

## ***Interactive comment on “Validation of reanalysis Southern Ocean atmosphere trends using sea ice data” by William R. Hobbs et al.***

### **Anonymous Referee #1**

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Firstly, I am really sorry that this review took so long for me to do.

This is an interesting and useful paper, in which the authors use the relationship between surface air temperature (SAT) and sea ice concentration (SIC) to evaluate a selection of reanalyses over the Antarctic. The analysis is simple (which I like) and effective, and the paper well written, and provides useful information for potential users of reanalysis data. I therefore recommend acceptance subject to minor revisions.

- Figure 3: marking a horizontal line with the  $p < 0.05$  significance would aid interpretation. Also in the paragraph that discusses these results, comment on the significance of the correlations.

- Line 133. You conclude that JRA55 and 20CRv3 have the best representations of

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long-term change over the Southern Ocean. I would clarify the phrasing here that they have the best representation over the study period. As JRA55 goes back to 1958, and 20CRv3 back to 1836, this could send the message to an incautious reader that this comment applies to earlier periods. Given the lower amounts of data going into both reanalyses in earlier period, we do not know whether this conclusion holds for earlier periods (and you obviously can't test it due to lack of earlier sea-ice data).

- Line 134 and 158, write numbers <10 in full 'Three' and 'Two'.
- Table 1: I think the '1980' in the reanalysis period box for MERRA 2 may be in bold
- Figure 1 is labelled as Figure 2.
- In the actual Figure 2, panel e needs clearer description. Define what 'S-RIP' is, and also are the black dots/line observations?

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-580>, 2020.

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