

Interactive comment on “Extending differential optical absorption spectroscopy for limb measurements in the UV” by J. Puķite et al.

Anonymous Referee #2

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Review of

Extending differential optical absorption spectroscopy for limb measurements in the UV

By J. Pukite, S. Kühn, T. Deutschmann, U. Platt, and T. Wagner

General comments:

The paper present a modified DOAS retrieval that account for the slant column densities wavelength dependence using a Taylor-series expansion. The authors demonstrated improvement to minor species profile retrieval (BrO in this case), mainly using

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simulated profiles, and to some extent, real observation using SCIAMACHY limb scatter measurements. The paper is some how too long and some parts of the text are poorly written. I encourage the authors to consolidate sections 1, 2 and 3 into one or two shorter sections,

In general I was disappointed to see a limited discussion for the retrieval results using real observations, which was presented in section 5.3, as compared to the simulation results which were well presented and discussed. This section is poorly written and somehow difficult to follow. The paper could benefit from proofreading preferably by an English native speaker.

Major revisions of the text are required for the manuscript to be published.

Specific comments:

Page 2922, line 10: “. . . e.g. ozone, clouds, aerosols, albedo etc.)”

Replace it with “e.g. ozone, as well as clouds, aerosols, albedo etc.)”

Page 2923, line 27: “The method is applied for simulated and measured spectra for different fit windows.”

The different fit windows were only shown for simulated profiles, not real measurement.

Page 2938, section 3.2.2: can you state the retrieval altitude range where it is independent of the a priori?

Page 2948, line 5: “The agreement is within around 25% for ..”

Change to “The agreement is within 25-35%..” Also change line 10 to “top) and 10% at Aire sur l’Adour . . .”

Page 2948 line 15-19: “We found that the later one is by 10% larger . . . Therefore, by a similar factor higher concentrations would be expected to be retrieved from the balloon if they were analysed using the Fleischmann et al. (2004) cross section.”

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Can you support this claim? i.e showing a 10% bias of the retrieved profile after multiplying your cross sections by 10%?

Page 2948, line 24-29: you are trying to support the same argument above using wilmouth cross sections that are 10% larger, and claiming a 10% lower retrieval compared to the retrieval using Fleishmann cross sections. Figure 10 shows only a difference of 2-3 % at most, not the 10% claimed in the text, which contradict your argument. Please revise those two paragraphs.

Page 2949, line 24- page 2950, line 3: "We also found that" to the end of the paragraph.

How difficult is it to use the temperature dependant cross sections in your retrieval? Assuming you already have a good estimate of the temperature, can't you just apply it for the 4 cases and present the results instead of guessing the temperature that gives the best agreement with the balloon measurements? This paragraph is at best confusing!

Page 2949, line 4-14: "For the tropical caseto standard DOAS"

An attempt to explain the poor comparison of the retrieval with the balloon tropical measurements leave the reader only wanting more! The claim that Rozanov's retrieval sees similar bias is not a real explanation, and the authors need to discuss the sources of this bias properly.

The statement afterward "Note that for all compared BrO profile retrievals the agreement with the profiles obtained by the IUP Bremen global fit approach ..." Should be deleted unless the authors can provide a valid reference to support it, or show a proper comparison.

Figure 1: Need to change the color of the right y-axis of the right panel, not sure of which color.

There are many grammatical errors and sentences that need to be rewritten. As I
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motioned above, the manuscript needs a proofreading preferably by an English native speaker.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 2919, 2009.