Dear Reviewer #2

Thank you for your useful comments. Please find our answers below.

Main comment

A validation of these daytime temperature profiles has been done by means of a comparison with the nighttime Rayleigh lidar measurements. Some discrepancies were found between both techniques and as the authors mentioned, they could be partially explained by the contribution of thermal diurnal tides. In this point I think it would have been interesting to compare also with other techniques (as for example microwave MLS measurements), in which the time difference between their measurements were lower than between lidar and GOMOS. It would have provided a better estimation of the accuracy of the GOMOS profiles. But I consider that it is something that can be addressed in future studies.

We agree that a comparison with other techniques observing the temperature at limb from space would be very useful. However this was beyond the scope of this study. The two most used space sensors for upper stratosphere – mesosphere temperature profiling are MLS-AURA and SABER-TIMED. These two sensors have been recently compared with the OHP Rayleigh lidars by Wing et al., (2018b) which showed systematic differences and suggested non-linear distortions in the satellite altitude retrievals. Despite the difference in local hour of measurements, GOMOS seems to be in better agreement with the OHP lidar at the stratopause region with less than 1 K bias, compared to nearly 4 K for SABER and greater than 8 K for MLS.
In order to better understand these differences, we plan to compare in a future work our new GOMOS temperature dataset with MLS and SABER. A comment is added on this point in the revised version.

Minor comment

- page 5, line 19: Indicate how many profiles are used for this statistics (validation using lidar observations).

554 collocated profiles have been compared. Added in the revised version.

Typos:

- page 4, line 2: Tukiainen et al -> add year of publication

Tukianen et al. (2011). Added.

- page 4, line 7: replace ".. is negligible" by ".. are negligible"

The sentence "… is negligible" seems OK for us.

- page 4, line 26, ... noise) -> delete it

Sentence corrected.

- page 4, line 29: in et al. (2018): the author is missing in the cite

Wing et al. (2018a). Corrected.

- page 6, line 6: ". . .. for the 45°N latitude for August and middle panels)". Something is wrong in this sentence.

“and middle panels)” removed.