

Interactive comment on “HDO measurements with MIPAS” by J. Steinwagner et al.

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- (1) Abstract, line 5: "delta D" assumes that people know what this means.
- (2) p934 line 5: there seem to be a lot of different definitions of MIPAS resolution, varying from 0.025cm⁻¹ sampling, 0.035cm⁻¹ unapodized and, here, 0.05cm⁻¹ apodized. The 0.025 and 0.035 figures are well-documented and functions of the instrument and spectra distributed by ESA, but I don't know where the 0.05cm⁻¹ figure comes from. Doesn't it depend on the type of apodisation, if any, that the user (you) have applied?
- (3) p934 line 10: this 17 sweeps only applies to the nominal mode scan pattern for the "full resolution" mission. There are many different scan patterns.
- (4) p935 line 19: Does the Milz et al paper (incidentally, there is no journal listed for this in the references) refer to the IMK-derived H₂O? If so, you should at least acknowledge

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that there is also a more generally-available ESA product also.

(5) p936 lines 1-4: it's unclear what you are doing with the contaminant species here. When you say 'taken from the previous MIPAS retrievals' do you mean retrievals from the previous scan, or previously retrieved profiles from the current scan (if so, whose? yours or ESA's?). If it is the second case, how can retrieving HNO₃, CH₄ and N₂O jointly with H₂O and HDO lead to a better representation of these products than just modelling the standard retrieved values? Presumably your H₂O/HDO microwindows have been chosen to minimise the interference from these species so you will only end up with less accurate modelling of their contributions.

(6) p936 line 13: 11km isn't one of the standard tangent altitudes. 12km?

(7) We have lots of questions about your error assumptions!

(a) p938 3rd bullet: treating temperature errors as correlated with altitude is strange. If these are meant to represent the random uncertainties in retrieved temperature then the errors are likely to be uncorrelated with altitude.

(b) p938 3rd bullet: what is 'line of sight' uncertainty. You describe it as an instrument characterisation error, but I think you mean that it is the tangent point pressure error from the pT retrieval.

(c) Fig.1: These plots have a parameter error, noise error and total random error. We assume that some, but not all, of the various parameter errors described in section 4.2 have been reclassified from "parameter error" to "random error", but you should make it clearer.

(d) p938 4th bullet: what is the difference between a "line strength" uncertainty and a "line intensity" uncertainty? You have assumed that the H₂O and HDO uncertainties are uncorrelated, but aren't they likely to have been measured by the same people at the same time? In which case your assumption that the spectroscopic errors for the two species are uncorrelated is likely to be over-pessimistic when it comes to calculating

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the error in the ratio HDO/H₂O.

(e) p939 line 3: I'm a bit surprised to see SO₂ uncertainty as a significant error source, especially since its concentration has been rather low throughout the MIPAS mission. Is this because you've used the original pre-launch estimate of variability for SO₂ which would have been based on the possibility of a major volcanic eruption such as Pinatubo. In retrospect, of course, we know that there has been no such eruption so the actual contribution of SO₂ uncertainty should be reduced by at least an order of magnitude.

(8) Section 5: While the maths looks correct, there must be a better way of explaining it. It would help if you defined J before using it (Eq 13) and I didn't find Eq (15) helpful.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 931, 2007.

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