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Atmospheric Measurement Techniques Discussions

Interactive comment on "Wavelength calibration of Brewer spectrophotometer using a tuneable pulsed laser and implications to the Brewer ozone retrieval" *by* Alberto Redondas et al.

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The paper describes a very detailed and unique characterisation experiment of a Brewer spectrophotometer to determine its spectral characteristics (wavelength scale and spectral resolution) which is necessary to calculate the ozone absorption coefficient required for the total column ozone determination from the solar irradiance measurements. The experiment was performed using a tunable laser source to compare and validate the standard procedure used by the Brewer community. The results show that the two procedures provide consistent results to within 0.1% which is very satisfying and confirms that the current standard procedure is valid.

Apart from minor grammatical errors the manuscript is well written and certainly interesting to the scientific community. I have a few comments which I would the authors to answer, pending those I support the publication of the manuscript.

- page 6, line 10: It is a cubic polynomial fit, not cubic spline.

- page 7, lines 13-17: It is true that the hg test of the Brewer is repeated when the discrepancy between the actual and determined position is larger than 1.5 steps. However the hg routine sets the position of the micrometer according to the calculation, and repeating the hg routine serves mainly for confirmation. Therefore the hg routine is accurate to +-0.5 steps, since this is the resolution of the system, not +-1.5 steps as written in the manuscript. This considerably improves the estimated wavelength uncertainty.

- In section 3.1, I would suggest to add some information on the wavelength uncertainty of the tunable laser setup, which will affect the Brewer wavelength dispersion. I expect in fact the Brewer wavelength dispersion to have less uncertainties when using spectral discharge lamps with published emission line wavelengths ($\sim$1 pm), than the wavelength obtained by the tunable laser system ($\sim$10 pm).

- In section 3.1.2 the authors compare the ozone absorption coefficient calculated with the parametrized and the actual slit functions and show that the difference is of the order of 0.9% (Table 2). The parametrized slits however are trapezoidal, with a plateau at 0.87 (13% from the top). However as shown in Figure 6, this is not representing the true slits, and therefore the parametrization might be closer to reality when using the full triangle as parametrization. This might show that the method using the parametrization with a full triangle will have less differences to the tunable laser results using the actual measured slit functions. (I have made some tests and the full triangle parametrization resolves about half of the 0.9% discrepancy). I would suggest that the authors add a third column in table 2 showing this information.

- In the conclusion, page 13, last sentence, I do not understand the statement saying

that both methods agree to 0.1% if the parametrized or measured slits are used. To my understanding, the standard method using a scanning grating is not able to use the measured slits, since the method relies on interpolating the slit functions to the ozone position, which therefore requires a parametrized slit.

- In my opinion the abstract should also mention the positive result that the tunable laser and the scanning grating method give the same ozone absorption coefficients (to within 0.3% or so)? Minor comments:

- The different wavelength scales (nanometer, angstroem) used in the manuscript and the figures is confusing, and I would recommend to use a single one (nanometer)?

-page 4, line 8 : i would explicitly state that the method is an ozone calibration (not to be confused with a radiometric irradiance calibration for example).

page 5, point 3: The FWHM also depends on wavelength, which therefore requires some sort of parametrization of the slit function when using the standard scanning grating method.

- Figure 2: The units on the left axis seem too small (maximum of 7 counts/second)?

- page 6, line 3: I would remove the value in parenthesis (0.0080 nm), or replace the picometer values. - Table 3, I did not find the acronym for SGW. Could it be added in the caption of the Table, for clarity?

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