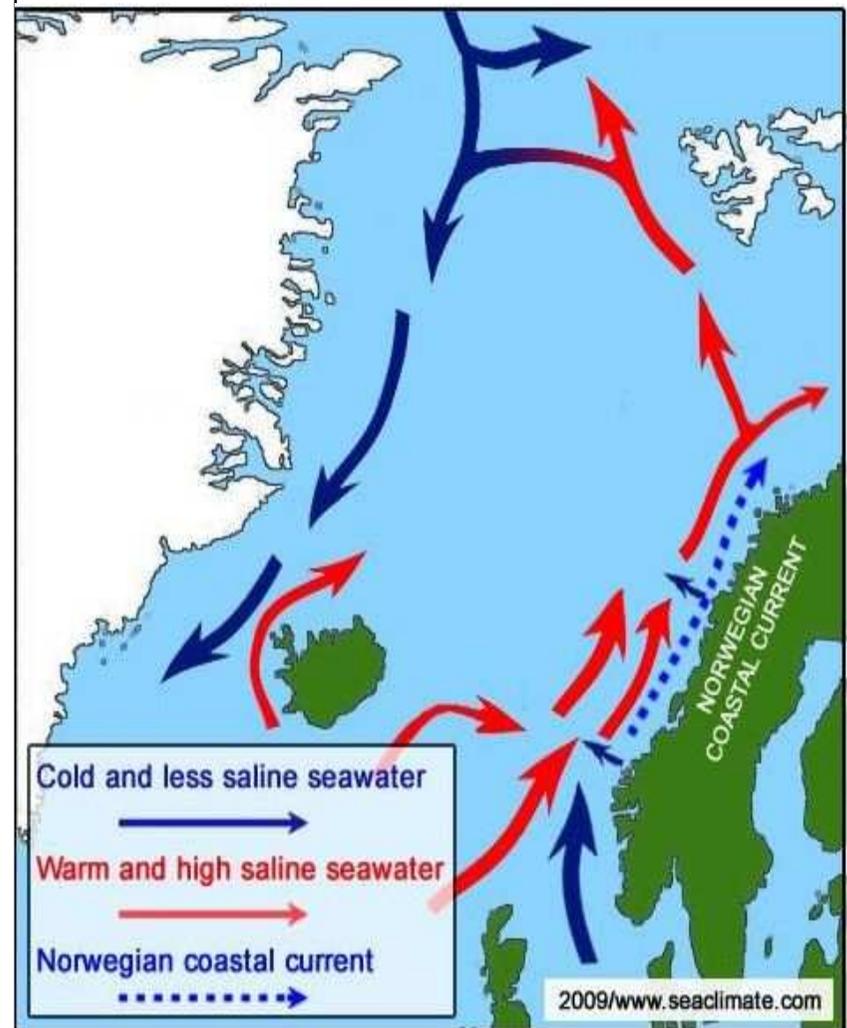
5. With a direct link to the naval war sea area in Europe

WINTER HALF-YEAR SURFACE TEMPERATURES TREND, 1920-1939



Info for image based on source:
Ola M. Johannessen et al., TELLUS 2004;
By approximation only and with modifications.

The pronounced Arctic warming over two decades (1920-1939) was restricted to an area not larger than ca. 1/3 of the whole Arctic Ocean. 2007AB



A dramatic shift in sea water temperature occurred suddenly in winter 1918/19! Will we ever know why?

Did sea water from naval battle areas change the sea structure in the Northern North Atlantic/Arctic sector?

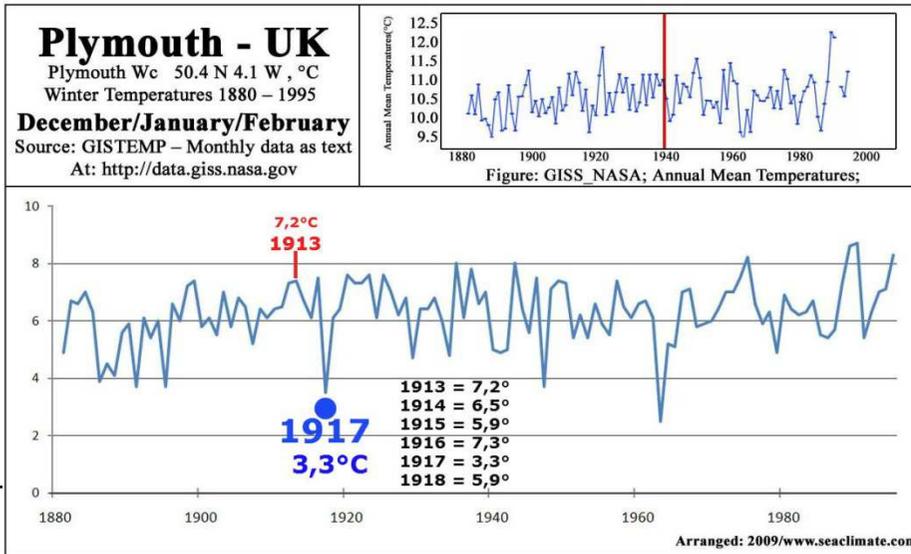
***“Norwegian and Russian scientists believe that the Gulf Stream, Europe's warm-water heating system, is flowing faster and farther into the north, tempering the climate, driving back the pack ice.
(TIME, June 16, 1947)***

The Russian scientist *Jules Schokalsky* informed the Royal Scottish Geographical Society in 1935:
“The branch of the North Atlantic Current which enters it by way of the edge of the continental shelf round Spitsbergen has evidently been increasing in volume, and has introduced a body of warm water so great, that the surface layer of cold water which was 200 meters thick in Nansen's time (1895/96), has now been reduced to less than 100 meters in thickness”

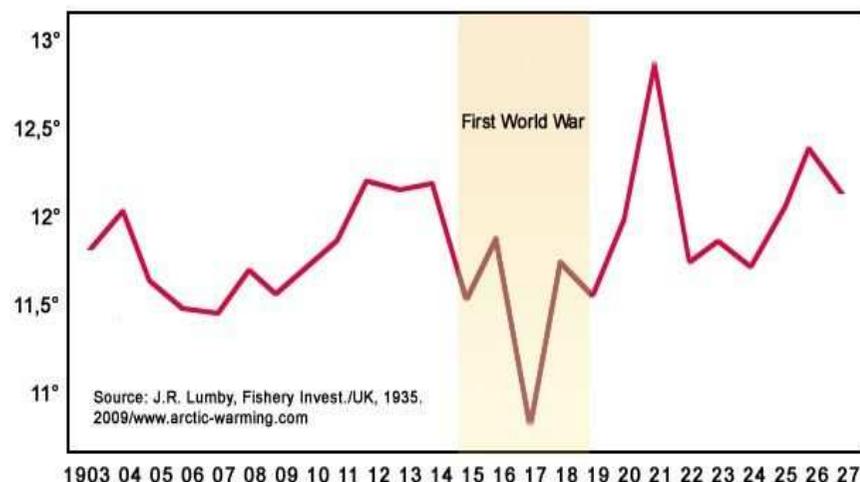
How can naval war be linked to weather/climate change?

- A. WWI provides a number of indications, of which here only few examples, observed in Europe, can be given.
- B. Specific observations which could establish evident correlation between naval activities and the alteration in sea and atmospheric affairs.

A. WWI provides a number of indications, of which only a few examples observed in Europe, are presented here.



ENGLISH CHANNEL – SEA SURFACE TEMP. (SST)
 Fluctuation of mean annual SST, 1903 to 1927

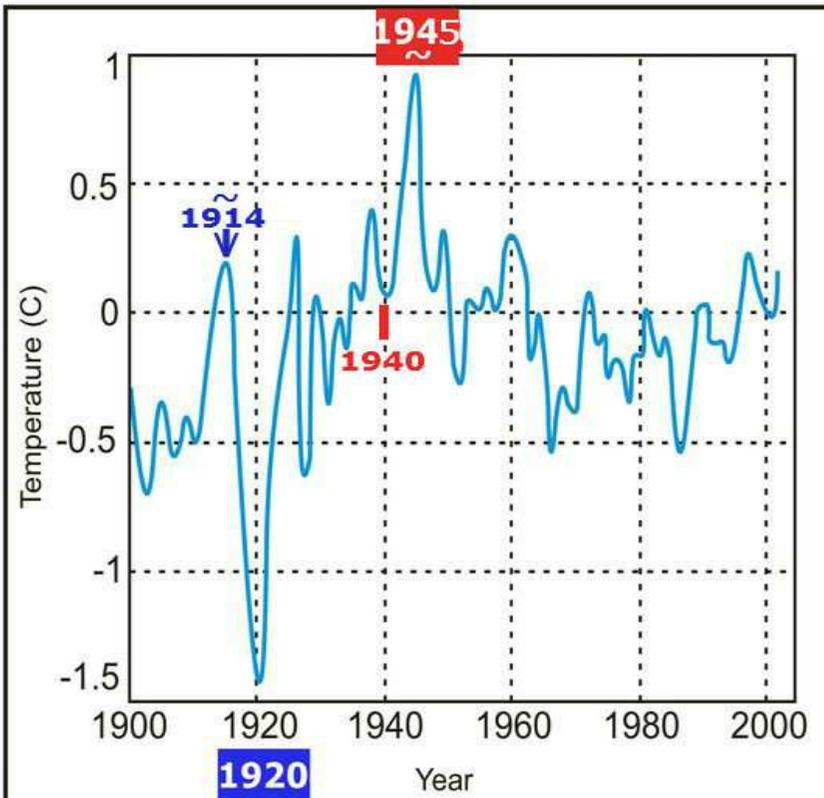


An observation by *A.J. Drummond* at the Kew Observatory (1943), is recalled:

“Since comparable records began in 1871, the only other three successive winters as snowy as the recent ones (1939/40, 1940/41, and 1941/42) were those during the last war, namely 1915/16, 1916/17 and 1917/18, when snow fell on 23%, 48% and 23%, of the days, respectively”

Two further examples deserve serious attention!

Atlantic seawater temperatures 1900 to 2005



Data source: Fisheries Research Service/Aberdeen (H. Yndestad, 2008)
By approximation redrafted by 2010/www.seaclimate.com

Taken between Scotland and Faroe Islands

The Baltic sea-ice conditions increased each year during the war until naval war activities ended with the Russian Revolution in October 1917. In 1941 C.J. Oestman observed:

Two very heavy ice years in succession are very rare since regular observations began in 1879. Beside the two last winters 1939/40 and 1940/41 that has been only the case in 1915/16 and 1916/17. (Oestman, 1941)

The sea-ice cover during the winter 1917/18 was evidently much less,

Sea ice cover, Baltic Sea, 1914-1919 How much did naval war contribute?



Total Area 420.000 km²
Source Finnish Marine Research 2009/www.arctic-warming.com

August 1914 to autumn of 1916: The first two war years are presumably irrelevant for initiation of the Arctic Warming toward the end of the war.

Autumn 1916 to November 1918: The naval war machinery went along in full gear since summer 1916, due to new weaponry and mass production. From now on to the end of 1917 the Allies lost, a ship tonnage of about 7,000,000 tons, which means every month between 70 and 350 ships (April 1917).

Photo # NH 103483 Depth charges exploding, during World War I



Exploding after being launched from an anti-submarine vessel's "Y-Guns", during World War I.

Source: USA-Naval Historical Center; / Photo #: NH-103483

During the remaining 10 full war months in 1918 the Allies lost another 2,500,000 tons. The total loss of the Allied ships tonnage during WWI is of about 12,000,000 tons, or about 5,200 vessels. Some five million tons of cargo and storage must have been on board the sinking ships. The total loss of all naval vessels (battle ships, cruisers, destroyers, sub-marines, and other naval ships) amounted to 650, respectively 1,200,000 tons.

What is the correlation between fierce fighting at sea, high ship losses (incl. cargo and store) and an exceptional summer sea icing in the North Atlantic during the months April to July 1917, which may have occurred only once since the Little Ice Age!



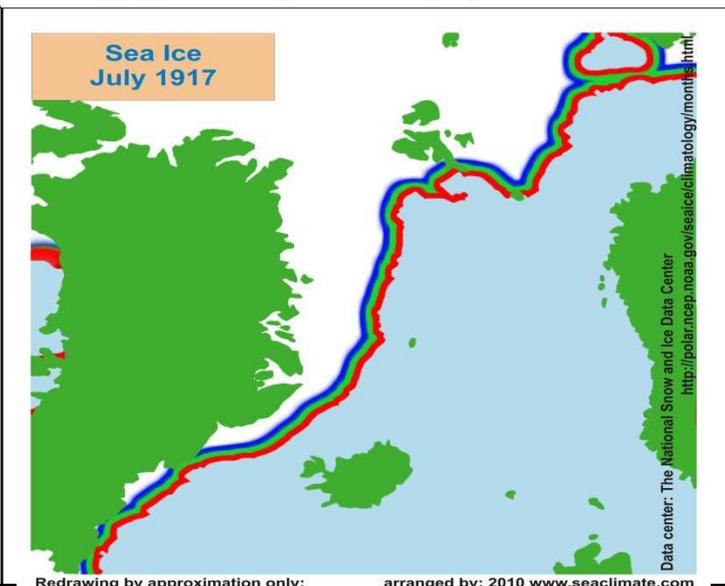
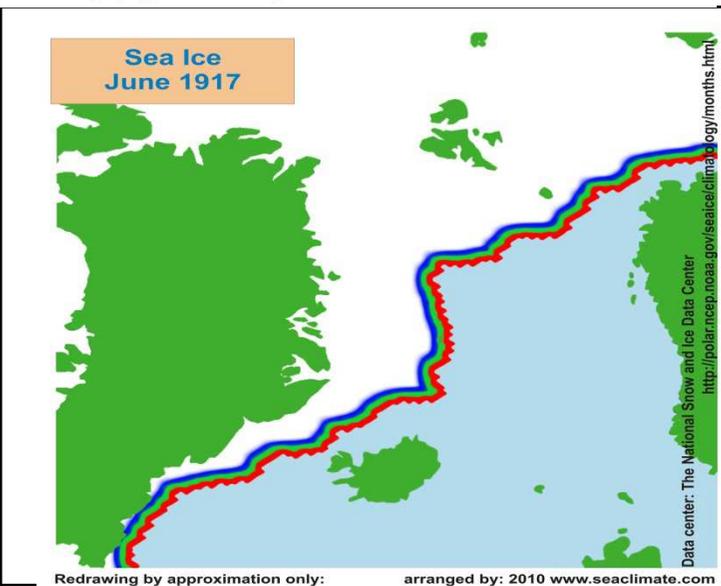
Redrawing by approximation only; arranged by: 2010 www.seaclimate.com



Note: Usually sea icing peaks in April. In 1917 it increased in May, remaining above max until July 1917.



Extraordinary Sea Ice in April, May, June and July 1917! Why?



QUESTION

Has a huge amount of melting sea ice in summer 1917 changed the ocean structure in Spitsbergen/ Arctic region?

A contribution of naval warfare a serious possibility^{13!}

The last war winter 1917/18 did not show unusual values,
 although January 1918 was the coldest since 1912!

BUT:

**A tendency to warming at high latitude emerged in spring
 1918, by higher air and sea-water temperature**)**

**) According L. Weikmann (1942) water temperature reached unusually high values of +7°/ +8°C in summer 1918.

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	-9.0	-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

The Norwegian B.J. Birkeland, who first published the Spitsbergen data, said:

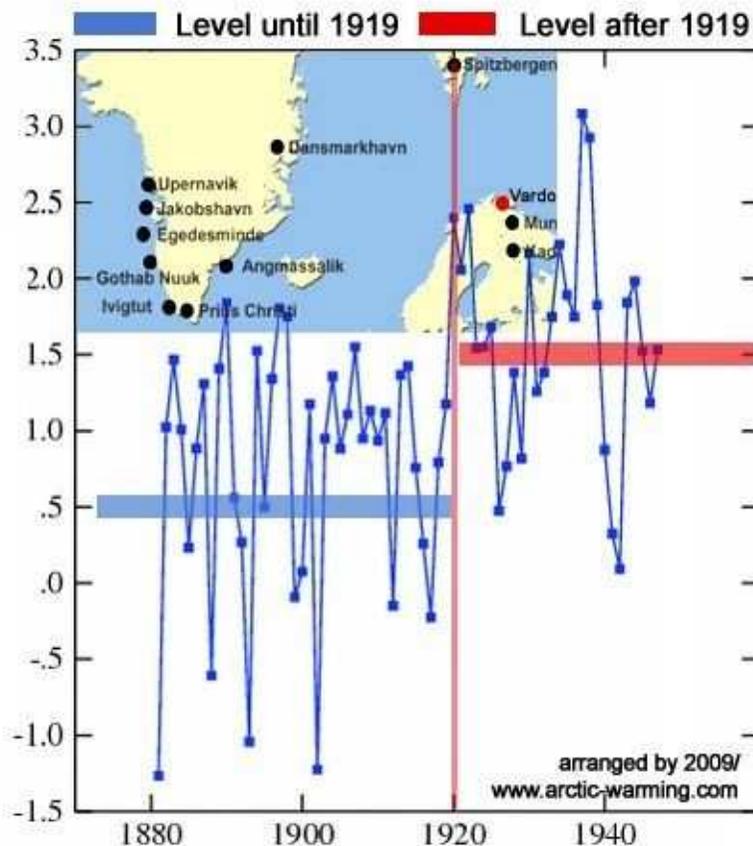
„In conclusion I would like to stress that the mean deviation results in very high figures, probably the greatest yet known on earth“

What may have, alone or combined, contributed to the most sudden and most pronounced climatic shift during the last 200 to 300 years?

Vardø – Norway (70.4°N, 31.1°E)

Annual mean temperatures °C

Source: NASA-GISTEMP - <http://data.giss.nasa.gov>



(1) The extraordinary NA summer sea ice, which can be a ,natural‘, or man-made event, and/or

(2) Ongoing massive naval war activities, e.g.

- open sea battles & bombing;
- hunting submarines;
- sea mine laying & sweeping!

For example: During the last 10 war months there were about 30 U-boats permanently at sea. Allies lost about 2,5 Mio.Tons (~ 1'000 vessels).

Or did sea mining and mine sweeping contribute in a significant way?

General Sea mining issue

Northern Barrage issue



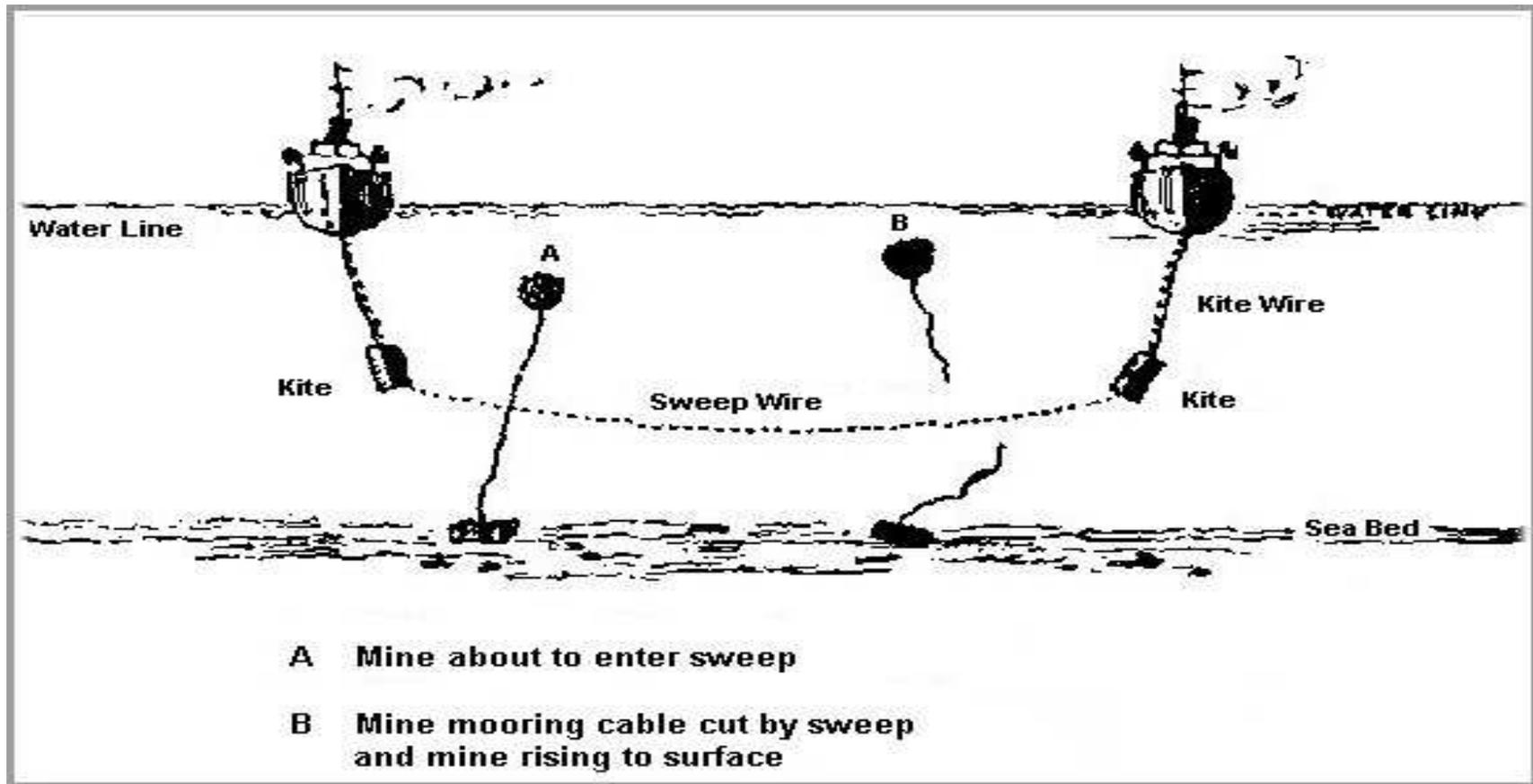
NORTHERN BARRAGE
70'000 sea mines laid from June to October 1918 to stop U-Boats



Source: US Navy Dep., Publ. No. 2&4, 1920.
2009/www.seaclimate.com

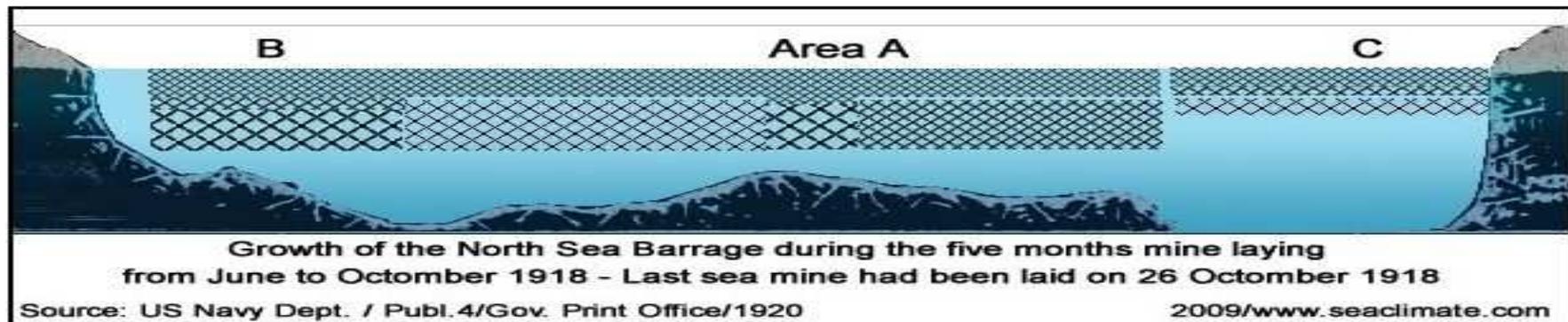
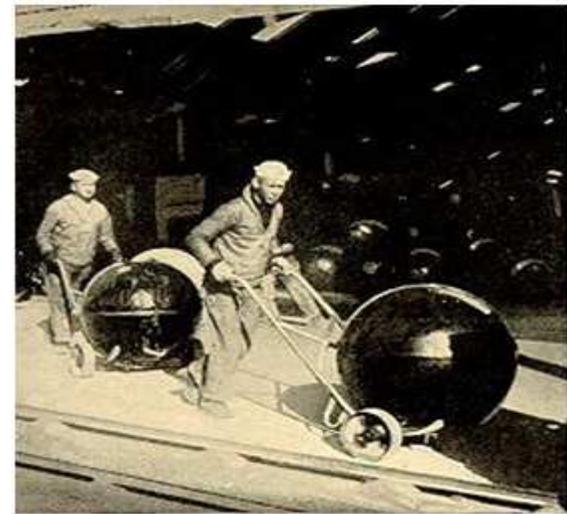
General sea mining issue!

A total of about 200,000 sea mines had been deployed. Of much powerful effect in churning the sea on a huge scale were those ships known under the name of minesweepers, which navigated the seas day and night to find and destroy mines. Britain alone had more than 700 operational minesweepers; the Germans came close, too.

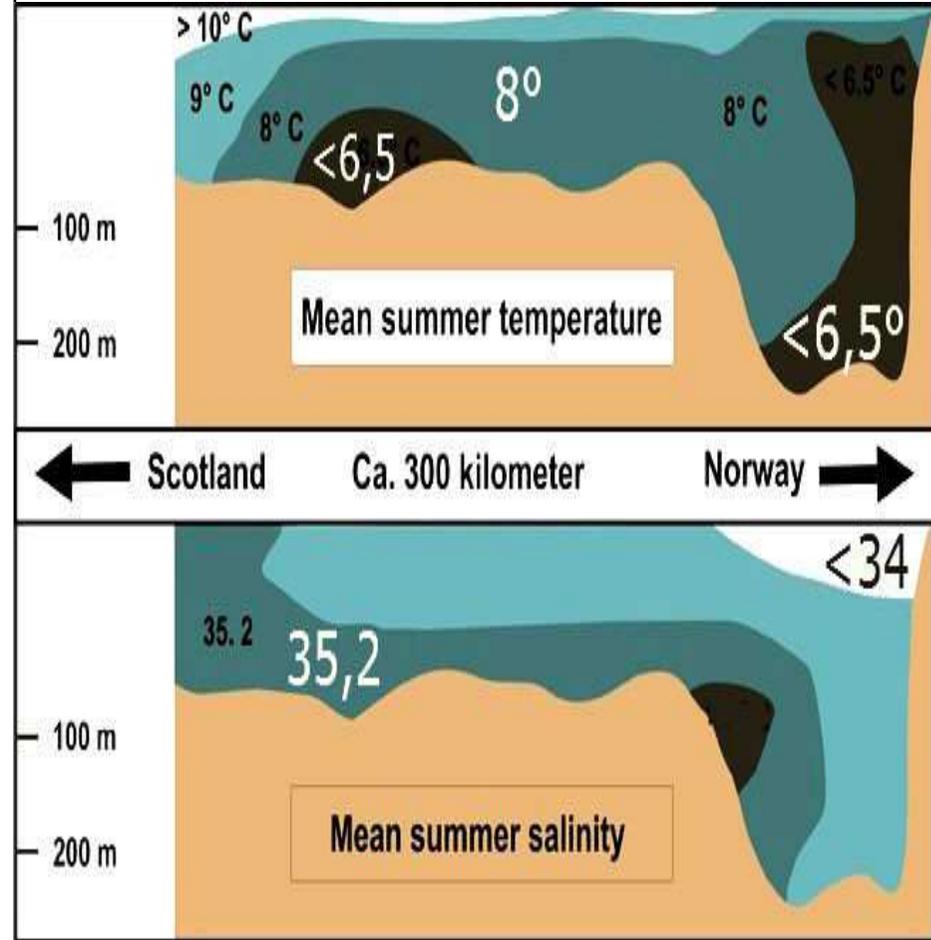
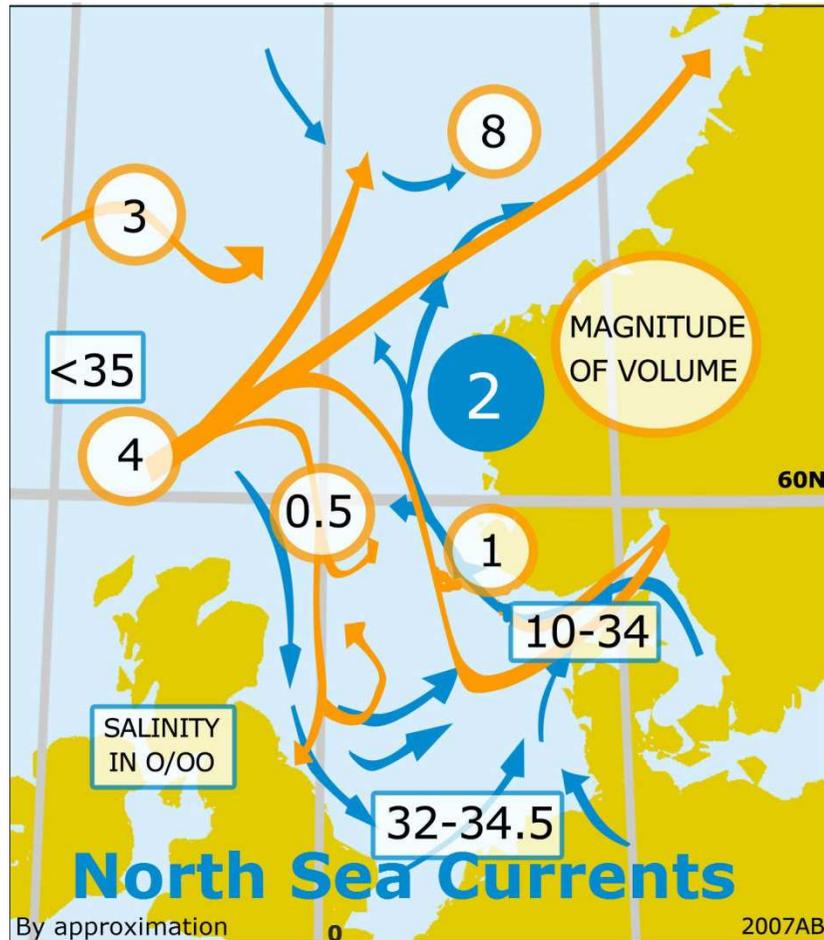


Special sea mine issue: Northern Barrage.

- The US & British Navy between Orkney Is. and Norway laid about 70'000 from March to October 1917.
- A especially designed mines MK6 (300 pounds TNT) were supposed to have an destructive radius of ~30 Meters against U-boats.



A highly sensible sea region used for the Northern Barrage!



All water flows North, and reaches the Atlantic sector of the Arctic Ocean within a couple of weeks or months!

The official NORTHERN BARRAGE map.



Mine sweeping started in spring and ended in autumn 1919. From more than 73,000 mines

- __ about 5,000 exploded prematurely soon after laying
- __ 20,000 mines were disposed of while the work was in progress
- __ from the remaining ca. 50,000 mines
- __ more than 30,000 mines were already 'gone' in spring 1919,
either drifted away, or exploded during winter storms;
- __ rest 20,000 were swept in 1919.

Six months of sweeping operation comprised seven sweeping missions involving more than 70 vessels and 10 supply vessels.

The close correlation between naval warfare and sudden warming of NA/Arctic region is indicated in observations by Hesselberg & Johannessen (1958)

"Of special interest are the data from Spitsbergen where the series of observations go back to 1912. During the first years the observations show no conspicuous climatic change, but then comes a rapid rise of temperature in the year 1917 to 1922. The increase of mean temperatures in this period was about 7 degrees Celsius in the winter, 3 degrees in the spring, 3 degrees in the summer, 3 degrees in the autumn and 4 degrees for the whole year. After the year 1922 temperatures continued to rise until the war broke off the series, but the rise was then much slower."

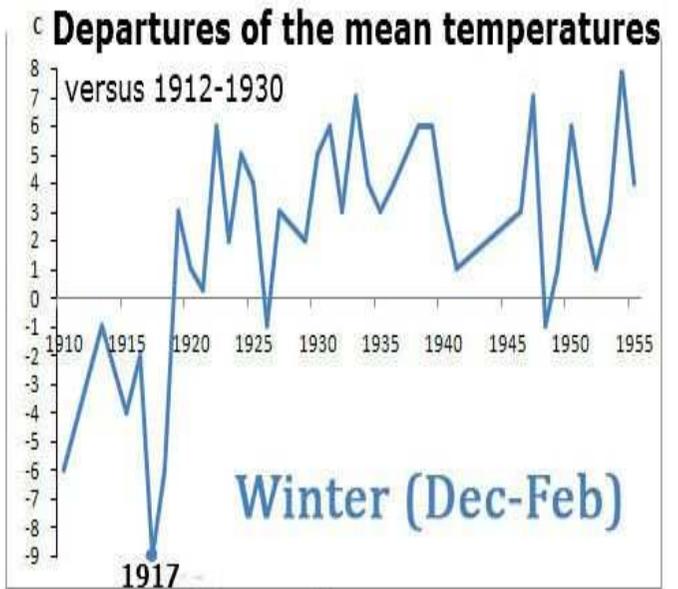
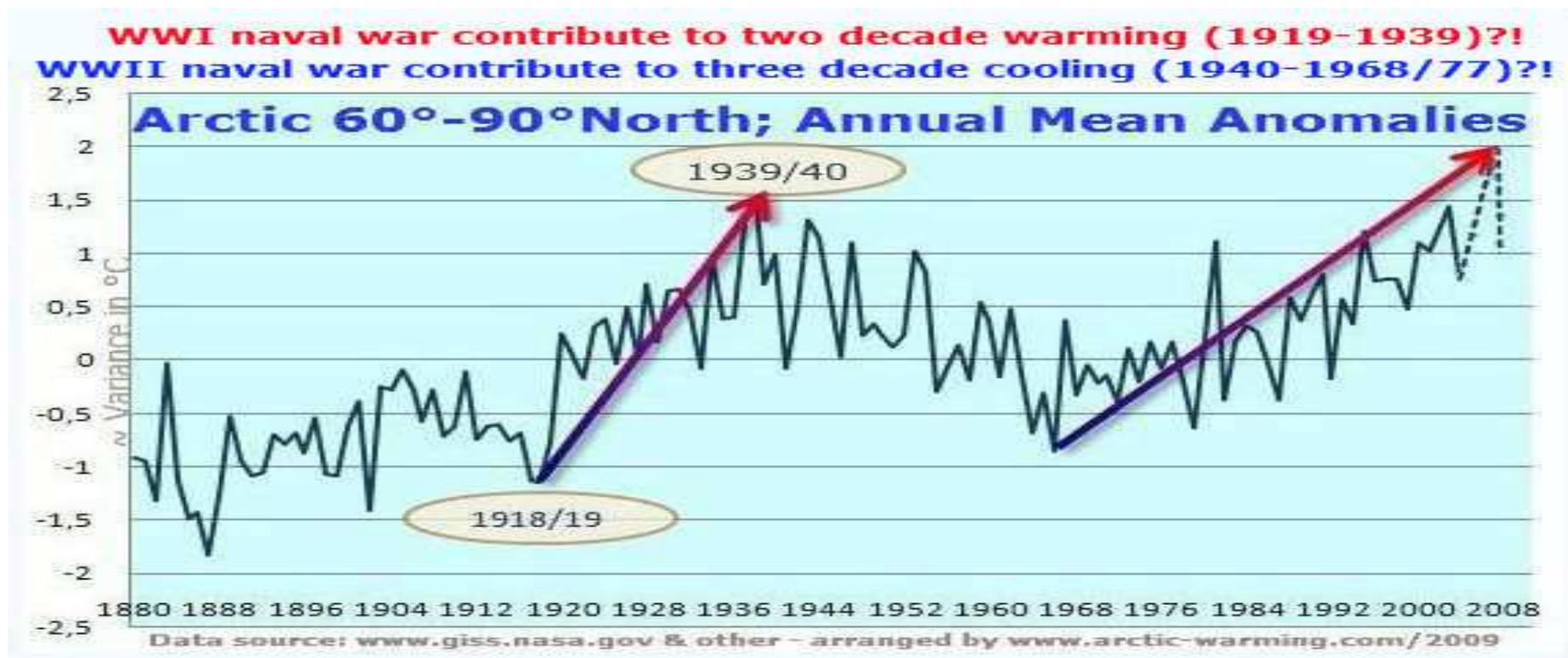


Image data based on source: Hesselberg & Johannessen, in: "Polar Atmosphere Symposium" (Oslo 1956), London 1958

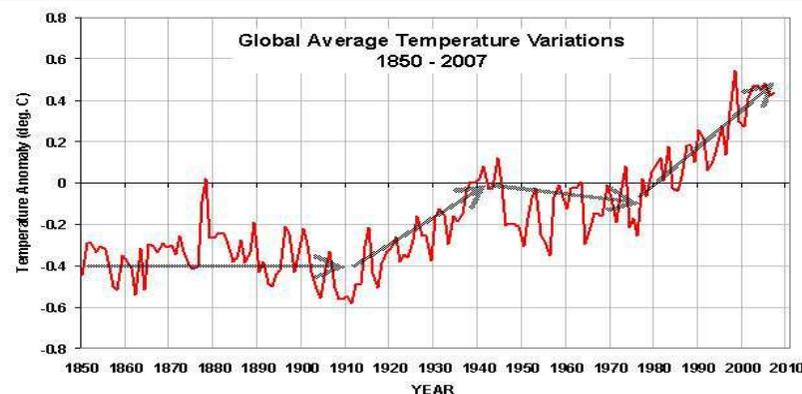
- Naval war was on scene when the early Arctic warming commenced in winter 1918/19.
- Naval war was on scene when the trend changed to cooling in winter 1939/40, which lasted until mid 1970s.



It seems high time to establish the cause of the two most pronounced climatic changes during the last two millenniums!

Summary:

The close timely and strong physical correlation between naval warfare from 1914-1918 may evidently confirm that man can change climate within a short time period, and science should demonstrate competence with thorough research, analysis and convincing explanations!



**Many thanks for your
kind interest!**

More related lectures are published at:

<http://climate-ocean.com/>

The Early Arctic Warming in detail:

Black & White Edition in U.S.A.

Arctic Heats Up. Spitsbergen 1919 to 1939

116 pages and ~100 b/w figures.

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Colored Edition in Europe

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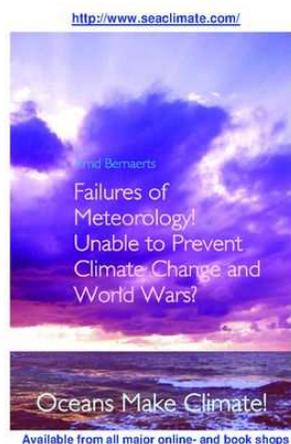
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