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Atmospheric Chemistry and Physics Discussions

Interactive comment on "HDO measurements with MIPAS" *by* J. Steinwagner et al.

J. Steinwagner et al.

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Below are the answers to reviewer 2's comments and questions on behalf of all co-authors.

RC 1
The whole paper is dominated by details on the retrieval technique. I suggest that this part of the paper should be shortened. Most details can be found in the literature.

AC
We think that most of the length in question stems from the HDO specific parts of the general theory. Those details are necessary to keep the obtained results traceable. Additionally, in the error calculation part of the paper we make heavy use of terms defined earlier in the paper.

Furthermore, this paper is thought to build the basis for scientific work with HDO and δD-data from MIPAS by providing a thorough characterization of these data with their random and systematic uncertainties, vertical resolution, etc. For this reason we consider discussion of retrieval details as necessary and helpful for colleagues from other scientific communities. Scientific analysis of derived global fields will be discussed in forthcoming papers where the retrieval details can be referenced.
However, for the final version we will carefully review the paper to identify redundant parts and remove them.

RC 2
SO_2 is considered in the error calculation (Table 2), and the errors introduced by SO_2 in Figure 4 are quite small. As far as I know, the spectral lines of SO_2 are very uncertain in the spectral region where HDO is retrieved. How is it possible to give such an accurate error estimate if the lines are so uncertain? This needs to be discussed.

AC
The error shown in the figures is based on an uncertainty of SO_2 abundances of 1000%. Our sources of spectroscopic data do not report spectroscopic data uncertainties but even if these were as large as 100%, their contribution would not be significant.

RC 3
Figure 9 seems to indicate a clear minimum at 23 km, as also discussed in the text, but Figure 2 does not. This needs to be clarified.

AC
The average profile shown in Fig. 2b belongs to a 5° latitude bin around 10°N which is

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at the edge of the pronounced tropical minimum around 23 km (see Fig.9), and for this reason the minimum in this selected average profile is less pronounced.
For the individual profiles like the one shown in Figure 2a, the signal strength of the minimum is within the total error bars of a single profile. Statistically significant vertical structures are only visible in the averaged profiles and not in individual profiles. Therefore, it is not expected that each individual profile shows the structure at 23 km, and the averaging is necessary to resolve those structures.

RC 4
In the bottom parts of Figure 1, 2, and 5 the main curve shows the average profiles, not the standard deviations. This is misleading in the captions and should be corrected.

AC
This indeed is misleading and will be corrected in the revised version.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 931, 2007.