

1 Answer to Referee's general comment

We thank the Referee for the detailed and constructive review, it helped us improving the readability and quality of our study.

We agree that the abstract brings many detailed quantitative information and that it is not easy to retain all of them. We have rephrased the part in the abstract where the statistics are provided, and therefore improved the readability. Unfortunately, it is not recommended by the AMT guidelines to include a table in the abstract. However, Table 5 brings exactly what requested by Referee#1 including the information about the portion of troposphere covered by the daytime and nighttime statistics.

2 Answer to Referee's specific comments

During daytime measurements in the lower troposphere, and nighttime measurements in whole troposphere, mean bias are found $\mu = 0.02 \pm 0.1$ K and $\mu = 0.05 \pm 0.34$ K respectively. How would you comment those big errors?.

The daytime $\mu = 0.02 \pm 0.1$ K and the nighttime $\mu = 0.05 \pm 0.34$ K are the mean biases along the atmospheric regions where the daytime and nighttime temperature profiles are calculated. Each mean bias is provided with a variability, i.e. the standard deviation of the biases. Based on values of σ of 0.62 K (day) and 0.66 K (night), representing the standard deviation of all differences $\Delta T = T_{\text{ral}} - T_{\text{ors}}$ over which μ is calculated, a variability of 0.1 K (day) and 0.34 K (night) can be expected.

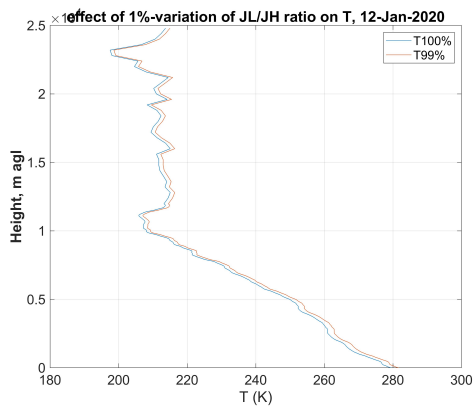
3 Answer to Referee's Technical corrections

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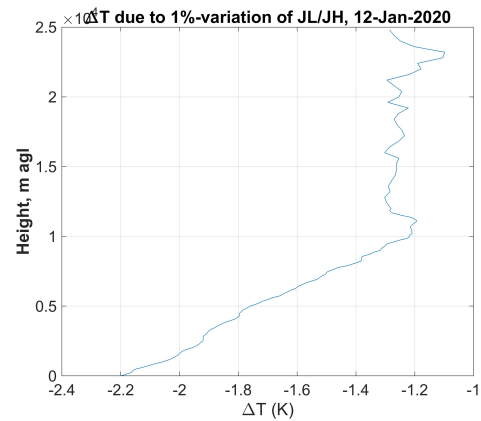
1. Page 1 Line 18-19 "imperfect subtraction" of the background from the daytime PRR profiles induces a bias of up to 2 K at all heights. In which figure is this represented?

The results have not been included in the paper because we deemed that it was out of the scope of the study. However, the sensitivity test of the calculated temperature with respect to a variation of 1% of the ratio $J_{\text{low}}/J_{\text{high}}$ has been carried out and is shown in figure 1. The plot in panel (b) shows as a change of 1% can induce up to 2 K difference in the lower part of the profile.

2. Page 3 Line 3 "Trustworthy references can be provided by co-located radiosondes, satellites or a numerical models." Probably "a" should be removed.
done



(a)



(b)

Figure 1: Differences in the calculated temperature induced by a relative change of 1% in the ratio J_{low}/J_{high} .

- Figure 1 (and for all similar graphs) St. dev and median are calculated after averaging, so maybe it should be mentioned at the label.

The median and St. Dev. have been removed from Figures 1-3 after the technical review.

- Page 4 Line 9-10 “Figures 1 and 2 show the statistical biases of the SRS-C50 and the RS41 with respect to the reference RS92 as a function of height for the day and night-time launches.” In order to be better-structured, figures or the SRS-C50, RS41 should be reversed.

Done

- Page 11 Line 23 “Once the signals corrected, their ratio is used used to retrieve the temperature” the word used should be removed.

Done.