

Modern research on the era

1 This is a very well written and illustrated e-book on the arctic warming 1919 to 1939 by **Dr. Arnd Bernaerts** with numerous references in the Bibliography

<http://arctic-heats-up.com/>

2) This is the definitive 2010 Polyakov et al history of arctic. It covers a very broad sweep of history, so whilst not strictly relevant to our narrow look at only a few decades, it is nevertheless worth reading.

http://bprc.osu.edu/geo/publications/polyak_etal_seaice_QSR_10.pdf

3) **Variability and Trends of Air Temperature and Pressure in the Maritime Arctic, 1875–2000**

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<http://journals.ametsoc.org/doi/pdf/10.1175/1520-0442%282003%29016%3C2067:VATOAT%3E2.o.CO%3B2>

4) “We have investigated (says [Dr. Kurt H. Kjær](#)) no less than 132 glaciers on a 600 km coastal stretch in Southeast Greenland, both those who terminate on land and those who calve in the ocean. The historical photos have proven to be extremely valuable, and with these photos and other aerial photos recorded later during WWII and satellite imagery we are able to observe glacier change in very long historical context. In the early 1920s and 1930s, temperatures were high, similar to that of the present, and this affected the glacial melt. At the time many glaciers underwent a melt similar or even higher than what we have seen in the last ten years. When it became colder again in the 1950s and 1960s, glaciers actually started growing.... There should be no doubt that if the current temperature rise in Greenland continues then we will have problems with the melting of the glaciers”

<http://www.nature.com/ngeo/journal/vaop/ncurrent/extref/ngeo1481-s1.pdf>

5) Useful article on history of arctic ice with many photos and graphics

http://www.science20.com/chatter_box/arctic_ice_october_2010

Contemporary material from the era

6) Of considerable scientific interest are the voyages of explorers who took advantage of the melting arctic ice and an unlikely matinee idol of the age was the respected scientific explorer Bob Bartlett who featured in numerous Pathe news reels with his ship the 'Morrissey'.

' Under "Bob" Bartlett, "the little *Morrissey*" made 20 regular voyages north, at one time reaching within 600 miles of the Pole, documenting the frozen north, its flora and fauna, and people for patrons ranging from the National Geographic Society, the Smithsonian Institution, the Cleveland Museum of Natural History, the Museum of the American Indian, and others. Star of Pathe newsreels and David Putnam's adventures for boys, *David Goes to Greenland* and *David Goes to Baffin Land*, which spread the name and fame of the venerable master and his schooner, Cap'n Bob and *Morrissey*, were as famous to the generation of the 1920s and 30s as Jacques Cousteau and *Calypso* were to the generation of the 1960s and 70s.'

http://www.mass.gov/dcr/stewardship/curator/Ernestina_RFEI_2012.pdf

7) 1906 report of shrinking glaciers

<http://trove.nla.gov.au/ndp/del/article/38087689?searchTerm=%22climate%20change%22&searchLimits=>

"Is the Earth getting warmer? That the earth is growing temporarily warmer is shown by the mountain glaciers. These are made by varying temperature and moisture to increase and diminish in size during periods of years that may be found to be more or less regular cycles, and a period of quite general decrease began about 45 years ago. This has continued, with many local interruptions, as in the case of Glacier Blanc, which advanced from 1889 to 1896. The latest report includes 90 glaciers in the Swiss Alps, in Norway, Greenland, the Caucasus, the Pamir, the North West United States, Western Canada. and Africa, and practically all are growing smaller. In the Savoy Alps and the Pyrenees small glaciers have quite disappeared.

8) 1923

<http://trove.nla.gov.au/ndp/del/article/23668813?searchTerm=%22climate%20change%22&searchLimits=>

This event was widely reported at the time, but as it has not been possible to definitively confirm the reality this item is put here for its interest value;

“Discovery of island previously ice buried; Christiania, September 1 1923

The Norwegian, Captain Wiktor Arnesen, who has just returned from the Arctic, claims to have discovered an island 12 miles in circumference near the Franz Joseph Island, in latitude 80.40. He says that the island previously was hidden by an iceberg between 70 and 80 feet high, which has melted, showing the exceptional nature of the recent thawing in the Arctic.”

9) Heat wave at Soviet North Pole—from 1937

<http://news.google.com/newspapers?id=LlgyAAAIBAJ&sjid=mbYFAAAAIBAJ&pg=6209,4507387&dq=heat&hl=en>

10) From 1940

[.http://trove.nla.gov.au/ndp/del/article/40934044?searchTerm=greenland%20%20melting&searchLimits=](http://trove.nla.gov.au/ndp/del/article/40934044?searchTerm=greenland%20%20melting&searchLimits=)

“Is the Arctic climate becoming more temperate? Remarkable new information given by the famous Swedish authority, Professor H. W. Ahlmann in a lecture to the Swedish Geographical Society, suggests that this may be the case. Professor Ahlmann was speaking on the collated results of his expedition to north-east Greenland, and he stated that the glaciers there showed clear signs of a change towards a warmer climate. As had been observed in other parts of the Arctic, especially in Spitzbergen, the melting had increased rapidly. By far the largest number of local glaciers in north-east Greenland had receded very greatly during recent decades, and it would not be exaggerating to say that these glaciers were nearing a catastrophe.”

11) 1946 Antarctic

<http://trove.nla.gov.au/ndp/del/article/46245346?searchTerm=ice%20free%20arctic&searchLimits=>

“Climatic problems. South Pole weather changes. International Investigation. OSLO, Dec. 3.--Snow-travelling jeeps will be used by a joint Anglo Norwegian-Swedish Antarctic expedition, probably in 1948-49. Supplies will be parachuted to the scientists on the ice. The main purpose of the expedition is to study climatic changes believed to be occurring at the South Pole. The scientists will also investigate the related problems of glaciology, meteorology and geology and climatic history. Professor

Hans Ahlmans, the Swedish glaciology expert, is interested to know whether the Antarctic territories in the future will become a vast fertile and habitable continent. Research showed that the Arctic ice was thinning comparatively fast before the war and Antarctic expeditions saw mountains free of both ice and snow. The expedition expects to find much coal. The Norwegians suggest an International conference to consider the unsettled question of Antarctic sovereignty.”

12) From 1947

<http://trove.nla.gov.au/ndp/del/article/46315410?searchTerm=global%20warming&searchLimits=>

“LOS ANGELES, May 30.-The possibility of a prodigious rise in the surface of the ocean with resultant widespread inundation, arising from an Arctic climatic phenomenon was discussed yesterday by Dr. Hans Ahlmann, a noted Swedish geophysicist at the University of California Geophysical Institute.

A mysterious warming of the climate was slowly manifesting itself in the Arctic, Dr. Ahlmann said, and, if the Antarctic ice regions and the major Greenland ice cap should reduce at the same rate as the present melting in the Arctic, oceanic surfaces would rise to catastrophic proportions and people living in the lowlands along their shores would be inundated. He said that temperatures in the Arctic had increased 10deg. Fahrenheit since 1900--an "enormous" rise 'from a scientific standpoint.

The waters in the Spitsbergen area in the same period had risen three to five degrees in temperature and one to one and a half millimeters yearly in level. "The Arctic change is so serious that I hope an international agency can speedily be formed to study the conditions on a global basis." he added. He pointed out that whereas in 1910 the navigable season along western Spitsbergen lasted three months it now lasted eight months.”

13) From 1951- extended piece on general arctic warming, talks of Greenland warming up 4 degrees since 1912

<http://trove.nla.gov.au/ndp/del/article/59534920?searchTerm=greenland%20melt&searchLimits=>

14) This from 1957

<http://news.google.com/newspapers?id=i3ZWAAAIBAJ&sjid=2OQDAAAIBAJ&pg=1581,5524109&dq=heat+wave+north+pole&hl=en>

Report of almost tropical arctic which reinforces the earlier article of the Soviet researchers wearing rubber boots to walk through the water that had collected on top of the ice.

15) **“Here we use a network of high-resolution terrestrial proxies from the circum-Arctic region to reconstruct past extents of summer sea ice, and show that—although extensive uncertainties remain, especially before the sixteenth century—both the duration and magnitude of the current decline in sea ice seem to be unprecedented for the past 1,450 years. “**

<http://www.nature.com/nature/journal/v479/n7374/full/nature10581.html>

16) Whilst the article is behind a pay wall the supplementary information is not and includes tree ring data. Table S1 from here

<http://www.nature.com/nature/journal/v479/n7374/extref/nature10581-s1.pdf>

17) Whilst not strictly relevant to this article this item will be of interest when trying to fill in the gap between the 1940's and present day-includes very useful graphic of 1951-1999 sea ice

http://gcmd.nasa.gov/records/GCMD_SOCC_Sea_Ice_Extent1951-1999.html

“Abstract: Prior to 1950, the reconstruction of the historical record for sea ice suffered from lack of data and incomplete coverage. Since then, however, most circumpolar countries have kept regular comprehensive sea ice extent and concentration charts for waters in their jurisdiction. In order to obtain a consistent homogeneous picture of sea ice, these various ice charts have been combined with satellite observations (starting from 1972) to produce a comprehensive over 50 year record for the northern hemisphere.”

18) This is very useful for a future article as it includes a sea ice index 1600 to 1840;

Sea Ice, Climate, and Icelandic Fisheries in the Eighteenth and Nineteenth Centuries

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<http://pubs.aina.ucalgary.ca/arctic/Arctic53-4-383.pdf>

19) Historical documentary data sets-

<http://www.ncdc.noaa.gov/paleo/historical.html>

20) This is a really excellent description of arctic exploration through the ages

http://www.whoi.edu/beaufortgyre/history/history_exploration.html

21 In this intriguing examination of the Dmi maps an estimate is made of likely sea ice during the period-see diagrams 17 and 19.

<http://hidethedecline.eu/pages/posts/arctic-sea-ice-data-collected-by-dmi-1893-1961-259.php>

22 This link leads to a detailed examination of the period

<http://www.climate4you.com/ClimateAndHistory%201900-1949.htm#1940:%20Long%20sailing%20season%20and%20occasionally%20no%20winter%20ice%20on%20fjords%20in%20western%20Spitsbergen>

23 This article looks at arctic climate change through the prism of the Polar bear population who need to adapt to changes in ice as the climate warms, cools, then warms again;

*“Several authors have presented data indicating that sections of the Arctic have experienced warming trends prior to about 1950 and have experienced cooling trends since that time. Zubov’s (1943) data show a warming of the Arctic for approximately 100 years prior to publication in 1943. He shows that Arctic glaciers have receded and the southern boundary of Siberian permafrost has moved northward..... Zubov (demonstrated) mean ice thickness was one-third less and the mean air temperature 4^oC higher in 1937-40 than in 1893-96. Dorf (1960) quotes Willett (1950) who states that in Spitsbergen mean winter temperatures have risen ~8[sic] between 1910 and 1950. ...**Mitchell (1965) states that world climate during the past century has been characterized by a warming trend from the 1880’s to the 1940’s. Thereafter, the warming trend appears to have given way to a cooling trend that has continued to at least 1960 with some evidence that it was continuing to 1965.**”*

<http://polarbearsience.com/2013/03/31/polar-bear-sea-ice-relationships-what-biologists-knew-in-72/>
