

Interactive comment on “Evaluation of the CMIP5 models in the aim of regional modelling of the Antarctic surface mass balance” by C. Agosta et al.

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This manuscript evaluates the ability of the CMIP5 models to represent Antarctic climate, to ultimately present a ranking of the best models to use for RCM simulations. This work will be of interest for RCM users and ice sheet modellers, and fits well within the scope of The Cryosphere. The paper is well written, methods and results well explained, figures are of good quality, and content is original. I recommend publication in TC after the authors could respond to one general and several technical comments outlined below.

General comment

C1357

P 3124, L 12-16: While the authors use sea surface temperature bias (in summer) as one of their metrics, they suggest here that it is not important after all, since it does not affect SMB simulations (at least not for Greenland). Moreover, sea-ice extent (in winter) seems to be much more important, also in the perspective of climate change. Based on that, models with a strong 'tos' bias but better 'msie' (e.g. CESM1-CAM5, ACCESS1.0) could ultimately produce much more realistic results than other models, although this is not accounted for when weighing the metrics equally. The authors should discuss the contradiction in the manuscript, and/or considering removing 'tos' as a metric, and/or apply uneven weighing.

Technical comments

P 3114, L 24: Rewrite: ' Mass change of the Antarctic ice sheet (AIS)

P 3118, L23: observationS

P 3122: this page should be checked, it seems to be forgotten by the authors, or added later. There are many typing errors on this page:

L 6-7: put the '2' after 'R' in superscript

L 8: these two variables

L16: extent are strongly

L20: plays a major

P 3123, L9-10: This is remarkable result: many CMIP5 models are actually more similar than ERA-Interim than NCEP or NCEP-2! This could be highlighted more, since this proves once again how unreliable NCEP is on the Southern Hemisphere.

P 3124, L 30: these two variables

P 3125: These types of simulations reduce.

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