

Personal remark from Rolf Muller

I think Fig. 7 is really helpful and it would be even more helpful if you managed to add a theta scale as an additional vertical axis (just as a suggestion)
Thank you for this suggestion. I have added a potential temperature axis.

Report 1

Publish as is.

Thank you for reviewing this paper!

Report 2

Lines 223-226 “The mean temperature... warm bias.”

Lines 340-342 “The edge points ... cold point bias.”

Lines 390-392 “These points have a... relative to the 0.25 trajectories.”

It is not quite clear how the fractions of the warm biases are computed as described in the texts listed above. It is difficult to follow the authors' logic and calculations using the numbers given in the texts. I suggest revising the descriptions for clarity.

E.g. In the first analyses (Lines 223-226), how did the authors obtain the percentages 50% and 26%?

E.g., for the 6-h run, 11% trajectories have mean CPT of 187.9 K at the edge points, and 89% trajectories have mean CPT of 185.7 K in the collocated regions. This makes a weighted mean CPT of 185.94 K for the 6-h run. Compared to the 1-h run (184.8 K), this is a 1.14 K warm bias. The new CPT after removing edge points would be 185.7 K. Compared to the 1-h run (184.8 K), this is a 0.89 K warm bias. Assuming the rest of the bias is caused by the edge points, $(1.14\text{K} - 0.89\text{K})/1.14\text{K} = 21.93\%$. But this calculation fails to match the authors' 26%.

Our method for calculating the percent warm bias induced by edge points was $(\text{fraction of edge points}) \times (\text{bias of edge points relative to higher res data}) / (\text{total bias})$. For this example, the calculation is $4640/43892 \times (187.9 - 184.8) / (186.0 - 184.8) = 0.27$ (there was a small error in our code, so the 26% number was wrong by this method too). Your method is a direct comparison to what the average cold point temperature would be without edge points, which is easier to interpret, so we adapt it in the new manuscript. (The numbers differ slightly due to rounding though. We supply the mean CPT of 186.0, and a warm bias of 1.2 K, so the fraction of warm bias for the 6-h edge points should be $(1.2 - 0.9)/1.2 = 0.25$.) Thank you for this suggestion.

Line 353: Fig. 6g -> Fig. 6f

Thank you for catching that. This is now fixed.

Report 3

The authors have done a good job on addressing my previous comments and revising the manuscript. I recommend acceptance of this paper for publication.

Minor comment:

1. Check the Figs S3 and S4 in the supplemental files and the text.

Thank you for catching that; we had swapped the titles but forgot to change their labels. The labels are correct now. The references to these figures in the text did not need to be fixed.

2. Figure 6 misses the potential temperature.

I am not sure what this is referring to. The right column in Fig 6 shows the temperature, longitude, and pressure of the cold point, which is consistent with Figs 2 and 8. The first manuscript submission had potential temperature in the left columns of these figures, but we have removed that subplot in each figure to create space for the additional resolution comparisons in the left columns.