Atmos. Meas. Tech. Discuss., 2, S112–S113, 2009
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Atmospheric Measurement Techniques Discussions



# *Interactive comment on* "MIPAS reduced spectral resolution UTLS-1 mode measurements of temperature, $O_3$, $HNO_3$, $N_2O$, $H_2O$ and relative humidity over ice: retrievals and comparison to MLS" *by* S. Chauhan et al.

**Anonymous Referee #3**

Received and published: 13 April 2009

This paper shows some nice and very useful figures comparing MIPAS, MLS, and ECMWF. The text, which seems extremely short given the amount of material covered, should be expanded in order to provide adequate discussion of at least a few interesting features. Most importantly, there needs to be much more quantitative discussion of the effect of clouds on measurements in the upper troposphere. At the moment, these are mentioned only in the introduction and the conclusion, where the rather vague statement is: 'MIPAS trace gas observations at lower altitudes are in general more obstructed by clouds than those of MLS'. Doesn't this lead to a significant bias in the

comparisons in the upper troposphere, especially in water vapor comparisons? A plot showing what fraction of measurements is obstructed by clouds at which altitude would be useful.

The authors should certainly state that the statistical uncertainty in the mean bias is very small, but it would still be nice to see actual standard deviations as well in and to compare them with the otherwise unvalidated measurement noise plots in Figures 1-5.

What is a zero-a-priori profile? Does this mean setting the species a priori to zero? If so, this does not seem like a good idea. If the a priori sensitivity is small then perhaps it doesn't matter, but, having brought up the matter, the authors need to state this.

Table 1 - So, if I understand things correctly, in the FR mode the retrievals are done using data from the entire bands shown in the middle column (e.g. 685-970 cmˆ-1)? Should the title (MIPAS bands used should also have a cmˆ-1 next to it.

Probably the striping in the vertical resolution plots is okay, but there should be some discussion of this obvious feature. This is not something that I recall ever having seen in plots of vertical resolution.

'the height constant regularization used'. What does this mean?

Why is signal to noise better in the summer hemisphere?

The horizontal resolution at different altitudes seems to have a huge variation. What causes this? Is it because different bands are important at different altitudes? Some discussion would be appropriate here. As far as I know, such large variations are not shown in the MLS validation papers.

Figure 7 - Wouldn't it be better to lump these panels together with Figure 6?

Some discussion of the structure in the MLS-MIPAS HNO3 comparisons near 20 hPa would be appropriate. This structure is not apparent in the Santee paper.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 439, 2009.