

Interactive comment on “IMK/IAA MIPAS temperature retrieval version 8: nominal measurements” by Michael Kiefer et al.

Anonymous Referee #2

Received and published: 10 February 2021

General comments:

This is a very well and clearly written paper on the most recent MIPAS temperature data product retrieved with the IMK/IAA processor from the MIPAS nominal measurements. The paper fits well into AMT and the MIPAS special issue and I don't have any major objections against the publication of the manuscript. In my opinion minor revisions are required for the paper to become acceptable for publication and I ask the authors to consider the specific comments below.

Specific comments:

Line 44: “.. degraded spectral resolution reduced resolution”

Perhaps “reduced resolution” can be italicized or put in quotation marks to make it

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easier to read. I had to read the sentence, particularly “degraded spectral resolution reduced resolution” several times.

Line 71: “correction led to too small values”

Unclear, what “values” refers to here: correction values, radiances or temperatures (probably radiances)? Please clarify.

Line 137: “and then fitting a linear regression function to the shift values, which are calculated for the single microwindows.”

It would be good to mention how well the frequency shift values for the different microwindows can be approximated by a straight line.

Line 154: “measurements)” Closing parenthesis can be deleted.

Line 182: “occurring” -> “occurring”

Line 196: “is obtained by linear interpolation along with hydrostatic correction of pressures at the given geometric altitudes.”

I don't really understand what was done here. Can you rephrase or add an additional sentence?

Line 203: “Since limb measurements used for one profile retrieval cover, depending on the measurement mode, about 1600 to 2200 km in the horizontal,”

I wonder, why this distance is so large. What does it refer to exactly? What is duration of a limb scan?

Section 3.5: Horizontal variability

The approach you used to consider horizontal variability seems very good. I suggest mentioning the horizontal resolution of your model atmosphere. This is not mentioned, as far as I can tell.

Section 3.7: Is the background continuum spectrally neutral? Probably yes, but it

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should perhaps be mentioned explicitly.

Line 248: “The cause of the continuum signal from high altitudes is presumably meteoric dust”

Just out of interest: Is there any chance the measurements can be used to identify meteoric dust? Or has this been attempted already?

Section 3.8: Does the offset have a constant value for all wavenumbers of a microwindow?

Section 3.11: I suggest mentioning which process/reaction leads to vibrational populations being removed from LTE. If it's several processes, perhaps the most important one can be mentioned.

Line 310: “are use” -> “are used”

Line 328: “The atmospheric conditions under consideration are northern and southern polar winter, polar summer.. ”

This is only a minor issue, but does polar summer include both hemispheres? I tried to count, whether it is nine scenarios and was a bit confused.

Section 4: I suggest mentioning how the individual error sources were added to determine the total error.

Figure 3: Please explain the meaning of the red crosses and plus signs at the bottom of the figure.

Line 366: Please explain or spell out “IF16”

Line 371: “Section3.2” -> “Section 3.2”

Line 461: I suggest replacing “cold temperatures” by “low temperatures” because temperature cannot be cold, strictly speaking.

Line 487 – 498: It would be good to provide more quantitative information here. How

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large was the drift before, compared to other sources (which sources) and how large is it now?

Figure 8: Suggest to mention the years in the caption of this figure, too.

Figure 9 and related discussion: One can see the differences, but one doesn't know which product agrees better with the true T-field. The discussions of the differences between versions 8 and 5 should be complemented by more quantitative comparisons with independent measurements. Perhaps you can simply refer to existing validation studies for V5.

Line 556: “The standard deviations .. was” -> “The standard deviations .. were”

Appendix A: The tables A1 to A9 differ in the altitude range shown. I guess this was done on purpose? If yes, it would be good to mention it and mention the reasons for the different altitude ranges.

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