We thank the reviewer for their careful reading of the manuscript and constructive remarks, which helped improve the quality of the manuscript. We have addressed all the recommendations, see details below (reviewer's comments in black, our replies in blue).

The Los Alamos sea ice model (CICE) is tested in standalone mode in the study and the performance on seasonal sea ice prediction is examined. The paper is well written and organized with clear logics that readers can readily follow. The results present now is informative. However, one more aspect can be considered to further improve the manuscript. My comments are generally listed below:

I would recommend add "Summary" or "Conclusion" in the text. Currently, the paper is rather a technique report for the authors themselves rather than new findings that the whole community can learn from, since the effect of CS2 SIT on sea ice prediction has been studied widely and comprehensively for years including CICE model (literatures can be found easily not limited to what the authors currently provided). Therefore, a paragraph with "Summary" or "Conclusion" is necessary for distinct new findings specifically in this study.

That's an excellent suggestion. We've made efforts to address this with a more specific and informative 'Summary and Conclusion' section in terms of new findings, including quantifying the seasonal performance of CICE, identifying its first-order biases, and the skill gained with a more realistic sea ice thickness initialization. We also emphasized the importance of SST and highlighted that the suitability of CICE for seasonal prediction depends on various factors, including initial conditions such as sea ice thickness, in addition to sea ice coverage, as well as oceanic and atmospheric conditions.

Regarding "2.3 Initial Conditions", the process to map CS2 SIT onto native model grid is not clear, for example, how to redistribute the mean thickness data to each category? what do the authors mean about the vicinity data to fill the North Pole, to what extent? which CS2 SIT record do you use, the daily or weekly? how the interpolation does? Bilinearly or conserved remapping?

Thank you. We have added more info to this section in the manuscript.

We utilize the monthly CS2 SIT dataset, where the mean ice thickness data is interpolated onto the CICE model grid as a single thickness category to initialize CICE. Due to missing data near the North Pole in the raw dataset, the conserved remapping method is suboptimal. Instead, we employ an interpolation method that is closer to bilinear interpolation, where the ice thickness at each model grid point is calculated as the average of all the raw data points within a radius of 2 grid spacings.

To address the challenge of missing data near the North Pole in the CS2 dataset, we adapt our approach to fill the model grid points located north of 87°N by expanding the search radius to 7 grid spacings at 87°N, and to 10 grid spacings at 89°N. This creates a more smoothly varying ice thickness field, which is important to be used as the initial condition.

Captions for Figure1 is not correct.

Thank you for catching the error in the caption. We have revised it to maintain consistency with the figure.

L119, we normally cite Zhang's paper instead of Schweiger et al., 2011 as Zhang is the main developer.

Thank you for bringing this to our attention. We concur and have replaced it by Zhang and Rothrock, 2003.

L128-L131: please rephrase the text to discuss the results quantitively.

Thanks. We have revised this to

Fig. 1(c) shows that the modeled Antarctic SIE has a positive bias of around 20% compared to NSIDC observations at a 0.5-month lead time in all seasons. The most substantial bias occurs during austral spring, similar to the Arctic. The positive SIE bias becomes even more pronounced at a 5.5-month lead time, reaching as much as 80% of NSIDC observations during austral spring. Additionally, at a 5.5-month lead time, the model shows a ratio of annual maximum to minimum SIE that appears to be excessively large compared to the observations, with approximately a factor of 3 in the Arctic and a factor of 5 in the Antarctic.

L134: Normally the seasonality of sea ice in the Antarctic cannot be like that, it's not about the initialization but rather a fundamental problem in the model!

We agreed. We have clarified in the text as:

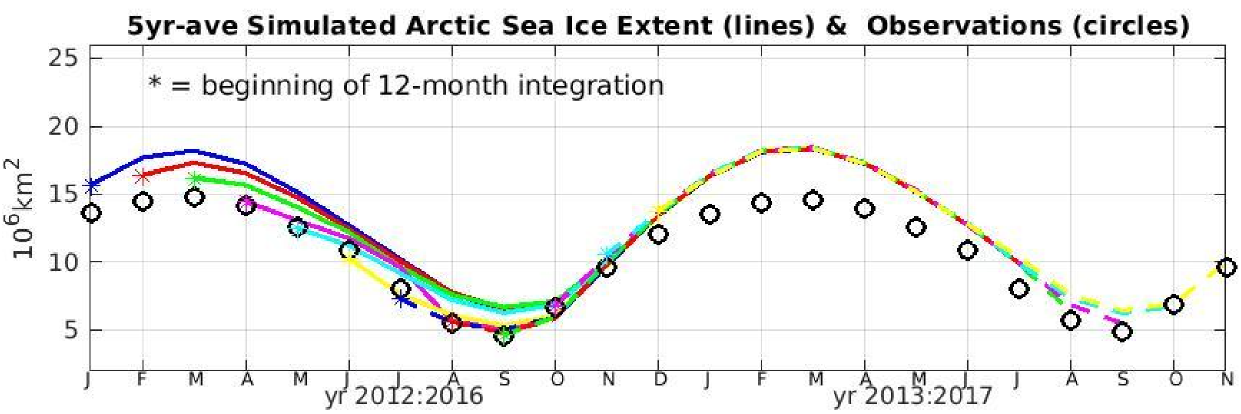
Neglecting horizontal transport in the ocean is impractical, especially in the Southern Ocean, where the Antarctic Circumpolar Current is a significant part of the global thermohaline circulation. This factor may contribute to the SIE bias, especially over longer lead times.

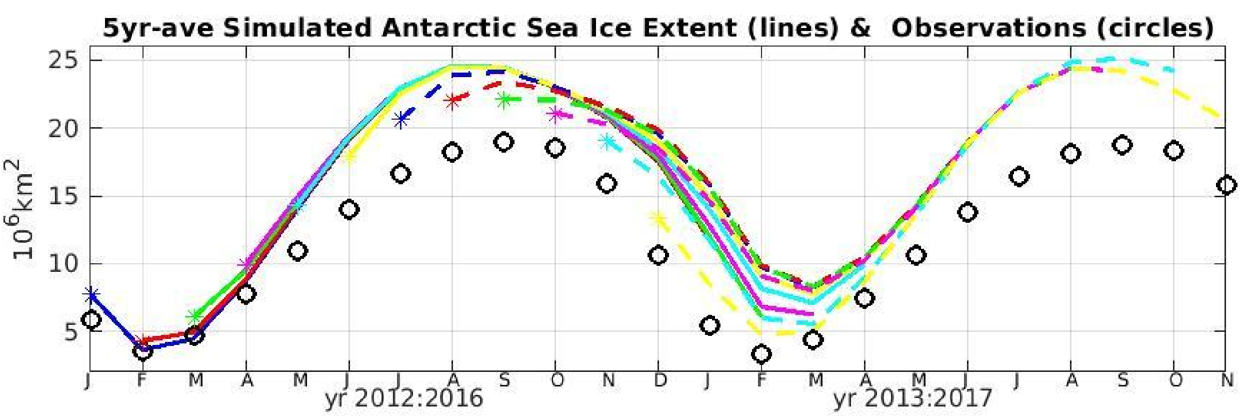
Figure 2a,b: I didn't get it why Nov has such distinct small bias over lead month >2? Same in Figure3 but in April.

A good question. Identifying reasons for a significant bias seems more straightforward than pinpointing the causes of a small bias, as small bias can arise either for valid reasons or due to errors from different sources canceling each other out, resulting in a minimal overall bias.

We plotted the simulated SIE in the control experiments, a 5-year average, against that from NSIDC in Arctic and Antarctic, see below, where * marks the beginning of the 12-month integrations. Clearly, the modeled SIE has a positive bias at almost all lead time, with the minimum bias in November in the Arctic, and in April in Antarctica. One approach to unravel this would be to examine the SIE tendencies from thermodynamics and dynamics. However, without observational data for comparison, we still won't be able to explain this phenomenon. Our intention is to contrast these quantities with those derived from coupled model experiments in future experiments in the hope of gaining insights.

On the other hand, higher skills in fall are also seen in other studies, e.g., Peterson et al. 2015, Martin et al. 2023. We have added references to these studies.





L187: With respect to tendencies arising from the thermodynamics and dynamics, for readers don't use CICE will never know what that means! A description on which terms the two terms account for is necessary.

Thanks for your suggestion. This part was added as a response to a previous reviewer. Now we added more description:

The origins of SIE change can be categorized into two tendencies, originating from thermodynamics and dynamics, respectively. Same is true for SIV tendencies.