

Responses to the comments of Reviewer 1

The authors would like to thank the reviewer for his/her positive assessment of the manuscript. In the revised manuscript, all notes listed under "Technical Comments" will be taken into account. We address the reviewer's specific comments below:

- *Upon thorough review, I noticed that there seems to be no mention of range resolution. Including this information somewhere in the paper would be beneficial.*

The height resolution for all datasets studied is 300m. We will include this information in the text of the revised manuscript.

- *ll. 161-169: In addition to providing specific dates for the earliest and latest onset of the PMSE season, it might be beneficial to include the respective years as well. Doing so would offer readers a valuable reference when investigating inter-annual variations around the mesopause.*

We thank the reviewer for this suggestion and will add the corresponding data to Table 3 in the revised manuscript.

- *ll. 287-295: Tidal effects are mentioned as one of the factors contributing to local time dependency of PMSE. On the other hand, previous studies, including Murphy et al. (2004), have pointed out seasonal variations in the amplitude and phase of tides in the Antarctic region. It would be valuable if the paper could discuss whether the local time dependency shown in lower panels of Figure 3 changes with the season, or at least remains qualitatively consistent. Such discussion could include how this relates to the research on the seasonality of tides.*

This is indeed an investigation that we have not delved into in detail in the present study. Similar investigations/representations, as shown in the lower panel of Figure 3, which are based on monthly time periods, indicate, however, that the diurnal variation depicted in this figure does not exhibit significant seasonal (monthly) changes in the positioning of the maxima and minima, but rather annual changes in intensity. This could mean that any local time tidal influence on PMSE is due to migrating tides, which tend to be stable, rather than more variable non-migrating tides. Further investigation of this is thought to be beyond the scope of the paper, however, we will add this information without visual representation to Chapter 4.2.2 in the revised manuscript.