

Dear Editor,

Thanks for reviewing our revised manuscript. We have further revised the manuscript based on your suggestions. Please find our point-to-point response below.

Yong-Fei Zhang, on behalf of co-authors

- 1. I suggest it has scope to improve its impact by strengthening the argumentation in the conclusions. This may, for example, be done by extending the synthesis around Antarctic sea-ice volume.**

We compared our SIV initial conditions to available reference datasets and found large discrepancies among all existing SIV products. For SIV forecasts, daily reference values do not exist, making it impossible to confirm whether our DA adjustment is in the right direction. Consequently, definitive conclusions about SIV accuracy remain out of reach. This uncertainty, combined with the discrepancies among existing datasets, strongly advocates for more SIV/SIT observations to constrain and validate DA systems. We have added the following text in line 378 to highlight this point.

“Without ground truth for SIV, we cannot confirm whether SIC DA adjusts SIV in the right direction, which advocates for more SIV/SIT observations.”

- 2. I2: Introduce the terminology "reforecast" as "hindcast".**

Thanks for the suggestion. We've edited the text in L2 to introduce “reforecast”. Please see the text copied below.

“This study evaluates the impact of sea ice concentration (SIC) data assimilation (DA) on subseasonal forecasts of Antarctic sea ice by comparing reforecast (aka, hindcast) experiment suites initialized with and without SIC DA.”

- 3. I23: Change "past decades." to "recent decades."**

Corrected. Thanks.

- 4. I46: Clarify statement "SIT is a strong source for summer sea ice predictions in the Weddell Sea,"**

We have reworded the statement to make it clear. Please see the copied text below.

“the SIT initial condition provides an important source for summer sea ice prediction skill in the Weddell Sea, which can be well constrained by realistic atmospheric forcings.”

- 5. I50: This is the only mention of "hindcast". Replace with "reforecast"?**

Thanks for the edit. We've replaced it with "reforecast".

6. 1165: Correct typo in "aurum".

Thanks for the edit. We've corrected it to "autumn".

7. Throughout manuscript: Stay with one terminology: Either "Ross sector" or "Ross Sea" and similar for other regions, all through the text.

Thanks for the suggestion. We've scanned through the text and stick with one terminology: sector.

8. Not all figures contribute equally to the research presented in this manuscript. Suggest to review to reduce the number of figures used, or - if needed - move some into a supplementary section.

Thanks for the suggestion. We reviewed the figures and decide to move Figure 13, which shows a December-initialized case, to the supplementary materials, since it's not part of the main body of the manuscript.