

## Three year ice package, 1939-1942 (3\_31)

### From highest warmth to lowest cold

The last decade before WWII was the warmest period since meteorology had started recording around the globe in the 18<sup>th</sup> century. To this extent, the weather had been gaining strength since the Little Ice Age, which ended around the middle of the 19<sup>th</sup> century. Since then global temperatures had risen steadily. Even the eruption of the Krakatoa volcano in Indonesia on August 27, 1883, whose dust clouds spread around the globe and blocked solar radiation by up to 20% for three years<sup>1</sup>, had no significant effect on the weather and the climate. At least, no occurrences of record weather conditions had been reported from anywhere.



About half a century after the Krakatoa eruption, the weather played havoc in Europe during the winters of 1939-42. Suddenly, there were three arctic winters that could be included in the league of the coldest winters during the Little Ice Age one hundred years ago. There were no major volcano eruptions, no earthquakes, no sunspots, nor did a big meteorite fall to the earth anywhere. Only a war had been started in Europe in September 1939. Suddenly, 'a force' emanated which needed the shortest period of time to take Europe back to the Little Ice Age. What an enormous energy and dust cover released by the Krakatoa over a period of three years could not achieve, namely a significant modification of regional or global weather, occurred in Europe, out of the blue, within a quarter of a year after the war had started. European winters turned from mild to arctic. Each of the triple war winters (1939-42) is discussed elsewhere in detail.



### Two 'war at sea' phases during WWII

A further strong indication of the enormous impact the Second World War (WWII) had on weather modification and climate change can be found if one reviews the first three war years, and their corresponding winters of 1939/40, 1940/41 and 1941/42, as a 'package'.

<sup>1</sup> Wexler, Effects

For two and a half years, from September 1939 until spring 1942, the war at sea had been largely confined to Europe's seas or close-by waters. Most of the military activities took place in the Baltic Sea, the North Sea, the Eastern part of the North Atlantic and the Mediterranean Sea. This changed completely within a few months after Japan's attack on Pearl Harbour on December 7th, 1941, and when the United States joined the Allies as a party in war against Japan and Germany. The picture of the war at sea changed dramatically, when it became global and entire areas of the North Atlantic and North Pacific became major battlegrounds. The war machinery increased to dimensions anyone could have hardly imagined prior to the Pearl Harbour event. The global war at sea from 1942 to 1945 is discussed in chapters: 'Oceans at war', and 'Ocean system affected'. The focus of attention in the following is on the time period when the war at sea was mainly confined to European waters.

### **Climatic relevance of the two phases**

Before looking at the European 'three war winter package', brief considerations should be given to the presumed relevance or difference that each phase may have had on the significant climate change that started with the winter of 1939/40. So far it is widely accepted that global temperatures reflect a significant cold phase from 1940 until the end of the 1970's. Any immediate impression that this trend was caused by only one event may lead to a wrong conclusion. The war at sea from 1939-45 had two distinct periods: the regional war at sea in Europe (1939-42), and the global war at sea (1942-45).

With regard to ocean structures and dynamics, a war at sea confined to European waters is an event that differs from the turmoil caused by the 'stirring and mixing' of entire ocean areas for more than three years continuously. Actually since 1942, all seas in the Northern



Hemisphere, from Murmansk to Florida and from the Bering Sea to Manila, had been 'ploughed through' in combat by many thousands of ships, torpedoes, bombs, depth charges and sea mines.

The most obvious practical impact of the extended war at sea since 1942 was that the global war at sea impeded further severe war winters in Europe. This does not mean that the 'war impact' on Northern European waters had been diminished, but that the global sea water 'stir and mix' effect superseded the regional impact (e.g. to early cooling of regional sea water).

From a logical point of view, one might expect that if all military activities had been stopped in December 1941, the climate would have quickly recovered to pre-war conditions. In this case, the three severe war winters from 1939-42 could have been regarded as 'modified' by the war at sea.

However, as recent precedents to the 1939/42 events indicate, that logic would lead to a wrong conclusion. As will be shown in other chapters, the specific warming in the Northern Atlantic realm in the 1920's and 1930's had most likely been caused by the war at sea during 1st World War (WWI). (A) Insofar, one could expect the 1920's-1930's warming trend to continue, if not to increase.

Further details: (A) Spitsbergen heats up, 5\_12.

As the war at sea had not been terminated in December 1941 but went global instead, the trend changed to cooling, thus indicating that it makes sense to clearly distinguish between pre and post Pearl Harbour with regard to weather modifications and climatic changes.

### **War and the seasons**

The relevance of annual seasons and geographical regions has been repeatedly emphasised in other papers. Making any distinction is to select those periods most suitable for climate change research. In Northern Europe there are seasons when the daily influence of the sun is reduced and is thus weak. During winter the ocean and seas become the most direct, if not the sole 'weather generator'. An impact of the war machinery on the sea is easier to trace in the absence of the otherwise dominating climatic factor, the sun.

In summer a war at sea will generate the same 'alterations' to the hydrodynamics of the seas (although sometimes with totally different consequences), but it will be much more difficult to identify changes in the behaviour of the weather, though the relevance is obvious. From the moment the sun is in a position to warm the sea surface, any 'stirring and mixing' by military activities will force the warm surface water into depths. Once energy is stored in water, it will remain there for quite a while. Even this process may show a climatic effect during the summer season, as briefly explained in the next section.

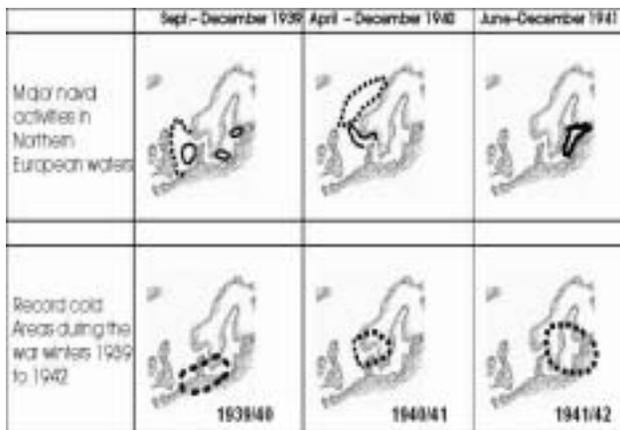
### *Three war summer: 1940 -1942*

In countries close to the North Sea and Baltic Sea, the three war summers were generally regarded as fine, sunny and dry. After cold winters, this has not happened for the first time. The cold water of the seas gives the area a more continental impact with more sun and subsequently more warm and summery weather. By war-at-sea-activities the period of cold surface water may have been prolonged, and thus extended the continental weather period beyond normal.

### *Centres of record winters*

It is interesting to observe that certain regions reported record climatic events on the one hand and on the other hand had seen intensive military activities 'close by'.

1939/40: Germany reported a record cold winter. In fact heavy mining, fighting (e.g. Gdansk), military surveillance, transport and exercises took



place in the coastal waters of the Baltic Sea during pre-winter months.

1940/41: Norway claimed to have recorded

low temperatures as never measured before at a number of stations in southern Norway

immediately after the Germans had invaded Norway in the summer, and mine warfare and fighting continued along its coast, and heavy ship movements took place between Germany and Norway thereafter.

1941/42: Sweden and Stockholm claimed the coldest winter in more than 130 years, after the German invasion of Russia, codenamed 'Barbarossa', brought heavy fighting to the Baltic countries from June to December.

The centre of the cold was 'in the middle of the Baltic and North Sea' somewhere between Hamburg and Skagen. Not only Sweden claimed the third winter of 1941/42 as the coldest, but also Denmark<sup>2</sup> and The Netherlands<sup>3</sup>, leaving the first war winter 1939/40 'only' a second place.

<sup>2</sup> Det Danske

<sup>3</sup> Labrijn

### Scientists’ observations of war winters 1939-1942

The occurrence of three very severe winters in succession during WWII, can be regarded as a major evidence to prove that this was not a natural variation, but was caused by massive military activities in Northern European waters. Before discussing this matter further, the exceptionality of these winters shall be discussed with reference to remarks of scientists, who are ‘contemporary witnesses’ and whose work had been published already during WWII, or soon after these remarkable winters.

#### *Drummond 1943 – Kew Observatory*

Drummond<sup>4</sup> started his essay on data from Kew Observatory with the following text: “The present century has been marked by such a widespread tendency towards mild winters that the ‘old-fashioned winters’, of which one had heard so much, seemed to have gone for ever. The sudden arrival at the end of 1939 of what was to be the beginning of a series of cold winters was therefore all the more surprising. Never since the winters of 1878/79, 1879/80 and 1880/81 have there been in succession three so severe winters as those of 1939/40, 1940/41 and 1941/42.” He further points to another significant aspect with regard to the theme of this investigation: “Since comparable records began in 1871, the only other three successive winters as snowy as the recent ones 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”. Drummond’s table showing the percentage of days of snowfall is as follows:

| Year                | December | January | February | Dec.- Feb. Means |
|---------------------|----------|---------|----------|------------------|
| 1939 -40            | 6        | 32      | 24       | 21               |
| 1940-41             | 6        | 36      | 29       | 23               |
| 1941 -42            | 3        | 42      | 46       | 30               |
| Average(1871– 1938) | 6        | 10      | 11       | 9                |

Comment: The snow issue is a marvellous piece of evidence to link war at sea and weather modification.

#### *Lewis 1943 – British Isles*

Lewis<sup>5</sup> made the following two statements concerning the snow-cover in the British Isles in January and February of the severe winters of 1940, 1941 and 1942. “The three consecutive winters of 1940, 1941 and 1942 were, however, unusually severe; the snow was



<sup>4</sup> Drummond

<sup>5</sup> Lewis.

<sup>6</sup> Liljequist, Stockholm

considerable and the number of days of snow-laying comparatively large”. “Three such severe winters in succession as 1940, 1941 and 1942 appear to be without precedent in the British Isles for at least 60 years, a similar succession occurring from 1879-1881.”

*Liljequist 1943 – Stockholm*

Liljequist<sup>6</sup> writes: Very cold winters in Sweden occur as a rule under circumstances when the atmospheric circulation is weakly developed, but

they are sometimes intensified due to eruptions of cold air from the Arctic. Three consecutive cold winters are scarce. During the period 1757-1942 only three such cases occurred (means temperature of December – March lower than minus 5° C); for which the figures are shown.

**Stockholm**

The coldest successive winter years in the period  
1757 to 1942

| Mean     | 1783- 1784<br>1784- 1785<br>1785- 1786 | 1802- 1803<br>1803- 1804<br>1804- 1805 | 1939- 1940<br>1940- 1941<br>1941- 1942 |
|----------|--|--|--|
| - 5,5° C | ↓ ↓                                    | ↓ ↓                                    | ↓ ↓                                    |
| - 5,6° C |  |  |  |
| - 5,7° C |  |  |  |
| - 5,8° C |  |  |  |
| - 5,9° C |  |  |  |
| - 6,0° C |  |  |  |
| - 6,1° C |  |  |  |
| - 6,2° C |  |  |  |
| - 6,3° C |  |  |  |

Source Gösta H. Liljequist

Comment: The result is remarkable. Not only is 1939-42 clearly the coldest

group of three winters, but also the difference to the next coldest group is astonishing. While the difference between the other two record groups is 0.1 C° the difference between 1802-05 and 1939-42 is 0.6° C.

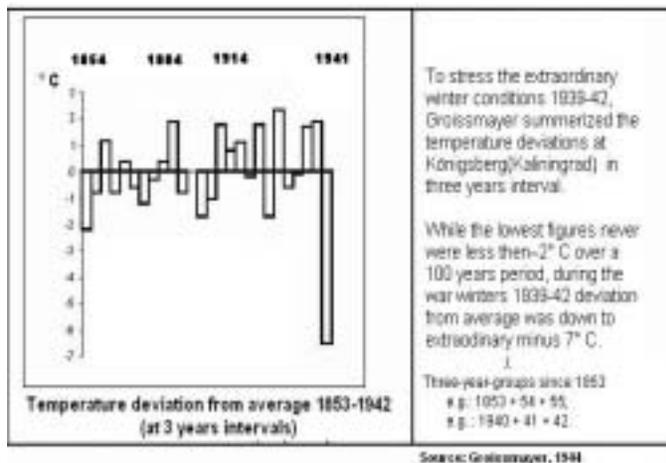
Liljequist summarizes his results on Stockholm’s cold winters from 1757-1942 as follows (excerpt): Since the beginning of temperature observations from about 1760 up to the decade 1931-1940 mean temperatures of the winter have increased by about 2° C. This tendency is especially marked from the middle of the 19<sup>th</sup> century. The number of severe winters has decreased in recent years, while mild winters have remained rather constant in number.

Liljequist concludes his summary (excerpt): The remarkable change in the winter climate came to an abrupt end in 1940, with three severe winters 1940, 1941 and 1942. It is noticeable that one of the very mildest series of three winters, viz. 1938-1939 preceded the most severe ones, 1940-1942.

Comment: War at sea in general, and the cold winters of 1939/40 and 1941/42 in particular, the extensive fighting in the Baltic Sea and the Gulf of Finland provide the only plausible explanation for the severity of the war winters of 1939-42 in Sweden.

*F.B. Groissmayer<sup>7</sup>*

As early as in the war year 1944, Groissmeyer summarized temperature data according to three year intervals starting in 1853 until the third war winter 1941/42. The result is shown in the corresponding graph.



*Hesselberg and Birkeland 1956 - Norway*

Authors Hesselberg & Birkeland<sup>8</sup> give a number of information on the particular speciality of the three war winters. With regard to the most exceptional winter of 1940/41 in respect of Norway, the winter that followed the German occupation of the country in summer 1940 is outlined in greater detail in chapter: Occupation of Norway (page 153). Most remarkable is the fact that only South Norway actually experienced three severe winters due to its closeness to the North and Baltic Sea which was one of the main areas of war at sea activity. According to the authors, who provide only departure figures from the corresponding mean values for the period 1901-30, some figures concerning Southern Norway (in approximation) are given as follows: The means deviations for the period 1940-42 from the mean values for the period 1901-30:

Approximate figures for Southern Norway (Source: Hesselberg)

|                         | <b>Winter</b> | <b>Spring</b> | <b>Summer</b> | <b>Autumn</b> |
|-------------------------|---------------|---------------|---------------|---------------|
| Atmospheric pressure    | +6 mb         | +3 mbar       | +0,5 mbar     | +0,5 mbar     |
| Air temperature         | -4°C          | -1°C          | +0,3°C        | +0,2°C        |
| Amount of precipitation | - 12%         | - 8%          | +2%           | +3%           |
| Wind from the north     | +24%          | +8%           | +4%           | +7%           |
| Wind from the east      | -5%           | 0             | 0             | -2%           |
| Wind from the south     | -17%          | -10%          | -6%           | -9%           |
| Wind from the west      | -1%           | +2%           | +2%           | +4%           |

Comment: The change in wind directions from the south to the north is quite remarkable. It indicates an enormous flow of air towards the North Sea and

<sup>7</sup> Groissmeyer, 1944

<sup>8</sup> Hesselberg, Birkeland

the Baltic Sea, the main areas of military activities at sea since 1939, until the war at sea went global in 1942.

### *Rodewald – Severe Winters*

Rodewald<sup>9</sup>, expressed his surprise at the arrival of three cold winters, in particular, that they came so suddenly, and contrary to the principle of conversion of the circulation and temperature deviation. Rodewald<sup>10</sup> points to the air pressure aspects in the Atlantic during the months preceding the winters (1939-42) as follows:

- From October to November a huge area of low depression covers most of Europe. The centre with –11mb (from mean value) is stationed between Norway and Shetland (entrance to the North Sea), which is usually south of Iceland.

Comment: The movement of the centre to the east has most likely been caused by the military activities in Europe's northern seas; whereby increased evaporation would be reflected in lower air pressure.

- December shows an inverse picture. Europe is dominated by a pressure increase of +12mb (from mean value) with the centre west of the Hebrides.

Comment: During the three Decembers (1939-42) the seas in Northern Europe were no longer able to sustain (the usual) maritime conditions. Due to a 'stir and mix' effect, they were too cold and therefore would soon be subjected to continental (high air pressure) influence. According to Rodewald the positive anomaly in December would, by rushing to Northwest Europe in January, actually generate strong Mid European winters. He included in his investigation two other cold winters during the first half of the 20<sup>th</sup> century, viz. the winters of 1928/29 and 1946/47 (A). An interesting question as to why those winters remained solitary while the winters of 1939-42 came in succession, will be answered only with regard to the latter. As the war at sea during these winters was particularly a war in the North Sea and Baltic Sea, it can be regarded as an evidential indication of a link between the war and the war winters of 1939-42.

Further details: (A) Winter 1946/47 & 1928/29. (4\_21).

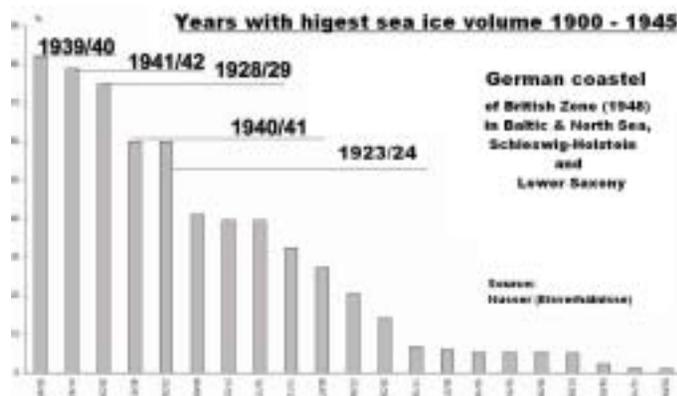
### **Three ice winters in the Baltic Sea**

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<sup>9</sup> Rodewald, Winter I

<sup>10</sup> Rodewald, Winter II

A brilliant indicator of the severity of a winter in the Baltic Sea and its bordering countries is the annual feature of icing. With the extent and severity



of ice during the three war winters of 1939-42 it should be possible to provide ample proof that this extraordinary situation could only have been generated by intensive military use of these waters over the time period in question. Main aspects are summarised as follows:

- First and foremost there is the suddenness and severity of each of these ice winters for which no other cause could be attributed than the war at sea.
- It is possible to establish a direct link between the extent of activities in the Baltic Sea and the degree of icing and arctic winter conditions:
  - 1939/40 intensive military activities, Gdansk, mining western Baltic and Gulf of Finland, Finnish-Russian war at sea, resulted in very heavy ice.
  - 1940/41 there were only general naval activities and as such icing was less serious compared to the previous year, but nevertheless it was a severe ice winter.
  - 1941/42 The Germans invaded Russia and had been fighting with the Russian Baltic Fleet for five months during June-December 1941 in the Central and the Northern Baltic Sea, resulting in the most extended and heavy icing ever observed.

Another proof of great importance is the fact that there has never before been such a severe icing. It should be noted that over the observation period the general mean temperatures in Sweden and in the Northern Hemisphere rose roughly one degree, while the winter temperatures in Stockholm had risen about 2°C since 1761<sup>11</sup>. This comparison of extreme winter situations from the late 18<sup>th</sup>, or early 19<sup>th</sup> century to similar events in mid 20<sup>th</sup> century, will make the latter appear even more severe and extraordinary.

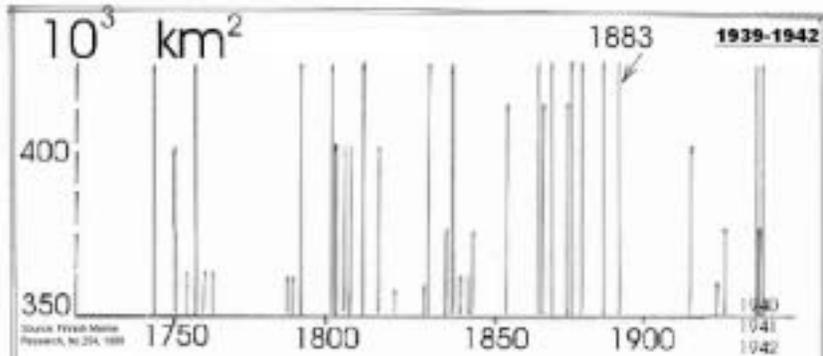
<sup>11</sup> Liljequist, Stockholm      <sup>12</sup> Liljequist, Is 1941/42

As already indicated above, Liljequist<sup>12</sup> observed: Three ice winters in succession are very rare. During almost 200 years of weather observations at Stockholm, there are only two periods that came close to the most recent one in 1939-42. But none of the previous ‘three-winter-periods’ had been as cold as the latter, which was 0.6°C colder than the next group:

Mean value December -March

|                           |                           |                           |
|---------------------------|---------------------------|---------------------------|
| 1783-86; means:<br>-5.6°C | 1802-05; means:<br>-5.7°C | 1939-42; means:<br>-6.3°C |
|---------------------------|---------------------------|---------------------------|

A further piece of hard evidence that nothing but the war at sea had turned the Baltic Sea into an ice age like status is the extent of the ice cover during the three years in question. According to a graph by the Finnish Institute<sup>13</sup>, showing the ice cover in the Baltic Sea north of latitude 57° North, there has not been one group of three successive years with so much ice cover since 1720, as during the three war years 1939-1942.



As the graph provided by the Finnish Institute actually shows figures only since 1720, the ice cover during the winters of 1939-42 could have been the most extensive in many hundred years. From the whole period of more than 200 years, only 15 winters reached the highest possible ice volume, including those of 1939/40 and 1941/42. One of the reasons for this rarity of successive high ice coverage is presumably the fact that, from the moment the Baltic Sea reaches a high ice cover, the water body no longer transfers heat to the atmosphere; the deeper waters retaining more heat for the following winter season. But due to the intensive ‘stirring and mixing’ of the sea by military activities, a record ice coverage in the Baltic Sea during the three war years 1939-42 had been achieved, which actually was inevitable. There is virtually no other explanation available.

<sup>13</sup> Finnish Institute

## Europe, the unique receiver of three arctic winters

### *Europe - the sole generator of arctic winters*

It is worth noting that only Europe experienced the three arctic winters during 1939-42. North America and Asia did not go through the same experience. The unique situation concerning the cold January 1940 all over the Northern Hemisphere has been addressed in the chapters, Rain-making (page 107), USA dried out 1939 (page 117), and War in China (page 123). From this follows that the principal source for generating and supporting the arctic winters in Europe, must have originated in Europe. External forces can be excluded with certainty. There is hardly any imaginable influence, which would have been able to introduce three 'Little Ice Age winters' only to North Europe while sparing other regions on the Northern Hemisphere.



### British Isles 'three years winter package' 1915-1918

The close similarity between the three war winters of 1939-42 and 1915-18 is the best evidence on the relevance of climatic changes by the war at sea. As already mentioned<sup>14</sup>, both periods saw excessive snow during three war years. In the chapter: Europe weather WWI (page 251) it is argued that the winter months of 1915-18 were almost as cold as during the period of 1939-42. The war at sea all around Britain (A) leaves no option but to accept this as evidence of anthropogenic climatic changes.

Further details: (A) War at sea WWI, 5\_13; Sea mines WWI, 5\_14.

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<sup>14</sup> Drummond

Extract from „Climate Change & Naval War – A Scientific Assessment 2005  
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### Summary



Quite a number of indications provide sufficient evidence that a succession of three arctic winters, like those of 1939-42, have their origin in the impact of the war machinery on the natural environment. Without even going into too much technical explanation on the 'stirring and mixing' of the seas and resulting consequences, the sheer fact of the sudden occurrence of three arctic winters 'from nowhere', shows sufficient proof that mere 'natural variation' can be definitely excluded as a cause of the extraordinary weather conditions during the winters of 1939-42. The three extreme winters 1939 –1942 in succession are an impeccable example of anthropogenic climatic change.

There was nothing in orbit, in the skies or on earth that could have triggered extraordinarily cold winters for Northern Europe alone. There was nothing but the war at sea.