

The ice season 2005-2006

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Key Message

The ice season 2005/2006 was late and normal in terms of ice extent.

The ice season started during December and the ice conditions developed like for a warm winter.

Ice conditions gradually became more difficult in the beginning of March due to cold north-easterly winds. The largest ice cover – 210,000 km² – was reached on March 16th. After this the ice situation began to decrease gradually.

The ice winter was, by the extent of the ice cover, classified as average (Figure 1.). The ice breaking up was in most waters about week later than normal and the 29th May the Baltic Sea was ice free.

From point of view of the navigation, the ice conditions on the Gulf of Finland for winter 2005/2006 were unfavourable, especially on second half of season – stormy winds often led to appearance the compressed ice on the fairway and rapid changes of ice conditions complicated the choice of the optimal ways of assistance of vessels.

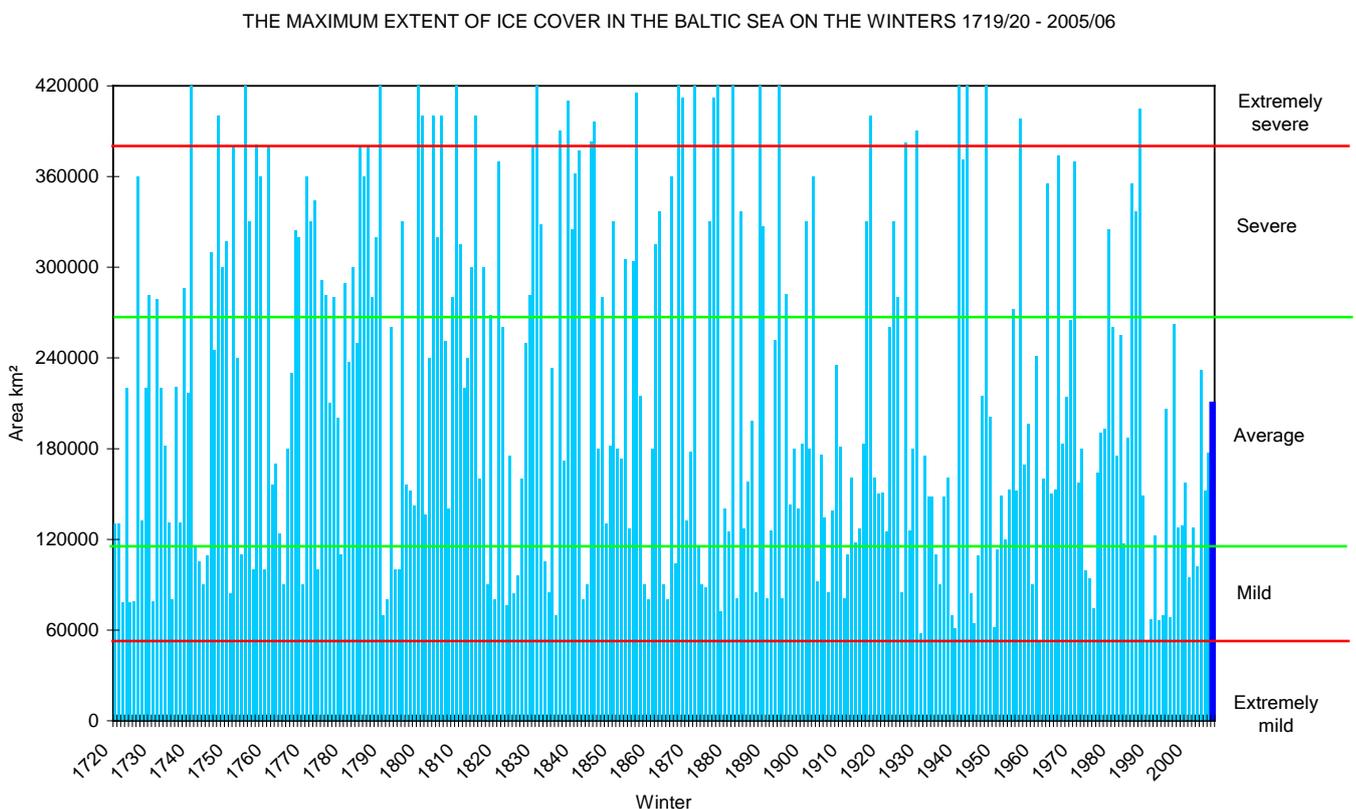


Figure 1. The maximum extents of ice cover in the Baltic Sea on the winters 1719/20 – 2005/06.

Ice formation

Bothnian Bay

The first archipelago ice formed quite normal in sheltered bays on the Swedish side of the Bay of Bothnia in late November. Elsewhere in the northern Bay of Bothnia the freezing started in the beginning of December, approximately a month later than average. In the southern Bay of Bothnia and the Quark the freezing started in mid-December, approximately a week later than average. In the Sea of Bothnia and the Archipelago Sea the freezing started after that at the normal time.

In the end of December there was a period of cold weather and ice was forming in the Bay of Bothnia off the archipelago, and in the other sea areas to the outer archipelago. However, the cold weather did not persist and the ice formation was interrupted. Due to dominating mild weather, the ice situation remained very easy until the end of January.

In the end of January the weather became colder and ice was forming in all sea areas. The Quark was covered with new ice. In the Sea of Bothnia new ice was forming off the archipelago and the Archipelago Sea was covered with ice. At the same time the fast ice in the archipelago got thicker.

Rapid ice formation occurred in Bay of Bothnia during the period February 3rd – 6th. All the Bay of Bothnia and the Quark then became covered by thin ice. The ice extension slowly continued southwards along the coasts of the Sea of Bothnia during the rest of the month.

In mid-February the Bay of Bothnia was completely covered with ice that is approximately a month later than average. At the same time in the Sea of Bothnia there were 20-30 nautical miles of ice off the archipelago. In the end of February the weather was milder and the ice situation decreased a little.

Gulf of Finland

The freezing started along coasts of the Neva Bay and in the Vyborg Bay in the beginning of December, 2 – 3 weeks later than normal. In subsequent days the ice formation had continuous character. The fast ice 5 – 10 thick in top of the Vyborg Bay appeared on mid-December, about two weeks later than average. The first appearance of the ice along coasts of the Luga Bay observed December, 19th. It was almost a month later than normal dates. In the western Gulf of Finland freezing started after mid-December, at the average time. During December the ice formation on the Gulf of Finland had slow and intermittent character. The ice conditions developed like for a warm winter.

In the end of year, there was 15 – 25 cm thick compact ice in the Neva Bay and westward up to the longitude of lighthouse Tolbuhin. Westward up to the longitude of the Krasnaja gorka there were dark nilas and new ice. The most part of the Vyborg Bay was covered by fast ice, 15 – 25 cm thick and compact ice, and 20 cm thick.

In the beginning of January the weather was mild. After mid-January the very intensive ice formation started. During one week the ice situation fast changed over to a moderate winter. In the end of January there was fast ice, 20 – 40 cm thick in the Neva Bay. Westward up to the longitude of Seskar prevailed compact ice, partly ridged, 15 – 30 cm thick. In the Vyborg Bay there was fast ice, 25 – 40 cm thick and in the entrance there was very close ice, 15 – 25 cm thick. There was also the belt of fast ice along coasts of the Luga Bay and compact ice, 10 – 20 cm thick, on the most of sea area and in the entrance.

In the beginning of February the weather became colder and the freezing began again in all sea areas. In mid-February the ice edge in the Gulf of Finland ran along the line Hanko – Pakri and in the northern Baltic Sea there was ice to outside the archipelago. In the end of February the weather

was milder and the ice situation decreased a little. The ice drifted north-eastwards and new ridges formed in the Gulf of Finland. In the eastern Gulf of Finland toward the end of month the ice formation increased. In the end of February there was fast ice 40–60 cm thick in the Neva Bay. That was 10 cm above the average. In the Vyborg Bay there was fast ice 40 – 55 cm thick. In the Luga Bay the fast ice was 30 – 45 cm thick. In general, the ice conditions developed like for a moderate winter.

The Baltic Proper

The beginning of the ice season was mild in the Baltic Proper. In the Kurshiu Marios lagoon the primary ice forms appeared on 3rd of December. The shore ice formed in the end of December. Off the Baltian coast the first ice appeared in the mid-January.

In the beginning of February the weather became colder and in the mid-February the ice edge ran in the mouth of the Gulf of Finland along the line Hanko – Pakri. In the northern Baltic Sea there was ice to outside the archipelago. In the end of February the weather was milder and the ice situation decreased a little.

The largest ice cover

Ice conditions gradually became more difficult in the beginning of March due to cold north-easterly winds. The largest ice cover – 210,000 km² – was reached on March 16th (Figure 2. and 3.) The Gulf of Bothnia and the Gulf of Finland were completely covered with ice. In the northern Baltic Sea the ice edge ran from the northern tip of Öland via Häradskär and Almagrundet to northwest of Ristna and from there via west of Saaremaa and Ventspils to the south of Klaipeda. During the ice winter the ice, which was carried out from the Kurshiu Marios lagoon, dominated in the Baltic Sea near the Klaipeda Strait. There was also thin ice in the archipelago in the southern Baltic Sea. After this the ice situation began to decrease gradually.

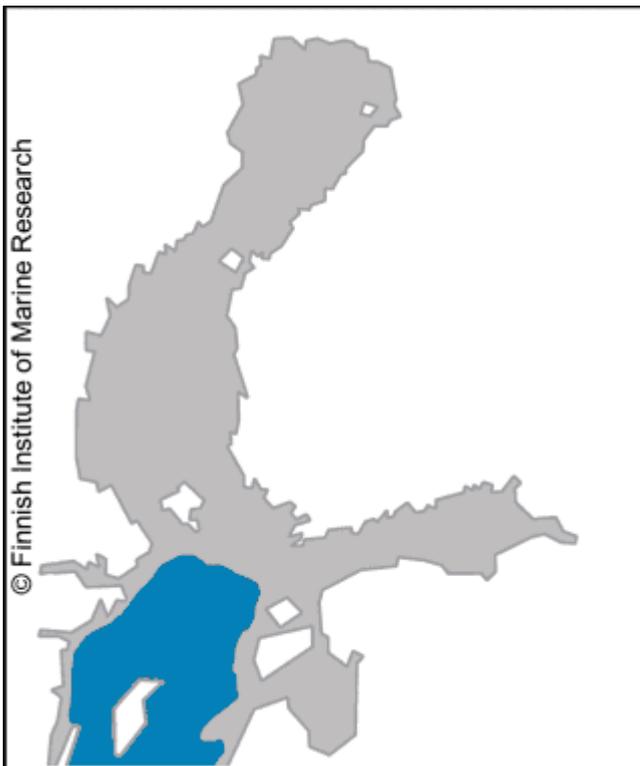


Figure 2. The largest ice cover – 210 000 km² – was reached on the 16th of March.

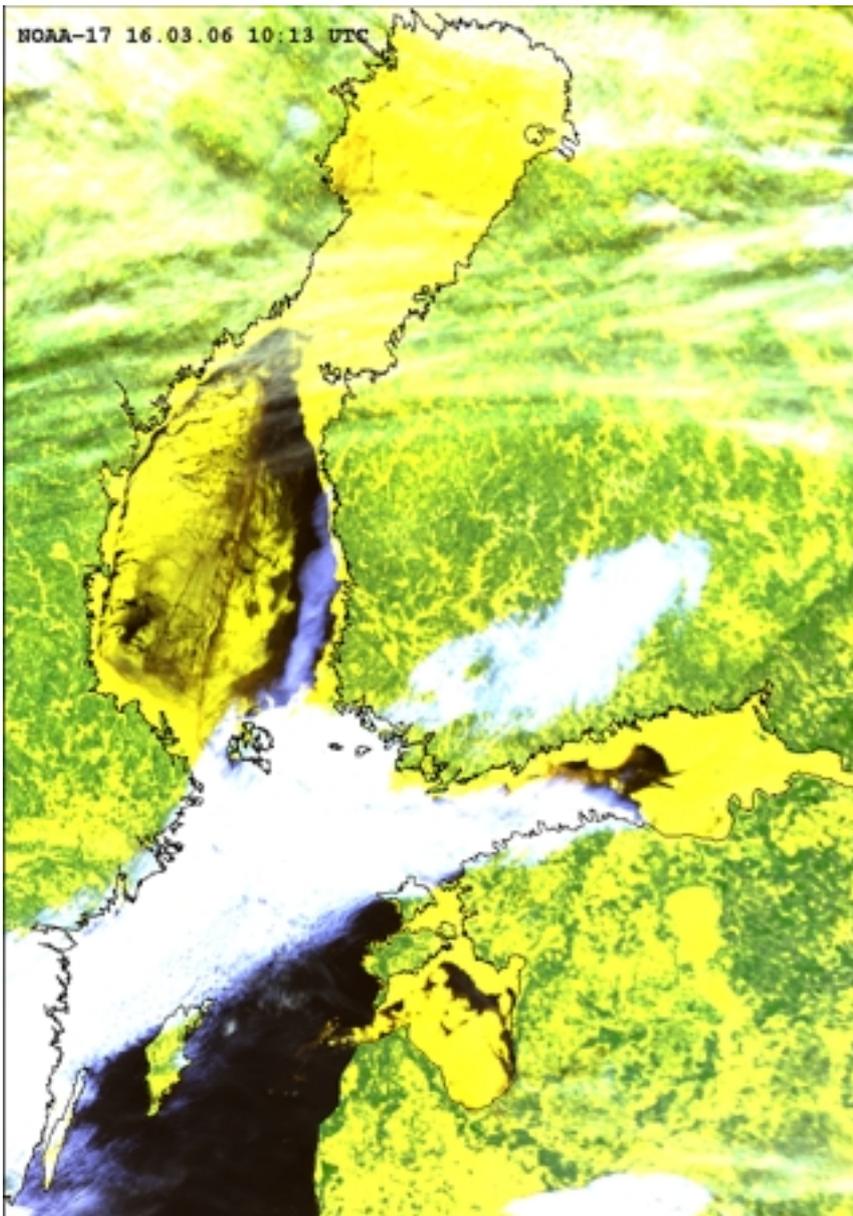


Figure 3. Satellite image of 16th of March 2006 (Courtesy of BSH).

Ice breaking up

The last ice from open sea of the Baltic Proper disappeared in the end of March. In the beginning of April the ice edge in the northern Baltic Sea ran along the line Utö – Pakri. Then the sea ice cover rapidly decreased. In a few days, most parts of the northern Baltic and the central Sea of Bothnia become ice free. On the other hand in April the weather was cool and the ice melted slowly and the final disappearance of the Baltic Proper shore ice happened 16th of April. In the northern Baltic Sea the duration of the ice winter was average. In the south-eastern part of Baltic Sea near Lithuania was longer than two previous years.

In the Gulf of Finland the ice disappeared in the end of April and in the beginning of May, about a week later than average. In general, the ice conditions in the Gulf of Finland developed like for a moderate winter and winter was approximately a week longer than average.

From April 20th the ice along coasts of the Sea of Bothnia gradually dispersed, the Quark passage opened and the fast ice in Stockholm archipelago melted. From the Archipelago Sea and the Sea of Bothnia ice disappeared in the beginning of May, more than a week later than average. Mild southerly winds in May caused a rapid break up of ice also in the northern waters, particularly on the Finnish side of Bay of Bothnia. On May 20th, there still occurred a large number of growlers and hard floes at sea. Bay of Bothnia was not completely free of ice until the 29th.

Ice thicknesses

The maximum thickness of the fast ice in the northern Bay of Bothnia and in the Sea of Bothnia was 50 – 70 cm and in the Archipelago Sea 30 – 40 cm. The thickness of the open sea ice was 30 – 60 cm in the Bay of Bothnia and 10 – 30 cm in the Sea of Bothnia.

The maximum thickness of the fast ice in the Gulf of Finland was 30 – 65 cm. The thickness of the open sea ice was 20 – 40 cm in the western Gulf of Finland and 35 – 55 cm in the eastern Gulf of Finland.

The thickness of fast ice in the Kurshiu Marios lagoon was 53 cm. The thickness of the open sea ice in the northern Baltic Sea was 5-25 cm.

In the southern Baltic Sea maximum ice thickness (level ice) reached 15-30 cm in the inner coastal waters and fairways and 5-15 cm in the eastern sea area.

The southern Baltic Sea

With milder than normal weather on the German coasts in November and December, ice development started later than usual. Although the first cold spell at the end of November led to sporadic ice formation in the eastern Bodden waters, this first ice melted away quickly, and the ice season really began in early January. A major cold spell occurred in the end of January, in the course of which the largest ice coverage of the German coastal waters was reached. In the following weeks, daily mean temperatures fluctuated around freezing point and caused some new ice formation in sheltered areas, but on the whole the ice cover decreased. Another cold spell in the first half of March led to wide-spread development of new ice over night, but prolonged insulation by day led to an overall decrease of ice.

The accumulated areal ice volume ($VA\Sigma$, an indicator of the severity of ice winters in the western Baltic) was 0.97 m on the Baltic Sea coast. Therefore, the ice winter of 2005/2006 has been classified as a moderate ice winter. In the past 110 years, 48 winters on the Baltic coast were stronger, and 61 weaker than the last winter season (Fig. 4).

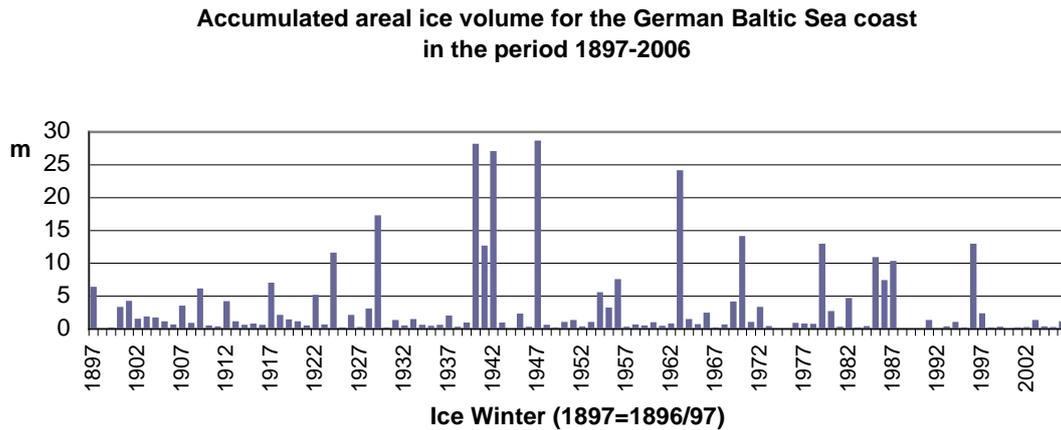


Figure 4. Accumulated areal ice volume for the German Baltic Sea coast in the period 1897-2006 (Courtesy of BSH).

On the coast of Schleswig-Holstein, thin ice was observed for 10 to 25 days, in the inner Schlei, however, for 59 days. The coastal lagoons south of the Darss-Zingst peninsula and the Bodden waters of Vorpommern were covered with ice for about 90 days, the inner fairways to Stralsund and Wolgast for 40 to 70 days. Thin ice occurred also in the Pomeranian Bay for approximately 10 days.

The maximum ice thickness (level ice) reached 15-30 cm in the inner coastal waters and fairways and 5-15 cm in the eastern sea area.

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For reference purposes, please cite this Baltic Sea environment fact sheet as follows:

[Author's name(s)], [Year]. [Baltic Sea environment fact sheet title]. HELCOM Baltic Sea Environment Fact Sheets. Online. [Date Viewed], <http://www.helcom.fi/baltic-sea-trends/environment-fact-sheets/>.