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# ***Interactive comment on “Comparison of HDO measurements from Envisat/MIPAS with observations by Odin/SMR and SCISAT/ACE-FTS” by S. Lossow et al.***

**Anonymous Referee #4**

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This paper shows an intercomparison of three sets of satellite measurements of HDO. The paper is, in general, well written and clear descriptions of the datasets and the method are provided. The results should be of interest to the community and the subject matter is suitable for publication in AMT.

General comments:

I think the paper would be stronger if more information were provided on the differences between the H<sub>2</sub>O (main isotope) retrievals from the three instruments. The authors refer to comparisons of H<sub>2</sub>O, but no reference or quantitative information is provided. Since dD, is really the main quantity of interest here, the H<sub>2</sub>O retrievals are

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very important in this context.

Could the authors provide some rationale as to why there is no quantitative information provided here on dD or on the H<sub>2</sub>O?

In general, when the ratio is taken to calculate the delta values, some systematic errors common to both HDO and H<sub>2</sub>O might be expected to cancel. Could the authors comment on whether the same discrepancies in spectroscopic parameters between spectral regions be expected for H<sub>2</sub>O as for HDO?

I would have liked to have seen some more discussion about the influence of sampling/cloud. The authors do note that the MIPAS and ACE-FTS results are likely to show more of a clear-sky bias than the Odin-SMR results, due to the wavelengths involved. However, I didn't see much discussion of the MIPAS/ACE-FTS differences at the lower altitudes. Could the large discrepancies between MIPAS and ACE-FTS at the lower altitudes be partly due to differences in the nature of the quality control/cloud screening applied to the two datasets?

Specific comments:

Page 1691: If I understand correctly, the ACE-FTS retrieval is linear and allows for negative values, while the MIPAS retrievals are in log(VMR) and would therefore not allow negative values to occur. Could this perhaps be part of the reason for the positive bias in MIPAS with respect to ACE-FTS throughout most of the stratosphere?

Page 1691: "totally unphysical" -How was it decided that these points were unphysical? What were the criteria?

Page 1701, line 10: "The ACE-FTS profile less structured...."

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Interactive comment on Atmos. Meas. Tech. Discuss., 4, 1677, 2011.

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