

## ***Interactive comment on “Long-term spatial variations in the Baltic Sea wave fields” by T. Soomere and A. Räämet***

### **Anonymous Referee #1**

Received and published: 22 November 2010

Long-term spatial variations in the Baltic Sea wave fields by T. Soomere and A. Räämet

General comments :

This paper presents an interesting contribution to wave climate research in the Baltic Sea, based on the results of a long-term wave hindcast computed by the third-generation wave model WAM that has been driven by adjusted geostrophic wind fields. Extensive spatial variations in long-term changes of averaged and extreme wave heights have been detected but almost no changes in wave periods. Trends have been identified and discussed in detail including an investigation about the significance of those. Together with valuable links to other wave climate research that has been done already for the Baltic Sea, this paper provides a good overview over long-term spatial variations and trends in the wave fields of the Baltic Sea. The manuscript is suitable

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for publication in Ocean Science after minor revision.

page 1895 line 24: The driving wind fields that are available partly 3-hourly and partly six-hourly have been interpolated spatially to the resolution of the wave model grid, but what about interpolation in time ? Are the wind fields constant for 3 or 6 hours or have those been interpolated in time as well (with regard to the underestimation of the wave heights) ?

page 1896 line 6: . . . the model apparently underestimates the long-term average wave height . . . This may partly stem from the particular choice of the coefficient 0.6 . . . What about the missing ice coverage (in the model) in winter and the corresponding fetch-length – and the coarse resolution of the driving wind fields in time (especially before September 1977) ?

page 1897 line 18: Why could the long-term maxima of peak and mean period occur in the southern Baltic proper although the predomination of south-westerly winds suggest those should be detected usually in the northern Baltic Proper ?

page 1910 Figure 4: is not mentioned in the text !

page 1911 Figure 5: Why is the statistical significance of the trends usually high in those areas that show remarkable positive or negative changes in the wave heights ?

Technical corrections and suggestions :

page 1890 line 2 : (average and extreme wave heights, wave periods) line 17: . . . in wave properties at different sites in the recent past that may reflect the natural spatial variability in the Baltic Sea wave fields. line 22: The flux of wave energy towards the coasts is responsible for many processes in the nearshore, ranging from long-term accumulation, erosion and degradation that gradually shape the coasts due to various marine-induced hazards and disasters. line 26: . . . and their potential changes establish the major knowledge . . .

page 1892 line 6: Another wave field characteristic of similar importance is the wave

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height in strong storms. The storminess in the entire region gradually decreased over the first half of the 20th century, increased rapidly in the ... page 1893 line 11: ... of the wave model WAM driven by surface-level winds derived from geostrophic wind data. Page 1895 line 1: ... the quality of available wind data obtained from different sources largely varied over the Baltic Sea, whereas the winds derived from the geostrophic wind data showed the best performance on average (Räämet 2010). line 6: ...quality of wave hindcast results as the use of geostrophic winds ...

page 1897 line 26: This quantity hereafter is called (overall) wave intensity (or activity).

page 1897 line 19: ... is decreasing at almost the same rate ...

page 1899 line 6: ... quite substantial variations in long-term wave heights have taken place, but no noteworthy increase or decrease in the typical wave periods has occurred in the Baltic Sea over the last four decades.

Figures: Figure 4: ... average (?) significant wave height ...

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Interactive comment on Ocean Sci. Discuss., 7, 1889, 2010.

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