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Atmospheric Measurement Techniques Discussions

Interactive comment on "Validation of water vapour profiles (version 13) retrieved by the IMK/IAA scientific retrieval processor based on full resolution spectra measured by MIPAS on board Envisat" *by* M. Milz et al.

Anonymous Referee #3

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General comments:

The paper presents an ample effort of MIPAS/Envisat water vapour profile validation. It is built up on a large comprehensive data set which offers the possibility to compare the performance of this spaceborne passive remote sensor with other instruments in a statistically meaningful approach. The basic problem remains: none of these instruments can be considered as a reference measuring the "true" water vapour concentrations. Nevertheless the papers' conclusion carefully circumvents this sad fact and states that at least the MIPAS instrument's uncertainties are well characterized (in most cases).

This is of fundamental importance for all data users.

The paper is well written and suitable for publication in AMT, contains however numerous inconsistencies between the figures and their descriptions which are listed below.

Specific comments:

Abstract: A summary on the geographical positions and the vertical range of the comparisons must be given here. It would also be useful to include the overall MIPAS instrument uncertainty resulting from this study, either as one number or given as an uncertainty range.

Section 4.1, last sentence: At mid-latitudes, longitudinal variations can also be pronounced, particularly in the vicinity of the polar and subtropical jet streams.

Section 4.3: Eq. 7 is identical to Eq. 4 from Rodgers & Connor (2003). You should cite them here again.

P. 500, line 22: I could not find any chi-sq analysis in the SPARC (2000) report. You can omit this ref here and eliminate it from the reference list.

P. 500, line 24: remove "and above 55 km".

P. 500, line 29: remove "indicating".

P. 501, line 11: ...overestimation of the [errors] at all altitudes...

P. 501, line 12: For altitudes above 66 km the assumed errors ...

P. 504, line 9: Only between 14 and 17 km ...

P. 505, line 3: Between 15 km and 26 km both...

P. 505, line 8: ...between 15 and 26 km.

P. 507, line 3: ... occurs at 17 km...

P. 507, line 5: For altitudes below 13 km...

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P. 507, line 7: Above 13 km...

P. 507, line 17/18: The prominent bump is weaker. The maximum difference of 0.7 ppmv or 15% is found at 23 km.

P. 508, line 10: Also between 12 and 20 km...

P. 510, line 1: ... values (cf. Fig. 27) calculated...

Section 5.3: The present manuscript is not the first and only comparison effort with MIPAS Version V3O_H2O_13. Kiemle et al. (ACP 8, 2008, p. 5256) present several comparisons between MIPAS and airborne water vapour lidar in the tropical UT/LS with good agreement above 12 km. It may be useful to refer to that paper here for the sake of completeness.

P. 510, line 27: ...the agreement is very good below $\sim$30 km and...

Fig. 28, left: Why are the differences above 30 km larger than the error bars in this situation with the smallest distance? Is it due to different air masses or different fields-of-view, despite the good co-location, or is there another reason?

P. 513, line 27: ...have a slight dry bias compared to FLASH-B and NOAA FPH.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 489, 2009.