

Topic Editor

Thank you for resubmitting your manuscript and thoroughly addressing the reviewers' comments. Your revisions have improved the clarity and overall quality of the paper, making it a valuable contribution to our journal. I have reviewed the changes and appreciate the effort you have dedicated to enhancing your work.

The expanded methodology section is particularly well done, providing additional clarity regarding your experimental procedures and data analysis techniques. This significantly enhances the reproducibility of your study. However, there are still some areas where minor revisions could further strengthen your paper. Here are my suggestions:

First and foremost, we thank the topic editor very much for the patience and suggestions below. We are delighted that the improvements we have made to the content of our study, particularly the methodology section, have been recognized. We will reply to the comments point-by-point in the following.

Introduction:

While you have included several key references, incorporating more recent studies would provide a more comprehensive background and set the stage for your work. Consider discussing recent advancements and their relevance to your research to highlight its novelty.

We have added several studies published in 2024 to the Introduction part of the new manuscript.

Methods:

The added details are valuable; however, ensure that any specific software or equipment used is referenced with version numbers or specifications, as this will assist readers wanting to replicate your study.

We have added the relevant information in the code and data availability statement in Lines 591-592: "The MITgcm software and documentation are available at [\url{http://mitgcm.org/}](http://mitgcm.org/), and the release is [checkpoint67v-18-q1e25bc255](#)." Meanwhile, we also revised the reference of the MITgcm documentation to the same release checkpoint to ensure consistency.

Results:

Figures and tables are generally clear, though I suggest reviewing the legends for precision. For instance, Figure 3 would benefit from an expanded caption explaining the observed trends in greater detail.

Where applicable, ensure that all statistical analyses are fully described, with confidence intervals and p-values reported for key findings.

We have expanded the caption in Figure 3: "(a) The time series of ACC transport The black line for the 8-km simulation starts from the 48th model year. The ACC transport in the 8-km simulation has reached a statistically steady state in the 48th model year. After refining the horizontal resolution, the ACC transport can also maintain a statistically steady state close to the result of the 8-km simulation....."

Discussion & Conclusions:

The discussion is adequately expanded to address most of the reviewers' concerns; however,

integrating a comparison with other studies' findings, even those that differ from yours, will provide a balanced perspective.

Further, I recommend highlighting the broader implications of your findings and suggesting potential future research directions.

Currently concise, yet reinforcing the potential applications or real-world implications of your results would benefit the reader's understanding of your work's impact.

We have further revised the relevant part in the new manuscript.

References:

Ensure that all cited works in-text are fully accounted for in the reference list, and vice versa. Consistency in the citation format is crucial.

We have revised the reference of the MITgcm documentation to the same release checkpoint (checkpoint67v-18-g1e25bc255) to ensure consistency.