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Interactive comment on “Evaluation of the use of five laboratory determined ozone absorption cross sections in brewer and dobson retrieval algorithms” by A. Redondas et al.

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The authors appreciate the time the reviewers have spent in assisting us to produce a high quality, understandable publication. All the requested corrections and suggestions are accepted and already introduced on the corrected version of the paper on the supplement . The responses to the comments by the Reviewer #1 follow.

1. The Theory of measurements section is too general. What is “n” in eq. (2), (3), etc.? Why do not just use 4 instead of “n” if the standard Dobson and Brewer algorithms are discussed? The authors should define 4 wavelength used in this study for Dobson and Brewer instruments. While it is in the text, it is nearly impossible to find this information for somebody who is not familiar with Dobson and Brewer instruments. The Brewer wavelengths are given in Table 1 only and without any explanation what slits and weighting coefficients are used in the Brewer algorithm. How the slit number in Table 1 is related to “j” in eq. (2) and (3)? The linear coefficient w_i in eq. (2), (3), etc. are not defined. Note that they are different for Dobson and Brewer ozone algorithms. The Brewer standard coefficients (1.0, -0.5, -2.2, and 1.7 for 310, 313.5, 316.8, and 320 nm respectively) were selected to minimize the SO₂ influence on the ozone retrievals, while the

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Dobson coefficients are just ± 1 . Thus in the presence of SO₂, it is not really appropriate to compare Dobson and Brewer ozone values, while in the absence of SO₂, there is no need to use the Brewer standard coefficients. The authors should check their equations. There are too many equations in the text and not all of them are necessary. For example, (4) is not used anywhere. The others are not well explained and often contain undefined terms.

Response

The theory of measurement text has been changed and also Table 1. Changes were made more fully explain the focus of the study. The introduction has been changed to address the SO₂ interference question. The validation data used in this study are from mountain sites above the boundary layer, and thus generally above this interfering gases. The algorithms are described in a generic manner, to emphasize the similar nature of the derivation. Alternative algorithms could use different numbers of wavelengths in similar combinations like the five wavelengths algorithms developed by Alexander Cede (Tzortziou et al 2012).

Tzortziou, M., J. R. Herman, A. Cede, and N. Abuhassan (2012), High precision, absolute total column ozone measurements from the Pandora spectrometer system: Comparisons with data from a Brewer double monochromator and Aura OMI, J. Geophys. Res., 117, D16303, doi:10.1029/2012JD017814

2. Title. It should be "...Brewer and Dobson..."

Response: *Changed.*

3. There are too many abbreviations in the text. Many of them are not necessary since they are not used in the text (GAW, IO3C, SAG..). Some of the abbreviations are defined in the text, but used only in Tables and Figures. Authors' use of "XS" is particularly annoying: in some places they use XS, in others "cross section" or even "cross-section."

Response: *A glossary has been added as Appendix A. The XS abbreviation has been removed, and replaced with cross-section*

4. Define T(z) and X(z) in eq. (6).

Response: *Definitions added to line prior to Eq (6).*

5. Why the same sum is written in three different ways (Sum j to n , Sum 1 to n , Sum $j=1$ to n) in (12)? See also eq. (2) and (3)

Response *All equations are rewritten for consistency*

6. Define all the terms used in eq. (16) and (17).

Response *All terms are defined in text (done)*

7. There is no need to use the bullet form for the conclusion section (p. 22996).

Response *Format of the conclusion section is changed.*

8. The wavelength units should be consistent though the text. But it is “nm” in some places and “Å” in the others.

Response *Angstrom units all changed to nm.*

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