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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Middle atmospheric water vapour and dynamics in the vicinity of the polar vortex during the Hygrosonde-2 campaign" *by* S. Lossow et al.

S. Lossow et al.

Received and published: 20 May 2009

Anonymous Referee #1 Received and published: 2 April 2009

Review of ACPD paper "Middle Atmospheric Water Vapour...", by Lossow et al:

There is some interesting water vapour data presented in this paper - it is certainly worthy of publication.

2. The major problem this reviewer has with this manuscript is the total lack of discussion of the accuracy of the H2O measurements. Nowhere in the paper are the measurement uncertainties presented; not on the ﬁgures nor in the text. The H2O proﬁles appear to be of very high quality and a great deal of emphasis is

placed upon the ﬁne structure, but no error bars, no standard deviations, no quantitative treatment of errors is presented. The text discusses H2O data quoted to the nearest one-tenth of a ppmv level of detail, but the reader cannot be sure the data is accurate to within 1 or even 2 ppmv.

Reply: The spread of the water vapour data represents the the statistical uncertainty and increases almost exponentially with altitude. The statistical error is about 0.04 ppmv at 50 km, 0.1 ppmv at 60 km and about 0.3 ppmv at 70 km. The systematic uncertainty we estimate to be within 10%.

3. More philosophically, the H2O proﬁles presented here are "snap shots" of the atmosphere. The details of these proﬁles have been identiﬁed with speciﬁc dynamics, however the time scales over which those details evolved are unknown.

Reply: That is correct. In the manuscript we discuss the role of gravity waves for the observations. The minimum period of gravity waves is about 5 minutes, which gives an indication of the shortest time scales that could be involved. The gravity waves we observed have periods of several hours, which gives an indication of time scales over which the water vapour profiles have been evolved during the Hygrosonde-2 campaign.

4. The selection of what parts of the descending observations of the Hygrosonde-2 instrument are (or should be) included here, in Figure 1., is not adequately discussed. This issue involves itself with needed information about measurement errors discussed above (in 2.).

Reply: The selection of which parts of the descending observations are included is entirely based on the attitude data of the rocket. Only where we can guarantee that the measurements were performed outside the shock front we use the data. Only outside the shock front contaminations from outgassing and desorption can be avoided, which are causing the highest error contributions.

ACPD

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Interactive Comment

5. There are a few typographical errors, as follow:

page 12229, line 4 - "trough" should be "through"

page 12230, line 4 - the year is 1984 not 1994

page 12231, line 5 - "enough" is redundant following "sufﬁcient" line 16 - "kind of" is redundant following "such"

page 12232, line 8 - "sensitivity" may be ascribed to the instrument as a whole, but "intensity" should be used for the light source

page 12234, line 11 - "slight" should be "slightly"

page 12235, line 13 - "trough’ should be "through" line 21 - replace with "Information about the vortex situation at higher altitudes is not included in the operational..."

page 12237, line 13 - replace "..vortex are range between.." with ".. vortex ranges between.."

page 12239, line 23 - "informations" should be replaced by "information", which is both singular and plural

Reply: all comments under 5. corrected

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 12227, 2008.