Atmos. Chem. Phys. Discuss., 6, S1190–S1194, 2006
www.atmos-chem-phys-discuss.net/6/S1190/2006/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "MIPAS database: Validation of HNO_3 line parameters using MIPAS satellite measurements" *by* J.-M. Flaud et al.

Anonymous Referee #1

Received and published: 12 June 2006

General:

The paper describes choices made to improve the spectroscopic data of HNO3 used for MIPAS/Envisat level-2 analysis. The new database is validated by comparison of forward modelled spectra on basis of the MIPAS PF3.1 and the new MIPAS PF3.2 database with MIPAS observations. Such a paper is important to characterize a large set of atmospheric measurements. It helps the community to avoid misunderstanding during validation activities and scientific interpretation of the data and to further develop spectral databases for different instruments. The first part of the manuscript - the description of choices leading to the new database - is clearly structured. However, there are still parts which need clarification (see below). In the second part - the validation of the choices by use of measured spectra - new results are presented. How-

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

ever, though containing the central part of the manuscript (see paper caption) it is very short and rather weak (details are given below). I would strongly recommend that the authors elaborate this section by a more detailed description of their calculations and by performing some additional retrievals/forward calculations which in my opinion are necessary to convince the reader of the advantages of the new spectroscopic dataset.

Specific:

p. 4255, l. 11: 'On the average these new line intensities are weaker than those in the HITRAN2K linelist: INTHIT2K/INTNEW $\approx 1.13 \pm 0.06$.'

-> In the abstract of Toth et al., 2003 a value of 1.14 ± 0.06 is given. What is correct? Which value was used for MIPAS PF3.1?

p.4256, l. 1: 'following value: 2.31(23)'

-> Could you specify which entries from Table 3 you use? I cannot reconstruct this number. What does the number in brackets describe? How is this calculated from the Table?

p. 4256, l: 6-7: 'As a consequence we retained the Toth et al. (2003) intensities at 11.2 μm'

-> Does this mean that they are retained for MIPAS PF3.2? However, above it was stated that a rescaling on basis of the Toth data has also been done for MIPAS PF3.1, but in the first row of Table 3 there are different band intensities for MIPAS PF3.1 and MIPAS PF3.2. Shouldn't they be equal in case the whole band intensity has been normalized to the Toth's one? This should be made clearer in the text.

p. 4256, l. 11: 'corrected taking into account the fact that at 11.2 μm the intensities of Toth et al. (2003) have been used.'

-> Please explain this correction more explicitly.

p. 4258, l. 4:

ACPD
6, S1190–S1194, 2006

EGU

-> Could you state here whether this model has been used for MIPAS PF3.2 air- broadening coefficients?

p. 4258, l.18:

-> Which version of MIPAS calibrated spectra have been used? The reprocessed ones?

p. 4258, l. 23: 'This filtering led to the selection of 55 spectra with nominal tangent altitude of 12 km and 55 spectra with nominal tangent altitude of 24 km.'

-> Why the same number at both altitudes? I would guess that more spectra are sorted out at 12 km than at 24 km?

p. 4259, l. 14:

-> Here it is stated that HNO3 has been retrieved with the MIPAS off-line processor. It seems to me that it has been retrieved once (using MIPAS PF3.1) and that these results have been fixed for all forward model runs later. If this is correct: why have no retrievals been made with PF3.1 and with PF3.2 and comparing than these residuals? I would suggest this approach such that the 'best fits' can be compared.

-> Further, which spectral windows have been used for HNO3 retrieval? From a mixture of the different spectral regions in Table 3 or only from 820-950? I would find it reasonable to perform retrievals in one region and then e.g. check for inter-band consistency.

p. 4259, l. 15:

-> The comparison in Table 4 is made over the spectral interval 840-930 cm-1 and this includes CFC-11 and CFC-12 as major contributors. In fact, in this wavenumber range these are the most important gases beside HNO3. Thus, I think it is necessary to retrieve also CFC-11 and CFC-12 individually to get reasonable comparisons, at least for the tangent height of 12 km but also for 24 km, since in the tropics there is a

ACPD

6, S1190–S1194, 2006

significant radiance contributing at these altitudes.

p. 4260, l. 1 and Figs 1 and 2:

-> In these figures the same spectral ranges as in Table 4 should be shown such that the reader has the possibility to see at which wavelengths there are improvements.

-> Figures of the comparison should also be shown for the 24 km tangent altitude tests.

-> There is large broadband residual offset in all cases shown. (Called 'Average difference' in Table 4). This is much larger than the spectral noise of MIPAS (which is only given in the Figures, but should also been stated in Table 4.). The authors should discuss the reason for this offset in more detail (on p. 4260, l. 10 these are attributed to 'other atmospheric species which are not perfectly modeled'. Can these species be identified regarding their large spectral contribution?

p. 4260, l. 3...:

-> The authors state that it is not possible to make statements about the consistency of the new database in different spectral regions. However, would it not be possible to retrieve HNO3 from different spectral regions and compare the resulting HNO3 profiles as has been done by e.g. Boone and Bernath on basis of ACE-FTS data (shown in Fig. 3 of Rothman et al., 2005) for the HITRAN04 database?

-> Finally, a comparison of HNO3 results between MIPAS PF3.1 and MIPAS PF3.2 using the spectral windows of the standard processor would be helpful for people interpreting the MIPAS level-2 dataset.

Technical:

p. 4254, l. 14: '483 to 630 cm-1'

-> In Table 2 637 cm-1 is given.

p. 4255, l. 24: 'Such a problem is not easy.'

ACPD

6, S1190–S1194, 2006

-> I recommend to omit this conclusion.

Table 2 and 3:

-> Could you state in the caption what the numbers in brackets mean? Errors?

p. 4259, l. 2-3: '(Ridolfi, M.: Accurate broadband forward model for MIPAS, private communication, 2004)'

-> redundant, since M. Ridolfi is an author of the actual paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 4251, 2006.