

Referee comments to the manuscript

Characteristics of Convective Snow Bands in the Baltic Sea Area

presented by Julia Jeworrek, Lichuan Wu, Christian Dieterich and Anna Rutgersson

It is a nice study on climatology of convective snow bands in the coastal regions of the Baltic Sea focussing on the Swedish coast. The results are derived from the regional climate model outputs. The topic is interesting and important. This phenomenon is an extreme event that has brought serious problems for traffic and other human activities in nearly all coastal regions of the Baltic Sea. Unfortunately, convective snow bands are not well studied. In my mind, this manuscript could be evaluated well but it needs minor revisions. First, I'll answer to the general questions of the journal and then I'll make my more detail comments and suggestions.

1. Does the paper address relevant scientific questions within the scope of ESD? Yes.
2. Does the paper present novel concepts, ideas, tools, or data? Yes.
3. Are substantial conclusions reached? Yes.
4. Are the scientific methods and assumptions valid and clearly outlined? Yes.
5. Are the results sufficient to support the interpretations and conclusions? Yes.
6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes.
7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes.
8. Does the title clearly reflect the contents of the paper? Partly.
9. Does the abstract provide a concise and complete summary? Yes.
10. Is the overall presentation well structured and clear? Yes.
11. Is the language fluent and precise? Yes.
12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes.
13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Yes. I'll explain below.
14. Are the number and quality of references appropriate? More or less, yes.
15. Is the amount and quality of supplementary material appropriate? Yes.

Remarks and suggestions

1. I think that the title of the paper does not reflect the whole content of the study. The word “characteristics” is very modest, not ambitious. The part of the comparison of modelling results is not indicated in the title. It will be good if the main scientific question of the study is somehow reflected in the title.
2. The structure of the article is not the traditional but acceptable. In the introduction there is a description of the studied phenomenon but the description of the state-of-art is lacking. I would like to see here an overview of the previous studies on convective snow bands and their main results, the lack of knowledge on this topic, which will be tried to cover in this study, its main research questions and hypotheses. The main objectives and research tasks could be clearly defined in the introduction. Comparison of different model sets is not mentioned as a task in this study.
3. The second chapter has nearly the same title as the whole article. It is not justified. I recommend to combine two first chapters into one introduction. There I did not find two important terms that are closely related to convective snow bands. I suggest that they occur mostly in case of cold fronts. A description of typical synoptic situations favourable for the formation of snow bands could be much more detail in the introduction. Sea ice is also a very important factor influencing on snow bands. Different extent of sea ice has a different impact. It could be described also in the introduction.
4. In some places I found repetitions concerning methodology. The same information is presented in Table 1 and on page 5 line 31 to page 6 line 9, and on page 5 lines 14-26 and in Table 2. If there are tables with the list of criteria then the criteria need not to be listed in the text.
5. The time series of 11 years is not a long time series at all (look on page 10 line 17). It does not allow to do any climatological conclusions. Temporal variability of convective snow bands as well as of winter weather conditions in general is so large that 11 years cannot describe the climatological regime of convective snow bands. It can be clearly seen on Figure 3. I am not sure at all that the Gävle and Västervik regions are the richest of convective snow bands in the Baltic Sea coastal region at all. May-be, the Finnish or Estonian coasts have them even more. What do you think about this?
6. Page 6 line 15. There is a sentence “Most days occur in the months of November and December.” Looking on Fig. 3b I am not sure that most, i.e. majority of convective snow bands occur only in these two months.
7. There is confusion with wind directions on page 6 lines 16-18. Wind direction 0-65° is not northwest but northeast direction. So, which was the most common wind direction in case of convective snow bands? Why westerly wind was not related to snow bands? I suggest that westerly wind is not related to snow bands because it brings warmer air in winter and not cold outbreaks. It is not a surprise. In my mind convective snow bands in the southern coast of the Gulf of Finland are directly related to northerly and northeasterly winds. The same

question is also on page 7 line 10. Are the snow bands really related to northwesterly and westerly winds? Please, clarify this.

8. The numeration of figures is incorrect in the section 5.2. There are referred up to 10 figures, but in fact there are 11 figures in the manuscript. Please, check the figures. There are many figures with a similar pattern (Figures 4a,b, 5, 6a,b). Are they all needed?
9. Page 11 line 10. There should be “cold Finnish land” instead of “cold Finish land”.
10. Page 2 line 23. There is (Mazon et al., 2014), but in the list of references the year is 2015. Please, check it.