

# Response to the reviewers of egusphere-2024-1652: Tropospheric Links to Uncertainty in Stratospheric Subseasonal Predictions

Dear Editor Petr Šácha,

On behalf of all authors I would like to submit the revised version of the original article "Tropospheric Links to Uncertainty in Stratospheric Subseasonal Predictions" including an annotated version of the modified manuscript.

Best regards,  
Rachel Wu

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Dear authors,

thank you very much for carefully considering all of the referee comments, which deserve credit for improving the manuscript considerably. I am happy to write you that I reached the editorial decision of "Publish subject to minor revisions". Also, I confirm the intention to nominate your article for a highlight paper. The minor revisions that I recommend below should help you to reach this goal and are mainly technical in nature. Definitely, they do not prevent publication of your manuscript.

Thank you for carefully reviewing our revision of the manuscript and the intention to nominate our article for a highlight paper. We have addressed the revisions as recommended. Please find below the detailed responses (in blue) to the reviewers' comments and suggestions. All line indications refer to the new (annotated) version of the manuscript.

Editorial comments (numbering follows the tracked changes version):

1) At numerous places of the manuscript (L94, L108, L171, L252), the not shown statement is invoked. I feel that particularly in the conclusions this is not appropriate, as here the most important findings supported by the results presented should be discussed. The manuscript is quite short right now and very readable, which I like very much. On the other side, I feel that there may be some space for adding a figure or two (from the Appendix?) to the main text and/or for expanding the Appendix (e.g. by the figures from the review process) to decrease the number of not shown statements. I would like to ask you to consider this comment carefully, seeking balance between readability on the one side and self-consistency on the other.

Thank you for the suggestion. We have now added Figure A1 and A2 to reduce the number of 'not shown' statements. Figure A1 is referred to on Line 75. Figure A2 is referred to on Lines 107, 171, 176 and 178.

2) In Fig.3, Fig. 5 (and in Figs. Ax) you cut the plots at around 60°S. While I understand your motivation, this results only in small space savings. Moreover, it seems that the significance regions would often extend to the SH polar region, if shown, challenging either your methodology or our current understanding. If you decide to keep the figures as they are, please include a statement justifying this cut-off.

Thank you for the suggestion. We have extended our plots to include the Southern Hemisphere (Figure 3, 5 and A4). Regions of significance are found over the Southern Hemisphere and are potentially related to tropical precursors. We have added some description on Lines 154-159 and 215-217.

Technical:

Chronological ordering (numbering follows the tracked changes version):

L26 - depositing wave momentum -> depositing momentum..this is more precise, because strictly speaking there is nothing like wave momentum, only wave momentum flux..

Thank you for the comment. The phrase is corrected on Line 26.

L60 - the phrase in particular appears twice in a short sequence, consider rephrasing

Thank you for the comment. 'In particular' is replaced by 'especially' on Line 59.

L93 - a typo - the results are do not change...

Thank you for spotting the typo. The phrase is now corrected on Line 91.

L166 - (Figure 2f) (Schwartz et al., 2022)...consider rephrasing. It is not clear, whether you point the reader to a possible Fig. 2f in Schwartz et al.

Thank you for the comment. The phrase is modified on Line 169.

L170-L172 - Please clearly state again whether this can be related to the positive impact of early SSW occurrence on the subsequent spread (downward impacts from the stratosphere).

Thank you for the comment. The results and sensitivity tests show that it is not possible to clearly separate tropospheric precursors and responses in uncertainty when considering all hindcasts together, as noted in the Conclusions (Lines 259-261). We have therefore added sentences elaborating on the timing of SSW occurrences in the hindcast composites and clarified that the overlap in timing makes it difficult to separate the direction of coupling. These clarifications are found at Lines 170-171 and 177-181.

L184-L187 I cannot see the extreme spread for the purple dashed line in Fig. 1a, nor the strong vortex state in Fig. 1b. Can you possibly clarify or guide the reader's eye better?

Thank you for spotting this. We realised we have accidentally plotted the wrong purple lines while updating the figure during the last revision. We have restored the figure to the version at the initial submission. The purple dashed line in Fig. 1a now shows extreme spread, and the purple dashed line in Fig. 1b shows the strong vortex state at initialization.

Starting at page 13: Please double check the formatting of the Appendix. It seems to be scattered between the Data availability and Acknowledgements statements.

Thank you for the comment. The data availability and acknowledgement statements are now all after the Appendix section.

Thank you very much again for publishing with ACP and wishing you all the best for the next steps.

Best regards,

Petr Šácha.