

## Wave climate in the Baltic Sea 2005

### Authors:

Heidi Pettersson, Finnish Institute of Marine Research

Thomas Hammarklint, Swedish Meteorological and Hydrological Institute

### Key message

The wave climate in the northern Baltic Sea in 2005 was characterised by a stormy January and by a December that calmer than usually. In spring, summer and autumn the wave climate was typical for each season. The highest measured significant wave height in the Northern Baltic Proper was 7.2 metres (January) and in the Gulf of Finland 4.2 metres (November). In the northern parts of the Danish Sounds the significant wave height reached 6.2 metres in November and in Kattegat 4.0 m (January).

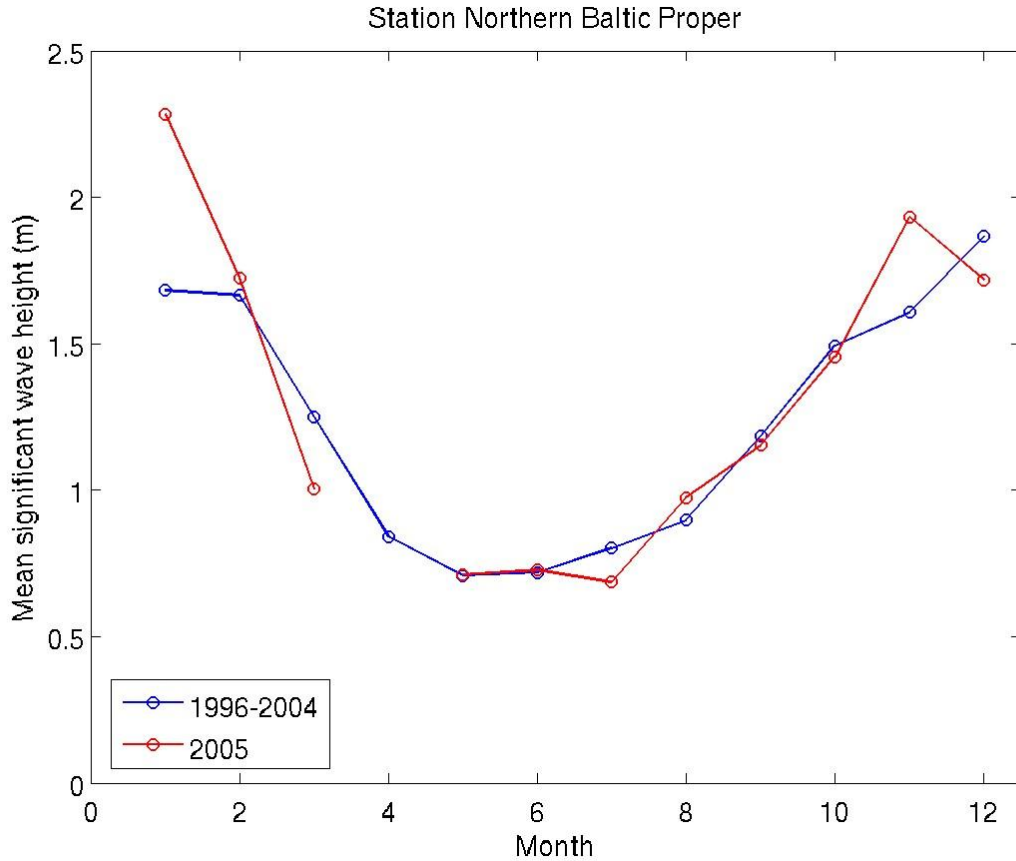
### Results and assessment

#### Northern Baltic Proper and Gulf of Finland

In 2005 Finnish Institute of Marine Research made real time wave measurements at two locations in the Baltic Sea, in the Northern Baltic Proper (59 15.00 N, 21 00.00 E) and in the Gulf of Finland (59 57.90 N, 25 14.11 E). The Swedish Meteorological and Hydrological Institute made wave measurements at one location in the Northern Baltic Proper (58 56.00 N, 19 10.00 E).

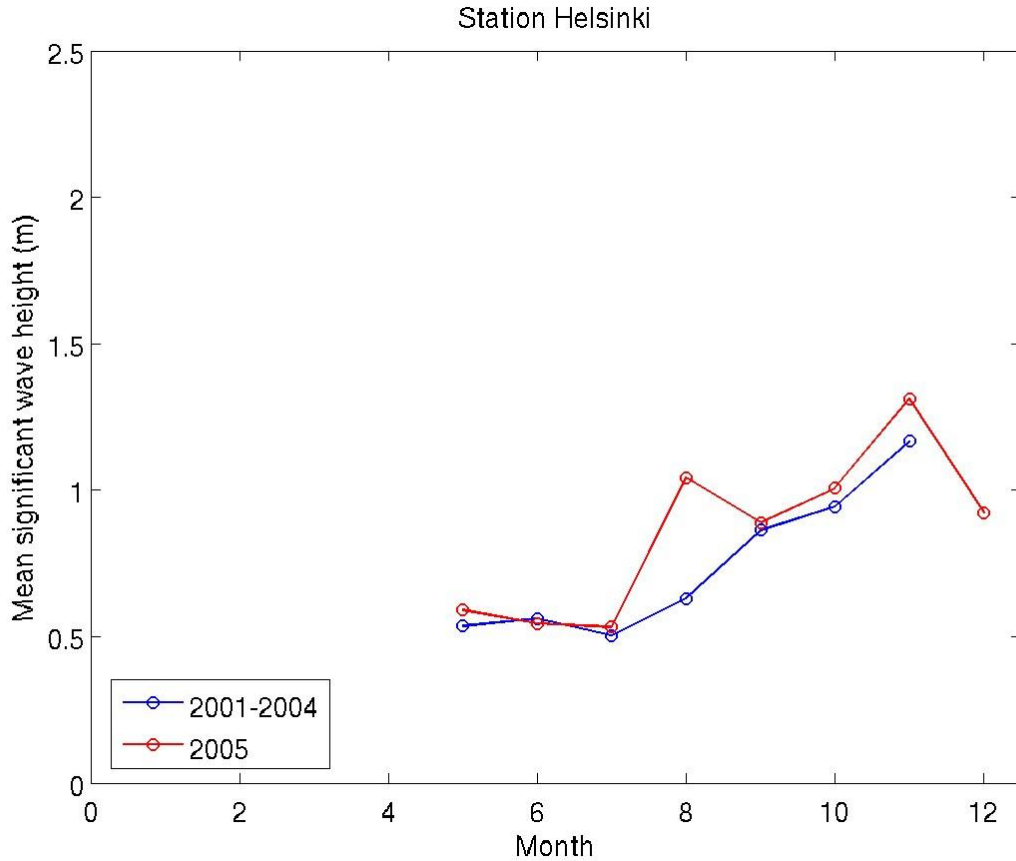
In the first half of January the wave climate in the Northern Baltic Sea was rougher than usual (Figure 1) and the significant wave height exceeded four metres four times. During the severe storm (called Gudrun or Erwin) 8-10 January that caused record high sea levels in the Gulf of Finland, the significant wave height in the Northern Baltic Proper reached 7.2 meters. It was half of metre less than the highest ever measured significant wave height in the area, 7.7 metres, measured only two weeks before. According to the wave model calculations the area with the most severe wave conditions during the storm were in the middle parts of the Baltic Proper. For this area the operational wave models predicted even 10 metres' high significant wave heights.

In February the significant wave height exceeded four metres twice, and reached 6.2 metres on 10 February. The measurements were interrupted in the mid-March due to the ice situation. The wave buoy was deployed again in the beginning of May. From May to the end of August the significant wave height did not exceed 2.5 metres. In autumn the significant wave heights over 5 metres were observed once in a month and November was rougher than usual. December, on the other hand, was somewhat calmer than in average. During this month the significant wave height reached four metres three times.



**Figure 1.** Monthly means of significant wave heights in the northern Baltic Proper (FIMR).

During the storm in 9 January the area with the highest winds speeds propagated eastwards on the southern side of the southern coastline of the Gulf of Finland and the buoy off Helsinki measured a significant wave height of 3.4 metres. Due to the freezing of the gulf, the wave measurements were interrupted in mid-January. After the break-up of ice the buoy was redeployed in the beginning of May. Until the beginning of August the significant wave height remained under two metres most of the time. The highest value during the season, 2.4 metres, was measured 24 July. During August the wave climate in the Gulf of Finland was rougher than usual (Figure 2), and 10 August the significant wave height reached 3.4 meters. In September and October the significant wave height did not exceed 3.5 metres. The highest significant wave height in 2005 was measured 15 November: 4.2 metres. The highest ever observed in this area is 5.2 meters, measured also in November four years before. Like in the northern Baltic Proper, the wave climate was calmer than usual in December.



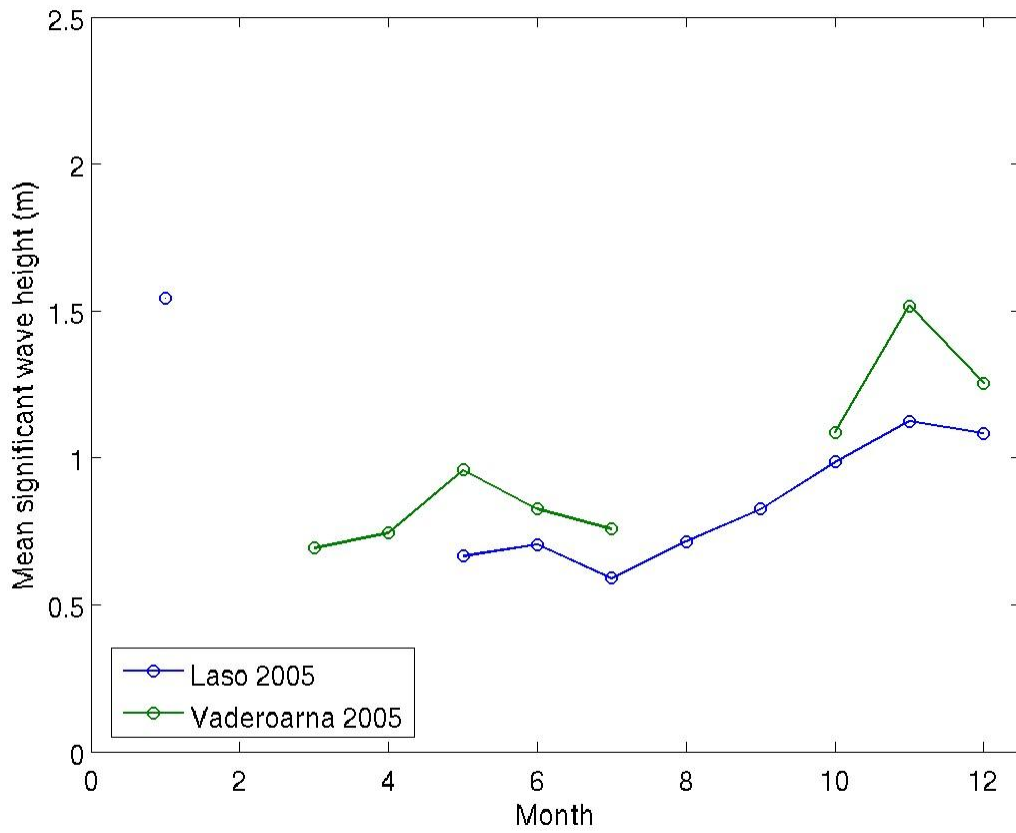
**Figure 2.** Monthly means of the significant wave heights in the Gulf of Finland (FIMR).

### Kattegat and Skagerrak

The Swedish Meteorological and Hydrological Institute made wave measurements in 2005 at two locations, in Kattegat (57 13.00 N, 11 34.00 E) and in northern Skagerrak (58 29.00 N, 10 56.00 E).

The monthly means of the significant wave height in Kattegat (station Läsö) and in the northern parts of Skagerrak (station Väderöarna) are plotted in Figure 3. During the storm in January the buoy at station Läsö was operational and it recorded in the evening of 8 January a significant wave height of 4.0 metres which was the highest for the year 2005. From May to September the significant wave height did not exceed 2.3 metres and highest values from October to the end of the year were 2.8 metres for each month. At station Väderöarna the measurement period was from March to December, excluding August, and the monthly maximum values of significant wave height in spring and summer season were between 2.7 and 3.2 metres. In October the significant wave height reached 3.8 metres and in December 2.3 metres. The highest significant wave height for the measuring period in 2005, 6.0 metres, was measured 15 November.

Table 1 shows the maximum monthly values of significant wave height at the five stations.



**Figure 3.** Monthly means of the significant wave heights in Kattegat (Läsö) and northern Skagerrak (Väderöarna) in 2005 (SMHI).

**Table 1.** Monthly maximum of significant wave heights (in metres) from stations Northern Baltic Proper (FIMR), Helsinki (FIMR), Huvuskär (SMHI), Läsö (SMHI) and Väderöarna (SMHI).

Month / station	N.Baltic Proper	Helsinki	Huvuskär	Läsö	Väderöarna
	59 15.00 N	59 57.90 N	58 56.00 N	57 13.00 N	58 29.00 N
	21 00.00 E	25 14.11 E	19 10.00 E	11 34.00 E	10 56.00 E
	1.1.-17.3. 10.5.-31.12.	3.5. – 31.12.	29.11.– 31.12.	1.1. –15.1. 31.5.-31.12.	2.3.-27.7. 26.9.-31.12.
	<b>m</b>	<b>m</b>	<b>m</b>	<b>m</b>	<b>m</b>
January	7.2	-	-	4.0	-
February	6.2	-	-	-	-
March	2.5	-	-	-	3.0
April	-	-	-	-	2.7
May	2.3	2.0	-	2.2	3.0
June	2.0	2.2	-	2.2	3.2
July	2.2	2.4	-	1.8	2.7
August	3.3	3.4	-	2.0	-
September	5.4	3.4	-	2.3	-
October	5.4	3.6	-	2.8	3.8
November	5.8	4.2	-	2.8	6.0
December	4.2	2.8	4.0	2.8	3.3

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