

Interactive comment on “Validation of MIPAS-ENVISAT H₂O operational data collected between July 2002 and March 2004” by G. Wetzel et al.

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First of all we thank the referee for her/his effort to carefully reading the manuscript and for all comments and suggestions for improvements.

Major comments:

Vertical coordinate:

H₂O retrievals of satellite and balloon-borne remote sensing instruments are performed on a pressure grid. In-situ experiments directly measure the atmospheric pressure. For lidar observations, altitude is the measured vertical coordinate which has been

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compared with the MIPAS tangent altitude and the corresponding MIPAS pressure (no conversions or assumptions were made).

Coincidence criteria:

The general coincidence criterion applied is 300 km and 3 h (if not otherwise specified). This is written in section 3.2 and Table 5 now. The strong coincidence criterion ensures that the same air masses are compared. For Arctic winter situations it has been qualitatively checked (with the help of PV maps) that no data pairs inside and outside the vortex were intercompared.

Description of smoothing used:

We included statements in the text to make it more clearly where smoothing has been used and where not. Smoothing has been used where the vertical resolution of the validation instrument was higher than the vertical resolution of MIPAS. VMR differences which are shown in the figures have always been calculated from profiles with a comparable vertical resolution. We included a reference describing the method of the smoothing in section 3.

Trajectory matching to increase coincidences:

We included a more complete description together with a reference in section 3.1. Trajectory match calculations have not extensively been used but only for the FISH aircraft and balloon comparisons. In general, the number of coincidences is shown in the figures and/or the figure captions.

Section 3.4, radiosondes:

ULAQ Vaisala RS80 radiosondes were used for the intercomparison with MIPAS. No corrections on the radiosonde data have been applied. Radiosonde data up to about 34 km (7 hPa) have been used. Above about 30 hPa (24 km), radiosonde data are less reliable leading to quite large combined errors. The averaging kernel smoothing was applied for data points above 12 km. The comparison for altitudes below 12 km

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was performed by simply smoothing the RS80 data (boxcar function in pressure). We modified the text for additional information. We re-plotted Fig. 18 with combined total error bars in a way comparable to the other figures. The standard deviation was not calculated because the differences between MIPAS data points and the radiosonde data points are not on a common altitude grid (as visible in Fig. 18).

P. 4455, l. 1-4:

We included Fig. 21 as a summary plot. We inserted both, altitude and pressure values, in the corresponding text.

Minor comments:

p. 4439 l. 1:

We added a reference for the new MIPAS data version.

p. 4440, l. 18:

The exact limits of the MIPAS microwindows are given in the text now. Spectral regions of other satellite instruments are mentioned in the corresponding sections. Exact numbers can be found in related publications.

p. 4441, Eq. 2:

The validation instrument is supposed to be the reference instrument which has been validated before by independent observations. Hence, the deviation of MIPAS is given with respect to the reference instrument. This is written more clearly in the text before Equation 2.

p. 4443, l. 27-29:

All mentioned microwindows are used. It is written in the text.

Table 3:

No limitation of the SZA was used. We changed the text in Table caption 3 accordingly.

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Throughout:

Combined total errors are meant at p. 4444, l. 10. We checked the terminology and minor grammatical inaccuracies throughout the text. Additional headings in sections 3.1 and 3.2 are principally possible. Anyhow, since balloons are discussed in a more common way instead of separately, we decided to renounce on further headings.

Technical corrections:

p. 4435 l. 3-4:

Corrected.

p. 4438 l. 2, l. 7:

Corrected.

p. 4438 l. 26-27:

We now list the operational products in the text together with the corresponding references.

p. 4445 l. 2:

We rephrased this sentence for better clarity.

p. 4446 l. 16-19:

We split the sentence into two parts.

p. 4448 l. 11:

Modified.

p. 4448 l. 14:

Modified.

Sect. 3.3.1, 3.3.2, 3.3.3:

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Modified.

p. 4455 l. 12:

Modified.

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