

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2021-53

Anonymous Referee #2

Referee comment on "Improvement of Odin/SMR water vapour and temperature measurements and validation of the obtained data sets" by Francesco Grieco et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-53-RC1>, 2021

The Grieco manuscript presents the updated retrieval of water vapor and temperature from Odin/SMR by fixing the sideband leakage issue. Validation against other satellite datasets were carried out. Improvement of data in this new version has been achieved.

The paper is well written with significant results. I recommend its publication after a minor revision.

Major Comments:

1. page 3: line 10-line 14, References for other satellite measurements are not representative. For example, MLS, SABER, SOFIE and ACE-FTS have inappropriate citations.
2. page 5, line 7: "The a priori for water vapour instead...." More information is needed. What kind of measurements at Bordeaux Observatory?
3. Figures should be described in sequence. For example, page 6, line 7 "Figures 12 and 13" are called too early.
4. Structure of the paper. Many figures are put in the appendix, but are discussed in the main text. For example, page 11, first paragraph. Need to rearrange.

5. page 12, line 5 "Regarding H₂O, measurements are considered coincident...., while for temperature" the separation of time seems too long: 9 hours and 4 hours. Tides will be mixed in the comparison.

6. Contours in the appendix need improvements. Figure A5-A6, A8-19, difficult to quantify the values. Use more color table or contour interval.

7. Why SABER H₂O and T are not used in the validation?

Minor comments:

1. Abstract: first line, "temperature is also important tracer" Not really. Temperature is also controlled by solar radiation and cooling. Not a dynamical tracer.

2. page 4, last line, "long wavelength"

3. page 6, line 14, what are the physics behind these r_0 values? Or just empirically determined?

4. page 7, line 9 "and increased methane oxidation...."or sure about it. Any reference?

5. page 7, line 14, "geostrophic balance" please double check its accuracy.

6. page 12, line 3, "that is MIPAS", --->"such as"