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Comment

Interactive comment on “Revised temperature dependent ozone absorption cross section spectra (Bogumil et al.) measured with the sciamachy satellite spectrometer” by W. Chehade et al.

Anonymous Referee #2

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General Comments

Chehade et al. present revised ozone absorption cross-sections which are used as input for the SCIAMACHY ozone retrievals. They demonstrate that the revised cross-section data improve the accuracy of the SCIAMACHY ozone retrievals from 3-4% to 1%. I found the paper interesting to read and think it is mostly well written. I would recommend the paper for publication in AMT once the specific comments and questions presented below are properly addressed.

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Specific Comments

Title and abstract: I think it is uncommon to add a bibliographic reference in the title of a paper. It is also not recommended to add references in the abstract of a paper (e.g. Day and Gastel, Cambridge, 2006). The abstract should be self-contained so that it can be published on its own, for example in a literature database. Therefore I would recommend to remove the reference to Bogumil et al. from the title and the abstract of the paper. I was also wondering why "sciamachy" is spelled in lower case letters in the title.

p2451, l6: I noticed that in some parts of the paper additional information is presented in brackets rather than full sentences. In this case the text reads "Ozone ... shields the damaging UV radiation in the stratosphere (protects life)". I would recommend to replace these brackets "(protects life)" by a full sentence or remove them, in case the additional information is not too important.

p2451, l3: see comment to p2451, l6

p2454, l9-14: It is stated that a spectrally continuous absorption cross-section was obtained by "gluing" the "useful parts" of different absorption measurements together. This is referred to as a "new" concatenation. It would be nice if some specific details could be provided. How are the overlapping regions defined? How large are the differences in the overlapping regions? Is the data in between the overlapping regions interpolated to compensate for differences in the overlapping regions? As this is referred to as a "new" concatenation, how does it differ from earlier analyses?

p2455, l1-2: It is stated that the revised cross-section spectra preserve the correct temperature dependence and that they are in good agreement with published data. However, at this point that might not be clear to the reader. The temperature-dependency and the comparison with literature data are discussed later, in section 3 of the paper. At this point I was just wondering which "published data" you are referring to. This information is found later, on p2456, l7-17, but I think this is an issue of a forward reference

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which should be resolved.

p2457, I2: It is stated that the comparison for the Huggins band exhibits excellent agreement. However, I noticed in Table 1-3 that the discrepancies between the different data sets are larger in the Huggins band than in Hartley and Chappuis bands. Could you please comment on that?

p2457, I12-19: The meaning of the parameter "a0" in Eq. (2) is not discussed. As it is a multiplicative factor to "a1" and "a2", according to Eq. (2), I was wondering if it is reasonable to compare "a1" and "a2" to other data sets, if differences in "a0" are not considered?

p2458, I3-5: It seems the largest difference between the temperature fit according to Eq. (2) and the measured data occur for the new, revised cross-section data set. Could you please comment on that?

p2459, I2-5: This sentence (or two sentences?) need to be rewritten and clarified.

p2459, I11-12: Here the WFDOAS acronym is introduced, but it is already used earlier in the paper, for example in the caption of Fig. 7. I also noticed that the acronyms DOAS, ESA, and GOME are used, but not defined.

p2460, I11-18: It is illustrated that the revised cross-sections improve the retrieval accuracy for selected orbits on 24 September 2008 and 20 March 2009. However, to make a general statement, more cases need to be examined. What about summer and winter conditions or other years?

Table 1: An error must have occurred when calculating the mean values of the literature data. For example, at 203K the mean of 3.54, 3.56, and 3.56 is 3.55 and not 3.53? Also, I would like to ask you to clarify if you included the new SCIA revised values in the mean values?

Table 4: The unit for "shift" is missing.

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Fig. 5: The acronym "BMD" in the Figure caption was not introduced before.

Fig. 6: The curves in both plots look very similar. Perhaps it would be more reasonable to plot the differences between them?

Fig. 8: The x-axis labels for the inset plot are missing.

Fig. 9 and 10: The x- and y-axes labels are missing. I would suggest to scale the residuals and retrieved baseline polynomial by a factor ~ 10 to illustrate if there is a spectral dependence.

Technical Corrections

p2451, l8: "radiations" -> "radiation"

p2451, l8: "by Earth" -> "by the Earth" (or "the Earth's atmosphere"?)

p2451, l10: "to Montreal Protocol" -> "to the Montreal Protocol"

p2451, l19: "MetOp B and C" -> "MetOp-B and -C"

p2451, l 28: "FM (flight model)" -> "flight model (FM)"

p2455, l1: "and in good agreement" -> "and are in good agreement"

p2456, l8: "tha" -> "the"

p2456, l15: "changes" -> "change"

p2456, l19: "tool" -> "measure" (?)

p2457, l3: "fit to within" -> "fit within" (?)

p2457, l6: "agrees" -> "agree"

p2457, l8: "shows" -> "show"

p2457, l13: "temperatures" -> "temperature"

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p2458, l8: "in the Huggins" -> "in the Huggins band"

p2459, l19: "for GOME ozone retrieval" -> "for the GOME ozone retrieval"

p2459, l21: remove "elaborate"

p2459, l23: suggest to split sentence, ", an agreement" -> ". An agreement"

p2459, l26: "a relative differences to within 1%" -> "relative differences within 1%" (?)

p2463, l14: "240-790,nm" -> "240-790 nm"

p2468, caption: "indicated are the one that" -> "presented here" (?)

p2471, caption: "Huggins Chappuis" -> "Huggins, Chappuis"

p2473, caption: "sub-panels" -> "sub-panel"

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