

Earth Syst. Dynam. Discuss., author comment AC4
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Reply on EC1

Ole Bøssing Christensen et al.

Author comment on "Atmospheric regional climate projections for the Baltic Sea region until 2100" by Ole Bøssing Christensen et al., Earth Syst. Dynam. Discuss.,
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in the following we quote the review in ordinary typeface and add our comments in boldface italics.

The paper is well written, scientifically sound and well documented. I think it is a very good and useful paper, which belongs to this collection of papers 100%. Apart from that, I support the reviewer's comments.

There one aspect which the reviewers have not taken up but which is important in my view.

The authors state that they have decided to show in the main paper only RCP8.5 results, but have not given an indication why they did so. It has been discussed that the exclusive use of this scenario gives rather unrealistic results and misleading conclusions by non-experts (e.g. Hausfather and Peters, 2020). Why did the authors choose to show results from that scenario in the main paper? It may be that in their view RCP8.5 are best comparable to the SRES A1B scenarios shown in BACC II? There may be good reasons to use these very hot scenarios, but it should be made clear or at least discussed that these are not more likely than results from the less hot scenarios. If only plots of the hottest scenario are used, the reader who is not a very expert may come to the conclusion that the plots shown are more likely than the others. It is good that plots from the other scenarios are available in the supplementary material, but it should be expressed more clearly that those plots are not less likely than the RCP8.5 ones displayed in the main paper. If the authors are not of that opinion, it should be discussed.

It is perfectly understandable that the authors do not want to delve into a discussion which scenario is more likely than another as this goes beyond the scope of this paper, but it is not clear why priority was given to the most extreme scenario.

I would recommend that the authors in the text, wherever they give a number (e.g. on warming, or % increase in precipitation etc.) resulting from the RCP8.5, they should also state that number for the lower scenarios. That will not add much text but it makes clear that RCP8.5 is not the most likely. Also they may refer to the supplementary material more often.

We agree with the Editor that we should explain better why we have used RCP8.5, and text will be added. We will also point more clearly to the scatter plots and the Supplementary Material that include all available scenarios: RCP2.6, RCP4.5 and RCP8.5. Although RCP8.5 is probably an extreme scenario, we have focussed in some of the figures on RCP8.5 because the ensemble under the RCP8.5 scenario contains the largest number of members and linear scaling will approximately provide figures corresponding to the other RCPs, at least as far as average fields are concerned (e.g., Christensen et al., 2015). A direct comparison between the available data of all three RCPs is only possible by comparing the largest common subset which is much smaller (16 members) than the number of members within RCP8.5 (72 members). The availability of a large number of ensemble members enables a reduction of the impact of natural variability.

Christensen, O. B., S. Yang, F. Boberg, C. F. Maule, P. Thejll, M. Olesen, M. Drews, H. J. D. Sørup, J. H. Christensen 2015: Scalability of regional climate change in Europe for high-end scenarios. Climate Research 64 (1), 25-38 doi: 10.3354/CR01286