

# Response to RC 1

Effects of Model Grid Spacing for Warm Conveyor Belt (WCB)  
Moisture Transport into the Upper Troposphere and Lower  
Stratosphere (UTLS)—Part I: Lagrangian Perspective

Cornelis Schwenk and Annette Miltenberger

February 22, 2026

## Major Comments

The current format of the Conclusions and Discussion section is heavier on the Discussion side and could use an extra paragraph of higher level conclusions. You list the main findings in 1-2 sentences (drier WCB outflow; more pronounced frozen-phase microphysics, stronger frozen precipitation, etc. for the higher resolution simulation) in the Abstract, and I was hoping to see a mirroring paragraph of these high level concluding remarks with some more detail also in the Conclusions and Discussion section. Currently, the rather detailed discussion/conclusion ends at line 600 and continues with placing the study into a larger context and the limitations paragraph. I would recommend adding a paragraph around line 600 that includes the key findings mentioned in the Abstract with some short elaborations. This would greatly benefit the readers who start from the Conclusions section and would be drawn in to read the full study.

*Thank you for the excellent suggestion. We have added a short paragraph in line 600 ff briefly summarising the key findings. Please refer to the new manuscript for the altered text (lines 616-625 in the revised manuscript).*

## Minor Comments

- The authors state that the current work is a follow-up study to Schwenk and Miltenberger (2024), pointing out the similarities in the methods and also partly in the results. The presentation of the research question and the hypothesis (the paragraph around line 110) also mentions the earlier study, and I recommend making this the first place where the reader is explicitly informed that the current study is a follow-up study.

*We have altered the text in that paragraph, so that it becomes clearer that this is a follow-up study. The new text can be found in lines 112-113 of the revised manuscript.*

- The end of the sentence on lines 128-129 and the beginning of the sentence on line 129 contain the same phrase: 'this study'. I recommend rephrasing these sentences to eliminate any confusion about which study or paper is being referred to.  
*The two sentence have been rephrased see line 131 of the revised manuscript.*
- The second criterion for the WCB trajectory selection algorithm ("... and second, the trajectories must lie within two specified longitude-latitude regions at two distinct times, determined using Eulerian cloud cover and sea-level pressure data from our simulation.") would benefit from an additional sentence or two that elaborates on how the selection of regions was based on the given Eulerian fields, as this appears to be different from Madonna et al. (2014) and Oertel et al. (2023).  
*The region was constrained manually by looking at different snapshots of sea-level pressure and cloud cover to avoid including trajectories that belong to adjacent MCs-type systems in the south-western part of the domain. This approach is not feasible in a climatological study like Madonna et al. (2014) and was not required in the study by Oertel et al. (2023) due to different meteorological conditions. We added a sentences in line 181ff to better reflect the subjective approach taken here.*
- Figures 2 and 4 might benefit from additional vertical lines that would indicate the mean and/or median values mentioned in the text for the corresponding figures.  
*We have added vertical lines to Figure 2. However, in Figure 4, there are enough histograms that adding vertical lines would lead to a very messy and difficult to interpret figure.*
- The sentence on line 282 seems to be missing a verb.  
*Changed to "... trajectories in the nested simulation ARE ON average 24 h old ..."*
- The figure caption for the Figure 5 subplots do not match the actual subplots.  
*Thank you for pointing this out, the caption was referencing an older version of the figure and we have corrected this.*
- The subsection 'Hydrometeor Content' in Section 3.2 contains an incorrect figure reference on line 339 and a non-existent figure reference ('Fig. 6g') on line 352.  
*Thank you for pointing this out, we have fixed the figure references.*
- Add the word 'trajectories' after the value '0.5%'. The values are very different; however, in the current wording, the 0.5% could refer to either trajectories or the PE value.  
*Thank you for pointing this out, we have reworded this sentence to make it more clear.*