

Wave climate in the Baltic Sea 2006

Authors:

Heidi Pettersson, Finnish Institute of Marine Research

Thomas Hammarklint, Swedish Meteorological and Hydrological Institute

Dieter Schrader, Bundesamt für Seeschifffahrt und Hydrographie

Key message

The seasonal variation of the wave climate in the Baltic Sea, Kattegat and Skagerak in 2006 was rather typical and no extreme events were measured. During the winter months the highest measured significant wave heights were between 5.0 – 6.7 metres in the northern parts of the Baltic Sea, between 3.1-3.7 metres in the Gulf of Finland and south-western parts of the Baltic Sea and between 3.9 – 6.0 metres in Kattegat and Skagerak. During the summer months the highest measured significant wave heights were between 1.1 – 4.1 metres.

Results and assessment

Measurements of waves

In 2006 Finnish Institute of Marine Research (FIMR) made real time wave measurements at two locations in the Baltic Sea, in the Northern Baltic Proper (station Northern Baltic Proper, 59° 15' N, 21° 00' E) and in the Gulf of Finland (station Helsinki, 59° 58' N, 25° 14' E). The Swedish Meteorological and Hydrological Institute (SMHI) made wave measurements at five locations, in the Southern Bothnian Sea (station Finngrundet, 60° 54' N, 18° 37' E), in the Northern Baltic Proper (station Huvudskär Ost, 58° 56' N, 19° 10' E), in the Southern Baltic Proper (station Southern Baltic, 55° 55' N, 18° 47' E), in Kattegat (station Läsö Ost, 57° 13' N, 11° 34' E) and in Skagerak (station Väderöarna, 58° 29' N, 10° 56' E). In the Western Baltic Sea wave measurements have been made since 1991 on the Darss Sill (54° 41.9' N, 12° 42.0' E), operated by GKSS Research Center, and since 2002 to the northwest of Cape Arkona (54° 52.9' N, 13° 51.5' E) by the Bundesamt für Seeschifffahrt und Hydrographie (BSH).

The length of the measurement period at each station depends on the extent of the ice cover, maintenance and deployment logistics and possible instrument damages. The lengths of the measurement periods in 2006 are indicated in the text. As a consequence, measurements are not always available for 12 months per year for the long-term statistics. The years given in the Figures 6 and 7 indicate the start of the measurements: in some months the statistics are over less years.

The Bothnian Bay

The Southern Bothnian Sea, station Finngrundet

The buoy was deployed the second half of the year, from June to the mid-December. The highest measured significant wave height in the Southern Bothnian Sea was 5.8 metres (1 November). The

significant wave height measured was mainly under two metres during June until September. The significant wave height exceeded two metres once in July and three metres once in September.

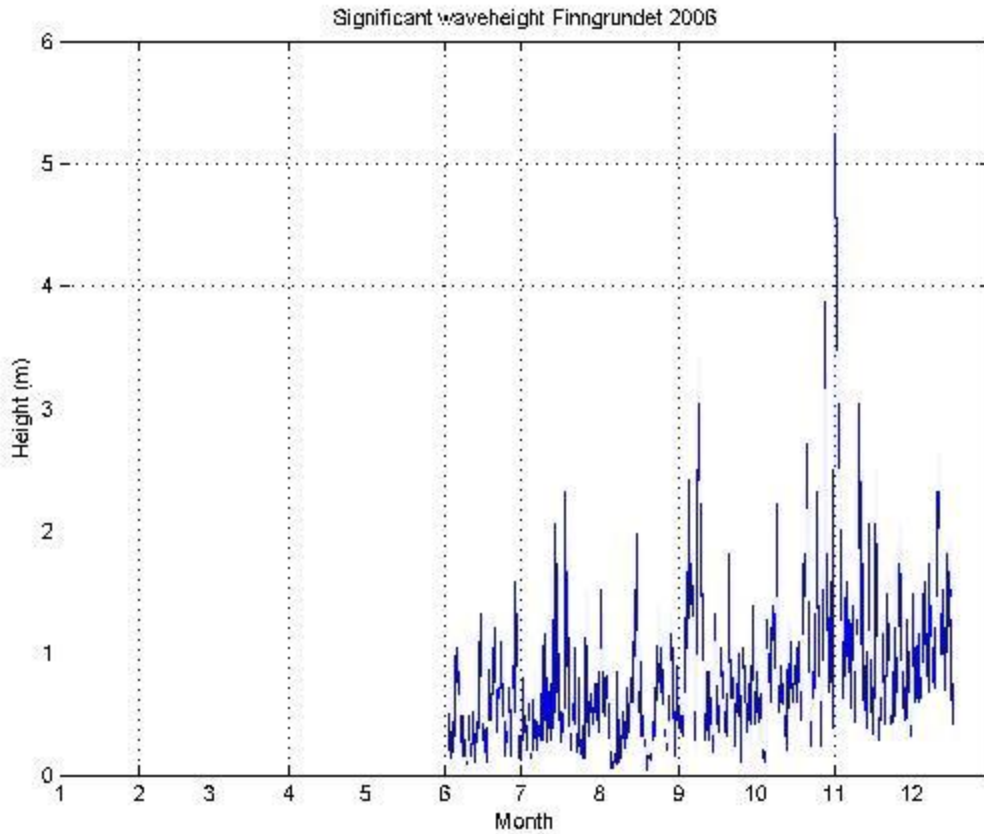


Figure 1. Time series of significant wave height at station Finngrundet.

The Gulf of Finland

The middle parts of the Gulf of Finland, station Helsinki

Over three metres significant wave heights were measured twice off Helsinki before the wave buoy was recovered 25 January due to the risk of ice. The measurements started again in the beginning of May. The significant wave height reached three metres on 24 May, which is the highest measured since 2002 in May at this location. From June to August the significant wave height did not exceed 1.9 metres and in September two metres were exceeded twice. During the first autumn storm in the area, 28 October, a significant wave height of 3.7 metres was recorded which was also the highest measured value for the year. In November the significant wave height exceeded three metres once and in December twice. The wave climate in average was rougher than usual in December.

The Baltic Proper

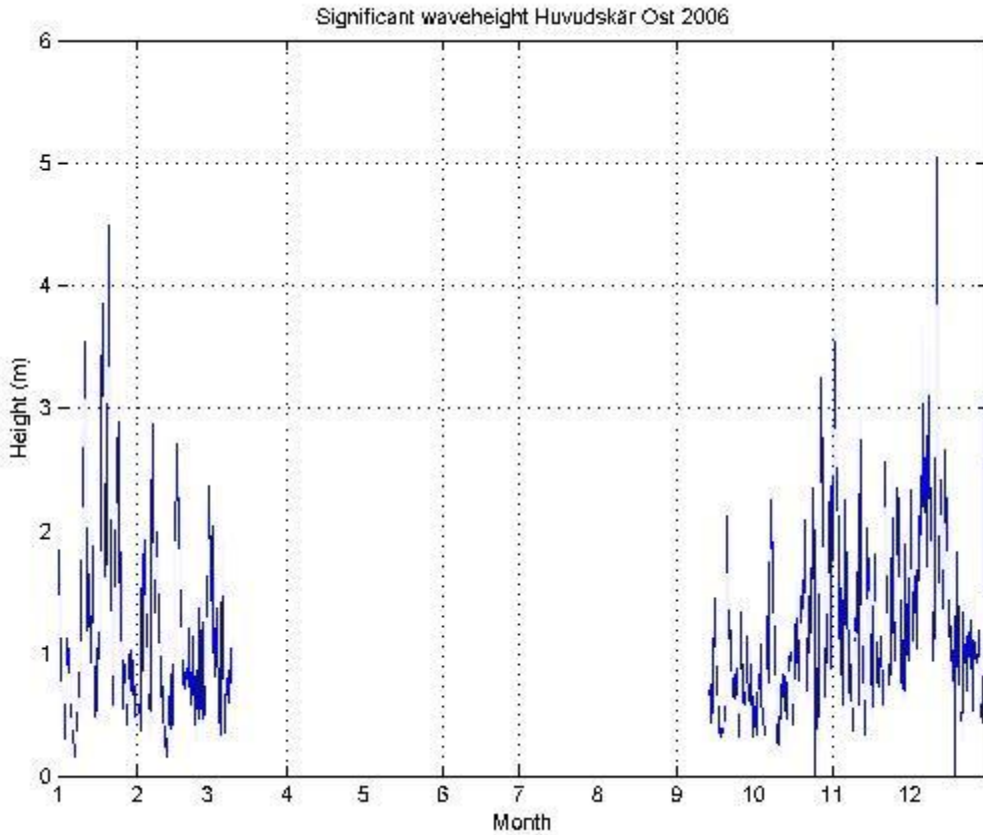


Figure 2. Timeseries of significant wave heights at station Huvudskär Ost.

The Northern Baltic Proper, station Northern Baltic Proper and Huvudskär Ost

The significant wave height remained under five metres in January. February was calmer than usual. Due to the risk of ice the buoy was recovered in the beginning of March and redeployed in the beginning of May. On 24 May a significant wave height of 3.9 metres was measured, otherwise the significant wave height did not exceed 2.3 metres from May to August. In September the significant wave height did not exceed 3.5 metres and during the autumn storm in 27-28 October the significant wave height reached 5.1 metres. In November the significant wave height reached four metres once. In average the wave climate in December was rougher than usual. A significant wave height over four metres was measured four times and the highest value for the period covered by the measurements, 6.7 metres, was measured 11 December.

The buoy at Huvudskär, to SWW from the buoy at station Northern Baltic Proper, was deployed for two weeks in January and during a period from September until December. Like at the station Northern Baltic Proper, the highest significant wave height in the measurement period was measured on 11

December: 5.0 metres. In October and November, the significant wave height exceeded three metres at several occasions.

Southern Baltic Proper, station Southern Baltic

A buoy was deployed for almost five month (March until July) in the Southern Baltic Proper. The significant wave height reached 2.7 metres in Southern Baltic Proper (15 July), the highest measured during the measurement period in 2006.

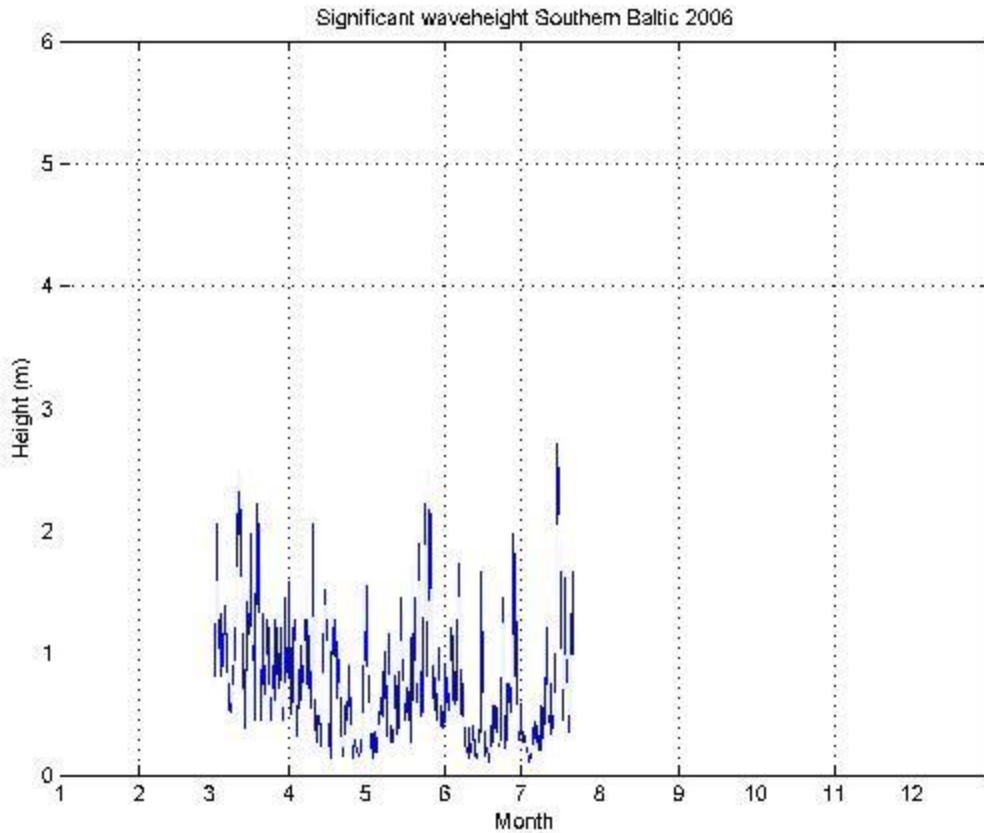


Figure 3. Time series of significant wave height at the station Southern Baltic.

Western Baltic Sea, stations Darss Sill and Arkona

In the Western Baltic Sea wave measurements were made at two locations, on Darss Sill and to the northwest of Cape Arkona. Both of the measuring sites were free of ice in winter 2006.

The mean significant wave height in the Darss Sill area is about 0.6 m in summer and 0.9 m in the winter season. At Arkona station the wave height is typically somewhat higher, namely between 0.6 and 1.1 m, because this position is located more distant from the coast and the sea is deeper there.

In June and July the mean significant wave height was somewhat below the climatological average. The highest sea state in the summer season occurred in August and reached 2.2 m on the Darss Sill and 2.8 m at Arkona station. Otherwise the wave height did not exceed 2 m in summer.

In the winter season the highest measured wave heights were 3.6 m in December (Darss Sill) and 3.7 m in October (Arkona). However, measurements at both locations were interrupted temporarily in February and March, so that no overall maximum values are known for the winter.

Kattegat and Skagerak

Kattegat, station Läsö Ost

At the station Läsö, in Kattegat, the highest significant wave height of 3.9 metres, was measured on 20 January. The significant wave height exceeded two metres at two occasions in February. The spring period, March until May, was mostly calm, and the highest significant wave height measured was 2.2 metres. During the summer period, June-August, the significant wave height did not exceed two metres. In September and October the highest significant wave height was 2.6 metres.

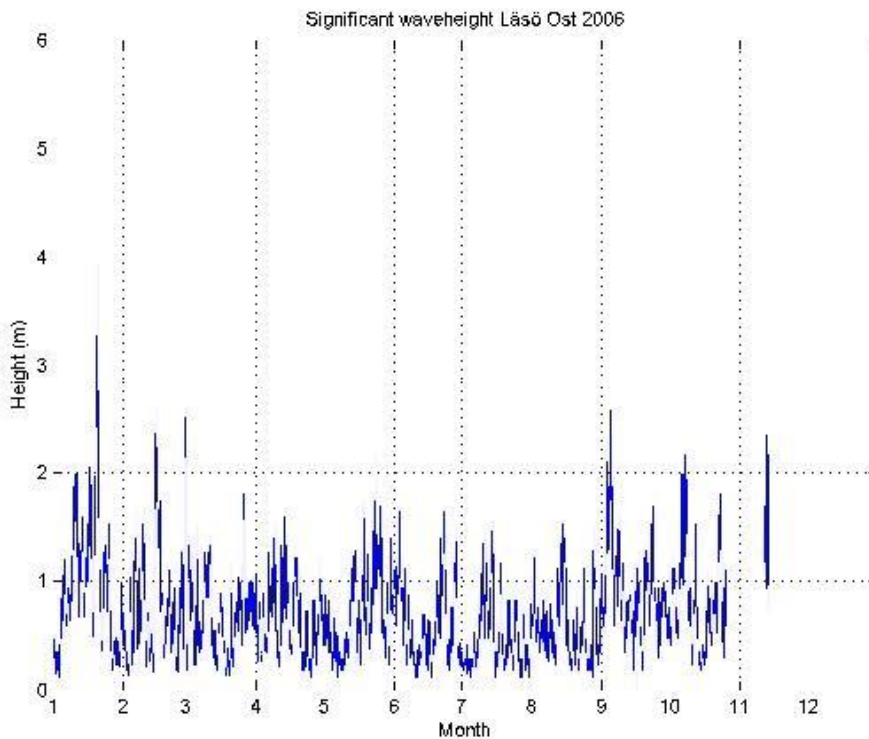


Figure 4. Time series of the significant wave height at the station Läsö Ost.

Skagerak, station Väderöarna

The highest recorded significant wave height, 6.0 metres, was measured on 11 December at Väderöarna, in the Northern parts of Skagerak. During December, at this station, the mean significant

wave height exceeded two metres due to windy weather. In May the significant wave height reached 4.1 metres. In the summer period, the significant wave height reached three metres at several occasions. Even during January and October-November the wave height were high and the significant wave height exceeded four metres at several occasions. The buoy was deployed the whole year except for a short maintenance period for one week in August.

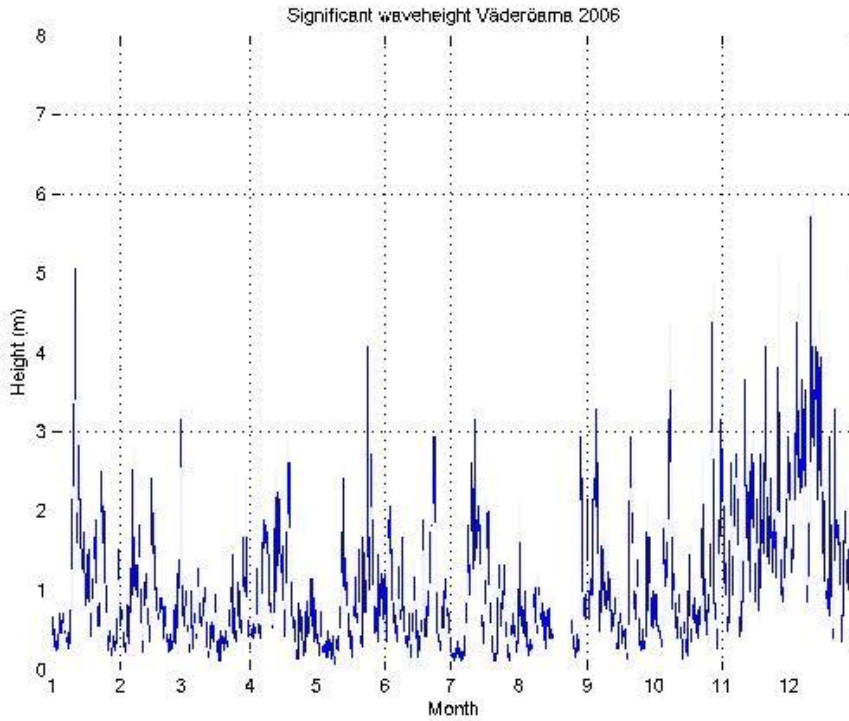


Figure 5. Time series of the significant wave height at the station Väderöarna.

Data

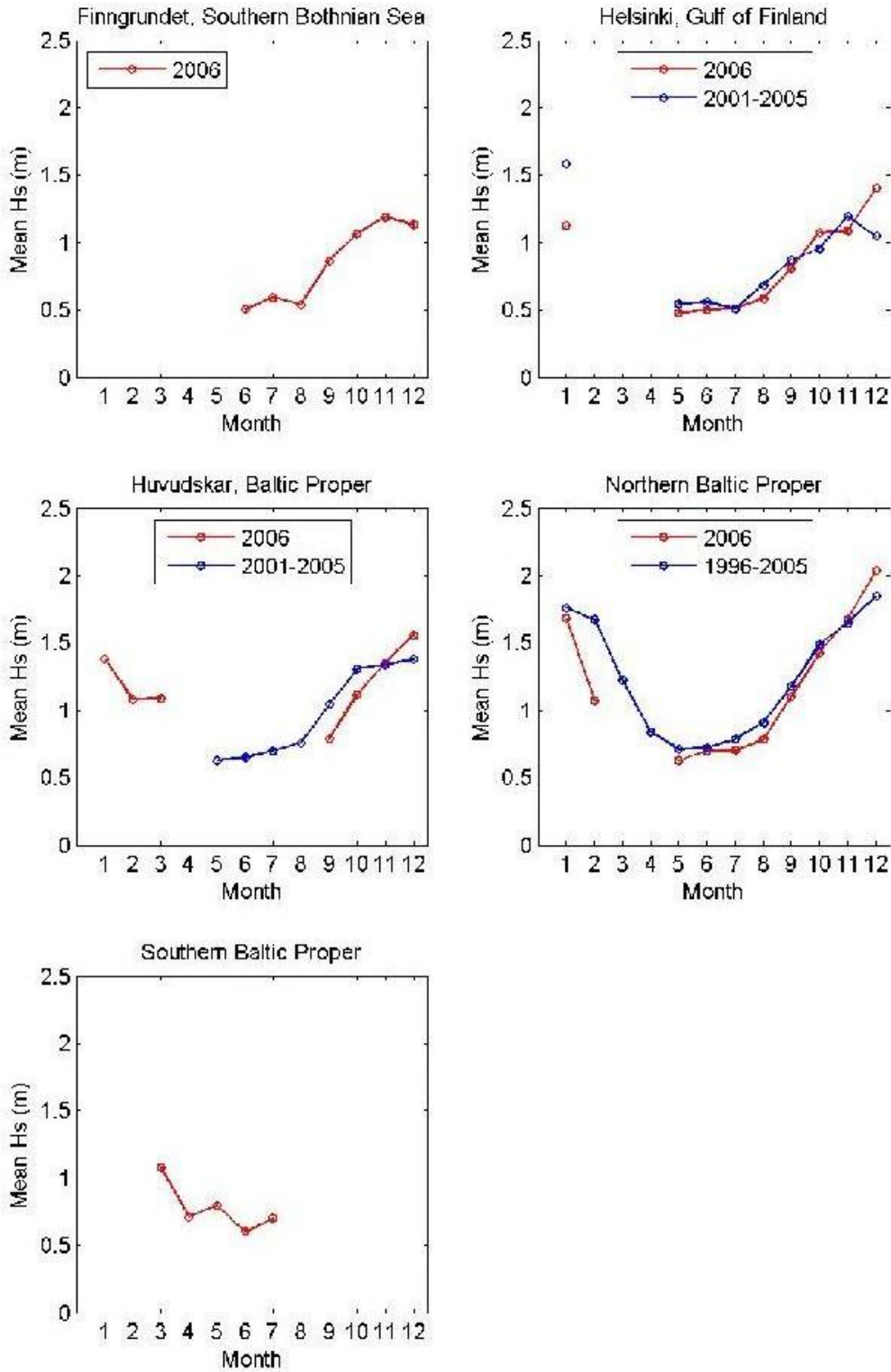


Figure 6. The monthly means of significant wave heights in the Southern Bothnian Sea, the Gulf of Finland and Baltic Proper. In some months the long-term statistics are calculated over fewer years than indicated in the legend.

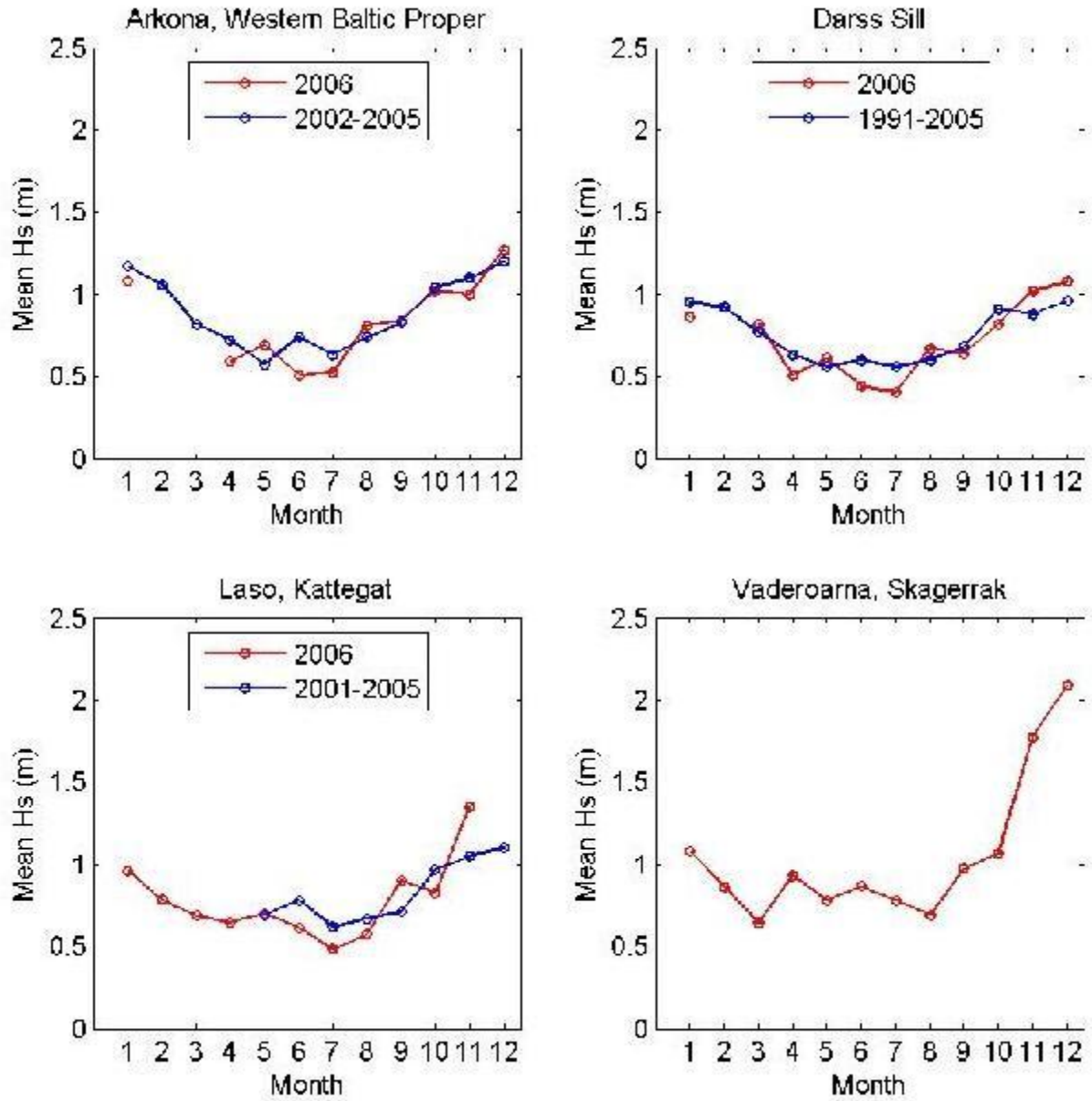


Figure 7. The monthly means of significant wave heights in the Western Baltic Proper, Kattegat and Skagerrak. In some months the long-term statistics are calculated over fewer years than indicated in the legend.

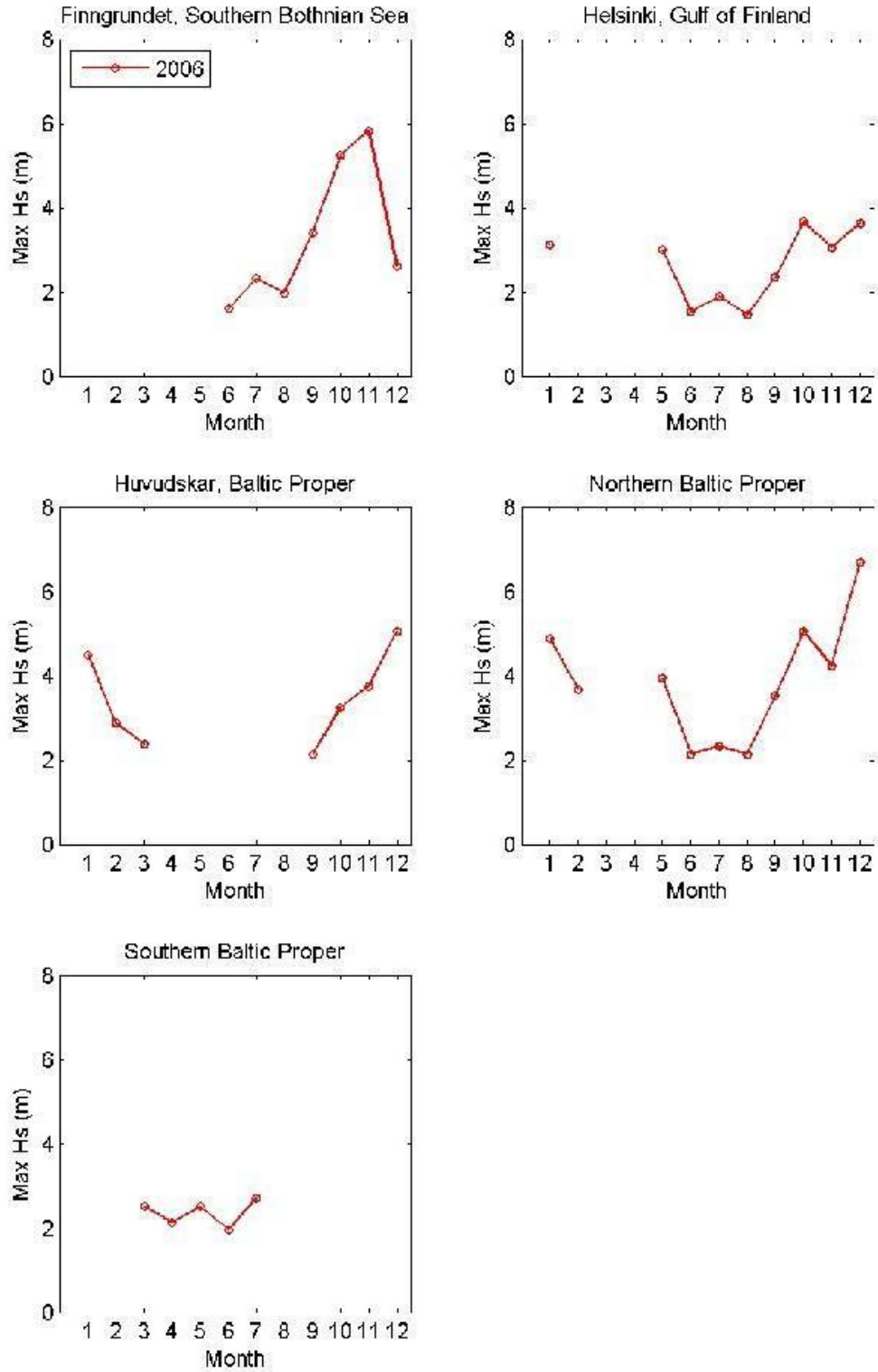


Figure 8. The monthly maxima of significant wave heights in the Southern Bothnian Sea, the Gulf of Finland and Baltic Proper.

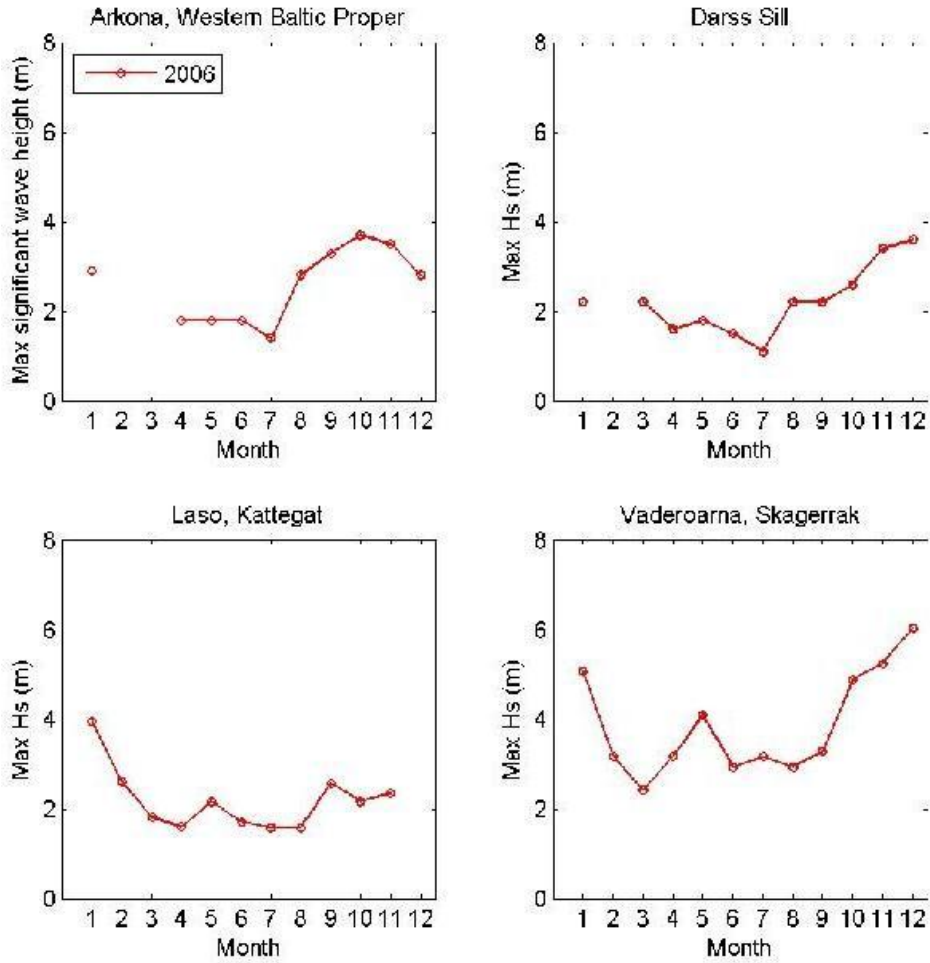


Figure 9. The monthly maxima of significant wave heights in the Western Baltic Proper, Kattegat and Skagerak.

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