

## **The 3<sup>rd</sup> war winter – 1941/42 – Baltic Sea experiment**

### **Frame of Experiment**

How can one make an arctic winter and how can one prove it? The first condition for an interesting climate experiment is to exclude the sun. We did it by concentrating research on the winter period during the 1<sup>st</sup> and the 2<sup>nd</sup> war winters of WWII. The second condition for improving experimental conditions is to exclude the external influence of the water influx coming from different sources, e.g. the Atlantic Ocean. The Baltic Sea is almost completely disconnected from the oceanic system, salinity is low or inexistent (Gulf of Bothnia) and the current system affected only by local forces (wind, temperature, salinity, and influx of river water). For the completion of an excellent climate change, the third condition is easy to imagine: the forceful stirring and shaking of the water basin. This all happened between June and December 1941 and the following winter proved the effectiveness of the experiment. Northern Europe fell pray to a record icy winter.

### **‘Barbarossa’ – Germany attacks Russia**

Under the codename ‘Barbarossa’, Germany planned and ambushed Russia with an Army of 3,000,000 men, 3000 tanks, 7000 artillery pieces, 2500 aircrafts and other war relevant equipment. This happened on the 22<sup>nd</sup> of June 1941, along a battle line of 2000 km.

It is a well-known fact that, within a few months of invasion, in June 1941, the German Army encountered winter conditions in Western Russia, the severity of which cannot be imagined. It was so much out of tune with the climatic records over many years. And it is not surprising that the German armies had not been prepared to face it. They fell prey to a misjudgement similar to that of the Russian Army in Finland, in December 1939. While military offensive in Finland ‘pushed the weather’ to very cold temperatures under the Arctic Circle during the winter of 1939/40, the Germans drove the weather conditions ‘over the edge’ by turning the Baltic Sea ‘up-side-down’

(see next paragraph). This six-month ‘treatment’ of the Baltic Sea, in 1941, was several times more intensive than in 1939. A little bit later, snow, freezing and ice conditions became extremely severe along the entire German–Russian front line, from the west of Murmansk, Leningrad, Kalini, Mazhaisk (west of Moscow) to Belowgrad, Rostov, and Sevastopol (Krim). Since mid-November 1941, temperature during daytime was of  $-3^{\circ}\text{C}$ , and at night it went down to  $-7^{\circ}\text{C}$ . By the end of November, temperature fell to  $-25$  degrees Celsius on the Eastern Front. Along the frontlines close to Leningrad, heavy snowfall blocked almost all German mechanized operations (NYT, the 4<sup>th</sup> of December 1941). On the 7<sup>th</sup> of December, the German High Command stated in a communiqué that “despite bitter cold, German and Italian troops have recorded successes in local offensive in the Donets Basin” (NYT, the 8<sup>th</sup> of December 1941), and that harsh winter forced the abandonment of big operations in the north until spring (NYT, the 9<sup>h</sup> of December 1941). In December, temperatures went down to  $-40^{\circ}\text{C}$ .

Before the severe cold wave hit the Eastern Front, there was a heavy ‘mud-period’ which lasted from early October until freezing began. It all started with snow on about the 7<sup>th</sup> of October and went on with rain, bearing quite a number of similarities with the situation discussed in an earlier chapter concerning rain-making on the Western Front, along the river Rhine, in late 1939. Until the end of December 1941, the costs of invasion for the German Army were: 174,000 dead men, 600,000 wounded and 36,000 missing. Germany also lost 758 bomber planes, 568 fighter planes, and 767 other types of airplanes, not to mention the loss of tanks, flaks and vehicles, which was huge. The Russians’ loss was considerably higher.

### **War sideline – Climate battlefield**

Immediately, the Baltic Sea became a battleground and its eastern part was churned and turned, from Gdansk to Leningrad. The operation

'Barbarossa' was a fringe war operation area. In climatic terms, it was a major theatre of regional weather modification.

The Germans mobilised about one hundred naval vessels: 10 large mine layers, 28 torpedo boats, and 2-3 dozen minesweepers. Air support was entrusted to the Luftwaffe. Russians had six big war ships, 21 destroyers, 65 submarines, six mine layers, 48 torpedo cutters and 700 airplanes. The considerable number of ships and airplanes became active in six months. The Kriegsmarine lost 35 ships. Russia alone lost 50 naval vessels when evacuating the Reval naval base. The total number of ships which sank in the Baltic Sea during the second half of 1941 is of about 370 (500,000 tons).

Sea mines were a considerable threat. Around 20,000 mines were laid, many thousands being swept and destroyed. Although many of the Russian mines weighted less than 100 kg, the Soviet Baltic Sea Fleet alone laid at least 10,000 mines in the Finnish Gulf and outside the Soviet Ports, in the Baltic Sea (e.g. Riga and Reval). In early August, a dozen of Russian naval vessels laid mines as far away as the west of Bornholm. Probably the last Russian distant operation was a mining operation close to Gdansk (October 20 – November 15).

Many hundreds of daily naval activities caused a great Baltic Sea 'turning and churning' experiment. One devastating experience determined the Russians Baltic Fleet to evacuate their fleet bases at Reval (Tallinn) by the end of August. More than 200 ships had been moved to Kronstadt, near Leningrad. More than 4,000 mines were laid on the way out, some of them placed so close together that the distance between two individual mines was sometimes of only 30 feet. Once the ships were out of the harbour, the convoys were bombed or torpedoed while crossing these minefields. This repositioning operation meant the loss of over 50 ships and some 36 transporters and auxiliaries for the Baltic Fleet, not to mention the total loss of lives (at least 6,000 men were lost).

Another significant event occurred in early December 1941, when the Baltic Fleet desperately tried to evacuate the Finnish island of Hangoe

which they had occupied in December 1939. During its sailing, the 7,500-tons ship *Josif Stalin*, carrying ammunition and military personnel, was hit by four mines that initiated a tremendous detonation, killing four thousand of the troops aboard. 2,000 men survived. Since evacuation from Hangoe started on the 31<sup>st</sup> of October, the Baltic fleet lost, in half a dozen missions, three destroyers, three fast mine sweepers and other craft and transporters (*Josif Stalin*, *Andrey Zdanov*), the icebreaker *October* plus a host of smaller vessels.

The 'Barbarossa' operation definitely remodelled Baltic seawater body during the autumn of 1941, to a seasonally water structure never experienced before, particularly the phenomenon of "squeezing" summer-stored heat at such an early date. For the occupation of the vast Russian territory, this may have been hardly more than a small contribution. But for regional weather modification, it was highly effective. This became evident at Malgoviks primary school, in December 1941.

### **Cold record on the 13<sup>th</sup> of December 1941**

An early date for a cold temperature record should be noted. Swedish Meteorological Service recorded in their annual publication that a new temperature, lower than  $-50^{\circ}\text{C}$ , was measured on the 13<sup>th</sup> of December 1941. At Malgoviks primary school in Norrland ( $64^{\circ}37'$  North,  $16^{\circ}25'$  East), this very low temperature was recorded on a plain alcohol thermometer. Actually, on comparison with a common thermometer, this temperature meant  $-53^{\circ}\text{C}$ . If such temperature was recorded before mid-December, there may be only two explanations. Either the recording is a gross mistake or deception, or the event had something to do with war at sea. 'Barbarossa' activities in the Baltic Sea could have had a big contribution. But contributions could have also come from other locations. Naval warfare was fiercely conducted in all European waters from Barents to the Mediterranean Sea. German U-boats operated across the North Atlantic. Since August 1941, the Allies supplied Russia with weapons and urgently needed equipment.

Convoys sailed from England. Until the 8<sup>th</sup> of December 1941, seven Arctic Convoys departed from Hvalfiord/Iceland and arrived about 15 days later in Murmansk or Archangel. Only six days before the record temperature at Malgoviks primary school, Japan attacked Pearl Harbour on 7<sup>th</sup> December 1941.

### Stockholm's coldness trophy

Location	January 1942			February 1942		
	average Jan. 1942	Normal 1901-30	Lowest 1942	average Feb. 1942	Normal 1901-30	Lowest 1942
Kiruna	-16,6	-11,9	-35,5	-15,8	-11,8	-33,4
Haparanda	-17,0	-10,3	-31	-14,2	-11,2	-30
Umea	-17,2	-7,4	-30	-13	-7,4	-27,8
Östersund	-16,9	-7,9	-31,4	-11,2	-6,8	-26,4
Karlstad	-12,3	-3,2	-25,2	-10,8	-3,1	-24,6
Stockholm	-10,6	-2,5	-28,2	-10,5	-2,6	-18,8
Karlskamm	-8,4	-0,3	-22,5	-6,6	-0,6	-16
Malmö	-7,5	+0,3	-25	-6,2	-0,2	-20

*All figures in minus Celsius degree; source: Statens*

More important than a short incident like that from the Malgoviks primary school are record conditions over a longer period and wider perspective. The winter of 1941/42 represents this longer period, while the temperature record over a century offers the wider perspective. Stockholm is a good place to demonstrate this situation, said the Swedish meteorologist Goesta Liljequist, who expressed his amazement about the winter of 1941/42 as it follows: After the two hard winters of 1939/40 and 1940/41 and the difficulties they generated to shipping and fuel supply for the country, one has awaited and expected that the winter of 1941/42 would bring a return of the mild winters, which had recently predominated. Instead this, winter became one of the toughest ever recorded, if not the severest of all winters during the last 200 years<sup>139</sup>. In 1943, Goesta Liljequist made a thorough assessment of the "The severity of the winters at Stockholm 1757–1942". The following data have been gathered from his work<sup>140</sup>.

139 Liljequist, Gösta H.; see Fn 1

140 Liljequist, Gösta H; 'The severity of the winters at Stockholm 1757 – 1942', Geografiska Annaler 1-2, 1943, p. 81-104; and as an extended paper in: Meddelanden, Serien Uppsatser, Stockholm 1943, pp.1-24.

The winter 1941/42 ranks high in the list of very severe winters. In a group of 15 most severe winters since 1757, the winter of 1939/40 ranks about the 10<sup>th</sup> and the winter 1941/42 is in the top as it follows:

Rank No	Mean temp. Dec.– March	Mean temperature Three coldest months	Sum of negative monthly means temp.
1	1788/89, - 8.0°C	1941/42, - 9.2° C	1788/89, - 31.9° C
2	1808/09, - 7.6° C	1788/89, - 9.1° C	1808/09, - 30.5° C
3	1941/42, - 7.5° C	1808/09, - 8.7° C	1941/42, - 30.5° C

Liljequist points to the fact that, since temperatures were taken, in 1760, the mean winter temperatures had increased with about 2°C and that this tendency was especially well marked since the middle of the 19<sup>th</sup> century. Insofar, the deviation from ‘normal’ became even more evident. A ‘true’ comparison would actually show that winter 1941/42 was in any calculation –0,5° (right column) to –2,5°C (middle column) colder than winter 1788/89. taking into account the group of the coldest three months (December to February), winter 1941/42 is the coldest since 1757. At that time, mean temperature was of –2,3°C in winter 1756/57. As no data from a previous period are available, Stockholm’s winter following ‘Barbarossa’ could have been the coldest since the last Ice Age, 10,000 years ago.

### Swedish January weather turned around

In addition to a very cold period all over Sweden, it is worth noting that the main climate conditions were ‘turned around’ within the country. Harsh conditions were more severe in middle and southern Sweden than in Northern Sweden. This definitely points to an extremely sub-cold Baltic Sea (including North Sea and beyond). Meteorological circumstances are well documented by official Swedish annual report<sup>141</sup>, which says concerning the month of January 1942 (excerpts):

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141 Statens Meteorologisk-Hydrografiska Anstalt, ‘Arsbok’, Månadsöversikt över Vänderlek och Vattentillgång, Argang 21-26, 1939 -1945, Stockholm.

## General Overview

During the first few days of the month, moderate westerly airflow dominated. On the 4<sup>th</sup> of January, a high-pressure zone developed in the NW of Lappland, which brought cold winds in the whole country. On the 7<sup>th</sup> of January, a small low-pressure area moved over Norrland to the East, where air pressure remained equally distributed but then increased generally. On the 13<sup>th</sup> day, there was a high pressure zone over the northerly Scandinavia. Wind came from an easterly direction in most of the parts of the country until the end of the month. The highest air pressure (1,045mb) was measured in Norrland, on the 21<sup>st</sup> of January. Together with the easterly winds, snowfall occurred temporarily, particularly on the Baltic coast. On the 24<sup>th</sup> day, very cold air came from the East and, despite a cloudy sky, the temperatures dropped down from  $-25^{\circ}\text{C}$  to  $-30^{\circ}\text{C}$ , with a wind speed of more than 10m/sec. On the 26<sup>th</sup> of January, at the same hour, temperatures recorded were between  $-35^{\circ}\text{C}$  and  $-40^{\circ}\text{C}$ , with clear sky and calm as far south as Smaland. Especially between the days 25-26 and 29-30, great difference in air pressure was recorded between northerly Sweden and southerly Baltic Sea, with easterly winds (kultje) dominating temporarily in the Baltic Sea.

### Air pressure

The average value was higher than the usual all over the country. In the northerly Norrland, deviation was the highest (17-18mb), but decreased gradually towards the south, so that the deviation was still of 4-5mb at Skane. Such high January mean air pressure has never been recorded in Norrland before. Usually, the air pressure in Norrland is lower than in Gotaland. Westerly and south-westerly winds usually dominate. In January 1942, the situation was completely reversed, which caused permanent easterly or north-easterly winds.

### Temperatures

The biggest temperature deficit, of about  $-10^{\circ}\text{C}$ , was recorded in the inner parts of Gotaland, northern Varmeland, Dalarna and southern

Norrland. A number of record temperatures were measured in Gotaland and Svealand. The temperatures were of 6 to 7°C lower than the lowest temperatures known until that moment.

### Swedish Summary

The Swedish meteorologist Gösta H. Lijequist<sup>142</sup> wrote immediately after the extraordinary winter 1941/42 (excerpt):

*The winter 1941/42 was colder than the winters 1939/40 and 1940/41. At Stockholm, it was one of the very coldest winters since 1756, when regular temperature observations were started. If we graduate the severity of a winter according to the value of the mean temperature of the three coldest months of the winter half year, 1941/42 is found to be the coldest winter since 1756.*



### Baltic Sea Icing

The meteorologist Gösta H. Lijequist assessed also the sea ice along Sweden's coast and Baltic Sea:

*“The formation and breaking up of the ice took place at a rather normal time in the Gulf and Sea of Bothnia: The formation of ice in the Baltic and on the West-coast started in the first part*

*of January, generally one or two weeks earlier than normally. The ice conditions grew worse after a mighty invasion of cold air on the 24<sup>th</sup> of January, when temperatures between  $-25^{\circ}$  and  $-30^{\circ}$  C were recorded in the whole country; at the same time, the wind force was 6 Beaufort scale or more.*

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142 Liljequist, Gösta H., see Fn 1.



*The thickness of ice was of about 100 cm in the Gulf of Bothnia – the maximum value observed this winter being of 125 cm – and 60 cm in the Sea of Bothnia. In the Baltic, the values varied between 50-60 cm. The ice period was generally longer than in 1939/40 but about the same as in 1940/41, except for the West coast and the Sound, where it lasted longer. On the 6<sup>th</sup> of June, all Swedish waters were ice-free”.*

### Concluding remark on ‘Barbarossa’



Circumstances on churning Baltic waters and meeting devastating arctic conditions on Russian soil demonstrate the interrelation between these two events. Insofar, it is easy to establish that Adolf Hitler shot himself in the feet. At least he should not have touched the Baltic Sea. Not reaching Moscow and fulfilling ‘Barbarossa’ plan conditions due to early and killingly winter conditions represented the beginning of the end of his

ruthless activities. Luckily, at that time science was not aware of such a link and thus could not advise Hitler and his army that they would endanger military goals by simultaneously conducting naval warfare extensively in nearby seas.

When Field Marshal Herman Göring had proclaimed, in February 1940: “Nature is still more powerful than man. I can fight man but I cannot fight nature when I lack the means to carry out such battle. We did not ask for ice, snow and cold – A higher power sent it to us”<sup>143</sup>, the winter of 1941/42 proves him wrong. The winter was man-made, more precisely, by Hitler, his Government and his Army. Hitler, Göring and their ruling companions are solely responsible for the

143 See above: Chapter I, Introduction

coldest winter in Northern Europe since data recording commenced in the middle of the 18<sup>th</sup> century.