

The manuscript by Glatthor et al. describes the new MIPAS CH₄ and N₂O data products version 8 from IMK/IAA. The paper is well written and explains the retrieval algorithm and error sources in much detail. I have the following comments.

General Comments:

1. The description of horizontal gradients in Sect. 3.2 should be clarified. Where does the information on horizontal variability for an individual measurement come from? Are only 2D/3D temperature fields used? How exactly are the horizontal gradients of CH₄ and N₂O mixing ratios “jointly retrieved” (p. 6, l. 15)? Are there additional assumptions?
2. The different error contributions are explained in very much detail in the paper and the Supplement. Which of this error information is contained in the data products?
3. Is there any information about the consistency between the different data products, esp. FR vs. RR products? For example, Figs. 4, 5 and 8 show averages over the complete MIPAS time series, so this should include both FR and RR data. A possible systematic offset between FR and RR could have some impact on the results. From the error budget described in section 4.1 it seems that there are differences.
4. The Supplement is very extensive (284 pages). I think for the paper all this information is not really required, especially because the references in the paper do not point to specific parts/pages in the Supplement. I also expect that data users would prefer to have the relevant part of this information in the data product itself. However, as this is only a Supplement, you may decide to keep it.

Specific Comments:

1. p. 4, l. 2–11:
As described in this paragraph, the oscillation detector only changes the initial guess between one iteration and the next. Does this imply that there is not enough information in the measurements themselves to remove the oscillations and you just apply an additional constraint on smoothness of the profile? Does this have an effect on e.g. vertical resolution?
2. p. 4, l. 13:
What is meant with “cloud-threshold of 4.0”? Does this refer to a maximum cloud optical depth?
3. p. 5, l. 30–31:
Please explain what is meant with “instrumental characteristic”. Do you refer here to e.g. altitude dependent spatial stray light which is not corrected?
4. p. 14, section 4.3:
Please specify which information is used to determine the horizontal averaging kernels. Are these derived solely from the measurements or are e.g. model data used?
5. p. 17/18, section 5.3:
Maybe the delta validation results should be related to the results from the error analysis. Are the observed changes within the expected systematic uncertainties of the products?
6. p. 19, l. 16:
“We suspect that this bias might be due to the spectroscopic data used, which suffers from large uncertainties.”

Why does an uncertainty in the spectroscopic data result in altitude dependent biases? Is this e.g. related to dependencies on pressure or temperature? Please explain.

Technical Corrections:

1. p. 4, Table 1:
Please provide in the caption some information on what is meant with the column "Retrieval log/lin". This is explained later in the text, but at this stage it is not clear if log/lin refers to the altitude axis or the retrieved mixing ratios.
2. p. 4, l. 14:
Please define "mean spectral radiance contrast". Is this the ratio between the mean radiance of the two windows?
3. p. 5, l. 12–13:
"In the V8 retrievals, for the first time horizontal mixing ratio gradients of both target gases were additionally retrieved along with the other unknowns."
I suggest to add a cross reference to section 3.2 here.
4. p. 11, Table 3:
Please define "target-ESD".
5. p. 16, l. 12:
"the 1.6 ppmv contourline" → "the CH₄ 1.6 ppmv contourline"