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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.

Anonymous Referee #2

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The Dobson and the Brewer spectrophotometers are the main instruments of the world wide ground-based network for monitoring of the ozone layer which is operated under the auspices of Global Atmosphere Watch (GAW) of World Meteorological Organization (WMO). These instruments have proven very useful for total ozone monitoring because of high precision and the excellent long-term calibration stability (when maintained properly). In order to achieve redundancy Dobson and Brewer instruments are operated simultaneously at several observatories showing a small but significant seasonal difference and small difference in absolute values which might be attributed to the temperature dependence of the ozone absorption. Within the committee ACSO (Ab-

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sorption Cross Sections of Ozone, see <http://igaco-o3.fmi.fi/ACSO/>) different sets of ozone absorption cross sections are evaluated for atmospheric ozone measurements. For ozone measurements making use of absorption in the Huggins band laboratory measurements from Bass and Paur, 1985 (still officially recommended for atmospheric ozone measurements), those of a French group (Daumont, Brion and Malicet, published during the 1990s) and a recently published data set of the Institute of Environmental Physics of the University of Bremen (IUP) are compared. The paper demonstrates that the ozone absorption cross sections measurements (including temperature dependence) of IUP are clearly superior over the other tested spectral data for Dobson and Brewer instruments because the retrieved total ozone amounts are more consistent to each other than those calculated with the other ozone absorption cross sections. The paper is scientifically sound and the results are highly relevant to the community. The paper merits publication, however, there are still improvements required/suggested for publication in ACP including many small errors. I think the paper is rather difficult to understand for readers not being very familiar with the design and operation of Dobson and Brewer instruments. Following my suggestions for changes: 1. A very larger number of abbreviations is used, some are not commonly used in atmospheric science (e.g. XS for ozone absorption cross sections, BOp, B05, IGQ4 and many more). I recommend to produce a list of all these abbreviations so that the readers can easily find help when they forget the definitions of these abbreviations when reading the paper; Title: 2. I would prefer large spellings in Brewer and Dobson; Abstract: 3. Line 6, p. 22980: Three Bass and Paur: I recommend to write: three data sets that are based on measurements of Bass and Paur (1985), one deduced from Daumont, Malicet and Brione , ; 4. Line 16, p. 22980: IUP instead of UIP; 5. Line 17, p. 2298: ... the calculated; 6. Line 22, p. 2298: Point at the end of the sentence; Introduction: 7. Line 16, p. 22981: I don't believe that the difference between Dobson and Brewer measurements are "removed", I think "strongly reduced" is more appropriate; 8. Line 4, p. 22982: advisory Group (SAG) for ozone of; 9. Line 26/27, p. 22982: I think this sentence is not correct: In double combinations (AD and CD) the

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effect of atmospheric aerosols is minimized ? Material and Methods: 10. Line 16, p. 22983: Perhaps add: (I0) (for determination of I0 see 3.2.1) ...; 11. Line 4., p. 22984: cross sections (xs): do you mean ozone absorption cross sections: I think earlier in the text you used large letters; 12. Line 3., p. 22985: I think it would be worth to introduce here the classification used here for Dobson and Brewer instruments: D for Dobson and B for Brewer instrument followed by the fabrication number; 13. Line 11, p. 22985: ... provided by Environment (?) ...; 14. Line 26, p. 22985: appears to include (?) spectra at selected ...; 15. Line 22, p. 22986: I think you should consistently use IUP; 16. Line 25, p. 22986. I think you should here explain the difference between IUP and IUPQ; 17. Line 16, p. 22988: Do you mean Komhyr et al., 1993 when citing Komhyr93 ? Analysis and Results: 18. Line 15, p. 22993: Lower than that for 19. Line 23, p. 22994: I don't believe that ";" is adequate; 20. Line 9, p. 22995: I don't believe that ";" is adequate; 21. Line 6, p. 22996: There should be a point at the end of the paragraph; Conclusions: 22. I suggest to start the conclusions with a sentence and possibly number the individual conclusions – the way the conclusions are presented remembers me to the style of a notebook rather than a scientific publication; References: 23. I don't know what the numbers of individual references (after year of publication) mean; Tables: 24. Table, e.g. 1, 5 and 7: You should not use the abbreviations (FWHM, DXS, XS) in the headings of the Tables; Figures: 25. I suggest to remove from all Figures top lines (this information needs to be given in the legend); 26. I think the rather special abbreviations such as " B Op, IGQ4 etc ... (Fig. 1, 2, 4, 5, 6, 7) need to be spelled out, at least in the first figure, for the others you can refer to Fig. 1; 27. Fig. 1: What mean the different colors of the thick line of the spectrum ? 28. Fig. 3: Legend: Coefficient for every instrument ... to what is "every" related to ? This should be evident when reading the text of the legend; 29. Fig. 4: I think it is difficult to figure out what the numbers on the bottom of the Figure exactly mean, please explain (in the text of the legend); 30. Fig. 6: I would replace XS by ozone absorption cross section in the text of the legend, and possibly refer to the legend of Fig. 1 for the strange abbreviations like IGACO B & P.

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