

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2022-307

Anonymous Referee #1

Referee comment on "Stratospheric temperature measurements from nanosatellite stellar occultation observations of refractive bending" by Dana L. McGuffin et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-307-RC1>, 2022

This paper presents a methodology for retrieving atmospheric temperature profiles from satellite observations using the stellar occultation technique. The methodology is clearly described with a precise analysis of the measurement errors. It is applied to observations made by two non-dedicated nanosatellites with limited performance because they were not optimized for such measurements and a forthcoming mission that should have much better performance with temperature profiles retrieved up to 41 km. This paper is well suited for publication in Atmospheric Measurement Techniques after some minor revisions as described below.

1) Introduction: Please quote Sofieva et al. (2019) who recover temperature profiles from bichromatic stellar scintillations using GOMOS observations.

2) Line 92: the highest pressure level predicted by MERRA2 is 0.01 hPa, which corresponds to about 80 km, not 86 km.

3) Paragraph 2.2.1: The PSF of the centroid of the star is described by a Moffat function. How do you determine the parameters included in this distribution (width and negative exponent) and what are their values?

4) Line 154: n cannot be neglected in the calculation of the impact parameter p near the ground. For $n=1.003$, the error on p will be 1.9 km, which is not negligible.

5) Lines 287-288: The brightness of the star is also attenuated due to refractive dilution due to the decrease in refractive index with altitude as explained in Sofieva et al. 2007.

Reference to be added:

Sofieva V., Dalaudier F., Hauchecorne A., Kan V, High-resolution temperature profiles retrieved from bichromatic stellar scintillation measurements by GOMOS/Envisat, Atmospheric Measurement Techniques, European Geosciences Union, 2019, 12 (1), pp.585-598. [10.5194/amt-12-585-2019](https://doi.org/10.5194/amt-12-585-2019) ©