

Significant additional Antarctic warming in atmospheric bias-corrected ARPEGE projections with respect to control run

Beaumont J. et al., 2021

Authors response to reviewers comment, second iteration, minor revision.

Authors : We thank once more the two reviewers and the editor for their constructive criticism about the manuscript and for the review process.

Reviewer 1 :

Thank you very much for your effort in replying to and incorporating my comment. I found that all my concerns are satisfactorily answered either in the text or in replies. I note, however, that I do not support a specific reply:

“Besides, we want to stress the fact that in AMIP-style experiments as those presented in this study, the fact that the oceans are considered as a surface boundary condition and that it can act as an infinite source or sink of energy already distort the laws of energy conservation in the experiment.”

because one violation does not justify another violation of physical laws, and the governing equations for the atmosphere can still be satisfied in AMIP-style experiments with given boundary conditions, i.e., what comes into the atmosphere equals to what comes out of the atmosphere (a very different level of “violation” from having sources or sinks within the atmosphere).

Authors : We take note of this relevant remark and will avoid using this argument as a justification in future works and discussion.

As the revised manuscript does not depend on this specific point, and the justification was made by other arguments, I recommend the manuscript be published in the Cryosphere.

Reviewer 2 :

I would like to thank the authors that they have used the time to address the concerns of the reviewers as good as possible. My evaluation is that the paper can be published almost as is. I have only three minor comments:

P18L11: It looks like the authors would like to say that their results are at the middle of the road compared to MIROC and NorESM1, but that's is not properly put down.

Authors : We think the reviewer probably meant P18L21. Actually, we wanted to stress out the fact that the climate change signal in terms of strengthening and poleward shift of the westerlies is about twice as low in the bias corrected ARPEGE projections with respect to non corrected control projections. We changed this sentence in order to make it hopefully clearer : « Each future projection (bias-corrected or not) displays a strengthening and poleward movement of the westerly maximum, but the magnitude of these climate change signals are about 50% smaller in ARPEGE bias-corrected projections with respect to non-corrected control run. »

Figure 9: There seems to be a regular pattern in the four absolute precipitation panels. Is that a plotting artefact? If so, try to remove.

Authors : Indeed, this was a plotting artifact. We removed it as much as possible.

P23L12: I would prefer to see an introducing sentence introducing the discussion section, listing the points of discussion.

Authors : Ok, we add the following introducing sentence in the text « In this section, we discuss the realism of projected climate change in bias-corrected projections as well as the future perspectives associated with the method and the results presented in this study.