

## ***Interactive comment on “Increased aeolian activity during climatic regime shifts as recorded in a raised bog in south-west Sweden during the past 1700 years” by R. de Jong et al.***

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General comments:

This is an interesting study on indicators of storm frequency along the Swedish south-west coast, on the large-scale atmospheric circulation factors that may cause the inferred changes, and on the possible implications of the processes associated with the changing modes of atmospheric circulation over Scandinavia.

The bulk of the data on which the current paper is based has been previously published by de Jong et al. (2006). The main new substance of the present paper is provided by the use of testate amoebae-based reconstruction of the effective humidity changes

of the bog surface during the last 1700 years. The new humidity record is interesting and provides new aspects for interpreting the past storm frequencies. The main argument of the paper is that the highest storm activity peaked during the shifts of the atmospheric circulation patterns, irrespective of the direction of the shift.

Specific comments:

The indicator for the storm activity is the aeolian sediment influx (ASI) in the peat stratigraphy. There is some confusion regarding the compatibility of this proxy with the effective humidity record. The latter is interpreted to reflect summer climatic conditions, whereas in chapter 4.2 the authors say that they tentatively interpret the ASI as a proxy for winter conditions. This would need more consideration - does the humidity record based on testate amoebae provide insights to general circulation pattern including the winter conditions?

Two hypotheses are put forward for explaining the suggested correlation between the atmospheric circulation changes and the ASI peaks. Particularly the first hypothesis, invoking increasing atmospheric mixing and air pressure gradient during the shifts between the zonal to meridional circulation modes, remains very speculative unless support can be provided by observational evidence or results of atmospheric modelling. The second hypothesis, proposing Arctic sea ice expansions and increased zonal pressure gradient in the North Atlantic as drivers of the storm increase, sounds plausible. References to Dawson et al. (2002) and Smith et al. (2002) provide time-series evidence for this hypothesis, but it would be useful to know whether system analyses and simulations of the atmospheric circulation patterns also show that the storm frequencies are associated with the modern expansions and contractions of the winter ice of the Arctic Sea.

Some additional information would help the readers. The authors frequently refer to the de Jong et al. (2006) paper, especially when dealing with the methods and chronology, and when discussing the background results from the bog. I suggest, however, these

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aspects would be explained in this paper, because they are critical for assessing the reliability of the results. In particular, data regarding the radiocarbon dates and the age-depth modelling should be shown in this paper as well. The chronology here is implicated as very precise (with statements such as “from 770-380 cal. yrs BP” etc.), and it would be useful to know whether the five radiocarbon dates mentioned in the text really permit this precise time resolution for the study.

Another part requiring further information is the ASI record from Storemosse, shown in the summary Figure 3 (curve 3d), and mentioned in the text on page 390. As no reference to this record is given, it appears that this a primary record published first time in the present paper. If so, it is necessary to explain how this record was obtained, how dated ect.

Remarks and technical comments:

Some reference could be added to the first paragraph of the introduction.

Page 386 line 8. “since these are entirely dependent on atmospheric water”, I suggest “since their water supply is entirely dependent on precipitation”.

Chapter 3. “Methods and material”. I suggest that the first paragraph describing the sampling would be numbered as “3.1 Sampling” and numbering of the rest of the sub-headings would be altered accordingly.

Page 392 lines 16-17. This is a surprising interpretation. Usually peaks of grass pollen in the Boreal zone are interpreted as indicators of intensified agricultural land-use.

Page 390 line 14. What is the source of sand if the landscape is snow-covered and frozen?

Abbreviations such as DACP and RO must be explained. There could be a reference to these terms (“Dark-ages cold period” is a particular culturally-constrained term)

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