

## ***Interactive comment on “Wave climatology in the Arkona Basin, the Baltic Sea” by T. Soomere et al.***

### **Anonymous Referee #1**

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This paper presents the basic features of the wave climate in the south-western Baltic Sea area, in the Arkona Basin. The study is based on in situ buoy measurements (1991-2010) and two wave model hindcasts. Both hindcasts have used the wave model WAM, forced by downscaled reanalysis winds, and by adjusted geostrophic winds, and are part of independent studies, previously published in the literature. The paper also presents a (crude) validation of the hindcasts based on the buoy data.

Although simple, the paper is of some interest.

The paper in its current form is relatively well organized but far from clear.

Summary rates:

#### 1. Details

The paper is somehow difficult to read, and the text is wordy, grammatically incorrect

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and misleading here and there. There is only so much that can be pointed out, but the following are examples that should be addressed by the authors:

### 1.1 Title

The replacement of “climatology” by “climate” in the title is suggested, since the paper deals with wave climate, and “climatology” is by definition the science that studies climate. This also applies to the remainder of the paper, where the “climatology” and “climate” terms are used somehow incorrectly (see e.g. line 7 on page 2239).

### 1.2 Abstract

Page 2239, line 1 – It is mentioned “. . .South-Eastern Baltic Sea” as the area of study, but the Arkona Basin is located in the south-west Baltic Sea, as it is mention (correctly) throughout the text.

Page 2239, line 13 – S-SW is used without being defined, and should not be used in the abstract.

### 1.3 Introduction

Page 2240, lines 18 and 19 – SW and NE are used without being defined.

Page 2239, from line 5 to line 12 – This paragraph is confusing: e.g. which “specific reconstructions”?; which data was made available for the Lithuanian coast?

Page 2240, line 24 – Should “that did not” be added after “surprisingly,”?

Page 2241, line 8 – Should “by about” be replaced with “of about”?

Page 2241, line 25 – Should “wave properties” be replaced by “wave parameters”?

Page 2241, line 26 – Should “in the institute” be replaced by “at the institute”?

Page 2241, lines 26-27 – Should “against experiments performed in” be replaced by “at the”? (After all we are dealing here with wave hindcasts and not numerical experiments.)

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Page 2242, line 4 – GKSS is not defined.

Page 2243, lines 4 and 6 – Should “maximally” be replaced by “a maximum of”.

Page 2243, lines 8 and 9 – What do the authors mean with “A few measurements were obviously distorted and 190305 records contain consistent data considered below”?

Page 2243, line 23 – It should be mentioned that the frequency bins are logarithmically spaced.

Page 2243, lines 23 and 24 – The downscaling was driven by the reanalysis atmospheric parameters at the boundaries and as initial conditions, not by (only) the “reanalysis winds”; replace “weather reanalysis” by “atmospheric reanalysis”; define NCEP/NCAR.

#### 1.4 Wave climatology

Page 2244, line 8 - It is not completely clear which hindcasts are represented by AW and RS.

Page 2244, lines 11 and 12 – Later in the paper the “thresholds” are defined as quantiles. This definition should be made here, and in fact, since the term quantiles is clearer and more often used, the replacement in the remainder of the text is suggested.

Page 2244, line 22 – Which simulation has a maximum wave height of 3.92 m?

Page 2244, line 25 and following – In paragraph starting in this line it is not clear if it refers to a general situation or to the Darss Still in the Arkona Basin site. Also when mentioning “breeze” the authors should make clear that they mean sea/land breeze, if that is (as it should be) the case.

Page 2245, lines 1 to 5 – The phrase starting with “The number...” is confusing.

Page 2245, line 12 – The most frequently used wave parameter is the “significant wave height”, and not the “long term average significant wave height”.

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Page 2245, lines 12 to 17 – The comparison between the in situ buoy measurements, and the two hindcasts make no sense, since the periods are different. The phrase starting with “As no long-term” on line 14 make no sense, as well.

Page 2246, line 20 – “estimated” might not be the right term to use here; this phrase (starting on line 20) is actually confusing.

Page 2246, line 22 and following until the end of this page – Based on what do the authors claim that the wave periods T-1 are inaccurately represented by the buoy measurements?

Page 2249, line 2 – In which study (reference) is defined the general shape of the Baltic Sea wave Hs-Tm scatter diagram?

Page 2249, line 4 – The expression (formula) used to express the fully developed seas (red line) corresponding to the PM spectrum in figure 8. should be added.

Page 2250, line 8 – The phrase starting with “The model in the AW simulation . . .” is not correct since it is not the model that suggest, but the data resulting from the hindcast (that used a wave model).

Page 2250, line 6 – The phrase starting with “The most . . .” is confusing.

### 1.5 Seasonal variations in wave heights

Page 2251, line 1 – The paragraph starting on line 2 , and at least until line 10 should be re-written (confusing). On line 6 erase the reference to the “adequacy” of the NCEP/NCAR reanalysis, since that cannot be assessed by the study, and in fact what was used to drive the wave model were winds from a downscale of the reanalysis.

Page 2251, line 17 and remainder of the paragraph – The reference to the daily, weekly and monthly mean wave heights in this paragraph is very confusing and far from clear.

Page 2252, line 7 – When mentioning that “The overall annual course of wave intensity follows a similar course of wind speed in the area in question, with a calm period in

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April-August and November-February as windy months” a reference should be added, since the wind speed is not analyzed in the present study.

Page 2253, line 8 – In the sentence starting in this line it is not clear to which of the hindcasts the authors are referring to.

Page 2254, line 9 – Replace “On one hand” by “On the one hand”.

## 1.6 Conclusions and discussion

Page 2254, line 23 and remainder until the end of the page – It seems from figure 11 (buoy data) that there has been a positive trend of the significant wave height at the site, therefore what is said here might not correspond to the true.

Page 2255, line 9 – How are the “limitations of the wave rider buoy” assessed in the study, and which other means of measuring waves the authors suggest?

## 1.7 Figures

Figure 1 (caption) – If only one buoy (Darss Sill) is used why are both depicted in the figure? And which is which?

Figure 8 (caption) - On line 2 correct “1991-2011” to “1991-2010”.

Figure 11 (caption) – Confusing text that should be re-written.

## 2. Suggestions

2.1 The paper deals with wave climate in the Arkona Basin, based on in situ buoy measurements. Since the observations are the closest to the reality, the use of two hindcast seems irrelevant, and unnecessary. What do they add? Maybe using just one hindcast would be enough. A 2D plot of the Arkona basin from the hindcast (mean and seasonal Hs plus mean wave direction fields, for example) could be interesting.

2.2 Since wave direction is available from the buoy data the study of the wave direction climate in the area could be added.

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