

Interactive comment on “Countervailing regional snowfall patterns dampen Antarctic surface mass variability” by Jeremy Fyke et al.

Anonymous Referee #2

Received and published: 7 September 2017

This paper provides new insights into regional variability in Antarctic snowfall from the analysis of an 1800 year preindustrial control simulation from CESM. The paper is well-written, with datasets and methodology clearly described. Results are generally clearly presented, compared to previous findings, with carefully supported conclusions. The paper can be accepted for publication following consideration of the minor points raised below:

1. It is not clear in the text and figure captions (e.g. Figure 3) what periods of data are being used e.g. in Fig. 3 are you comparing average spatial correlations from 1800 years versus 1979-2015 from RACMO2?
2. Related to point 1 above, is there any evidence of multi-decadal variability in the spatial correlation patterns in the CESM control simulation? One would expect to see

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some evidence of pattern shifts related to periodic shifts in circulation that are a characteristic of the climate system. If there is, are there particular periods that favour increased/decreased Antarctic-averaged snowfall?

3. The issue of multi-decadal variability also comes into the statement made at the top of page 6 about "sufficient record length"... if there is significant multi-decadal variability in spatial correlation structure, long-term averaging may mask an important source of temporal variability in ice-sheet-integrated accumulation.

4. The sentence on page 9, line 20 "Thus, an important by opposing precipitation variations" is difficult to follow. The first "Antarctic" is redundant, and it looks like something is missing after "ice-sheet-integrated variability" (in accumulation?).

5. It is nitpicking, but I found there was a tad too much repetition of your central theme of countervailing trends throughout the paper.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2017-102>, 2017.

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