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Atmospheric Measurement Techniques Discussions

Interactive comment on "Stratospheric methane profiles from SCIAMACHY solar occultation measurements derived with onion peeling DOAS" *by* S. Noël et al.

Anonymous Referee #1

Received and published: 11 October 2011

The paper describes a simple and elegant approach to retrieve stratospheric methane profiles. The approach uses onion-peeling and applies a posteriori correction factors to remove non-linearities in the radiative transfer. The paper is well written and I recommend publication after some minor revisions.

General comments:

At first I expected a section on the advantages and disadvantages of this method with respect to other strategies such as optimal estimation, but soon realized this was already discussed in the Noël et al. (2010) paper on water vapour profile retrievals. How-

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ever I would suggest adding a paragraph or, when referring to this paper on p4804, line 9, stating that therein such a discussion can be found.

When dealing with long time series such as described in this paper, it is often useful to have some information on the long term stability of the data. Did your comparisons with ACE-FTS reveal any such information?

Specific comments:

page 4809, l 6: Is there a significant dependence of the residuals on altitude?

page 4809, l 24: How is this error defined, is it based on the fit residuals (mentioned later)? If so you might want to refer to the later section or mention it earlier.

page 4810, l 15: Is water vapour fitted as well?

page 4812, l 1: Did you test the impact of variable CH4 on the CO2 correction factor?

page 4813, l 10 + 17: I would add "estimated" as in “The estimated mean error”, since all other parameters have been derived from the ACE vs. SCIA comparisons and mean error could be confused with the mean standard error.

page 4814, l 5-6: Why were the effects of the applied corrections not considered? Did you not look into them or did you find them to be negligible with respect to other error sources? Please clarify. In fact you might want to consider a designated small chapter (2.4.4?) on the SCIAMACHY error assessment prior to the part on the preliminary validation.

Fig 4: The “Avg. Tropopause” label on the bottom right side of the figure is hard to read, I would suggest increasing the font size a bit (and turn it 90°, if the increase forces you to decrease the entire figure size)

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 4801, 2011.