

Review of the manuscript "An assessment of the stray light in 25 years

Dobson total ozone data at Athens, Greece" *J. Christodoulakis, C.*

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The work shows a study of the stray-light in the Dobson Spectrometer using the straylight model of Basher and describes a statistical method to derive the model parameters. The study is relevant because it focuses on one of the artifacts that explain the largest discrepancies between ground-based and satellite ozone measurements.

In the study you only focus on AD pair observations up to airmass 5 as we can see on figure 3, but the measurement of this pair is not recommended for air masses over 3 then CD pair is used. The CD pair measurement is the recommended measurement for high airmass when the stray light error becomes important as it uses longer wavelengths and is less affected by the stray light. The comparison of AD and CD corrected for the known effect of the ozone cross section can give an additional information of the stray-light. (see for example the Figure 9 McPetters et al 2008).

The stray light in Dobson and Brewer are usually shown against the Ozone Slant Column (ozone x airmass) rather than air mass (see for example Evans 2009, Scarnato et al 2012 for example) as the radiation level of short wavelengths depends heavily on this parameter and they are more affected by the stray light. A plot of the Dobson AD/CD observations during a year averaged on OSC ranges could be illustrative of the stray light effect for AD and CD measurements.

For this experiment it is clear that the method requires good measurement conditions to get Direct sun measurements along a wide range of airmass. But my question is if the method requires a stable ozone ?. I'm also noting during the selected days that the ozone goes down with airmass near to 1, do you have an explanation for that ?

On the abstract the authors say that the effect is insignificant but in the last section that the application of the Basher model gives an underestimation of 3.5 DU using the $\approx 1\%$. The abstract or the last section must be changed accordingly.

The attribution to the difference between Dobson and Satellites to the stray-light in the short airmass ranges (up to 2.5) is not justified, as the stray light effect is proportional to the airmass could be illustrative if this difference is plotted against the airmass or to the ozone slant column.

1 Comments

p 1990 20

Is not clear the difference between sky light error, and atmospheric scattered error , the causes of the stray

p 1989 10

The Dobson is a reference instrument for TOC but i'm not agree that is "the reference instrument", Brewer spectrometer and DOAS instrument are also used for satellite validation, and not calibration, and both maintains independent scales.

p 1990 10

During the calibration campaigns the instrument are characterized and the calibration is transferred from the reference instrument (primary or secondary standard).

p 1990 1 20-30

Is not clear the difference between sky light error, and atmospheric scattered error , witch are his effects on the ozone measurement and how are related to the stray light.

p1991 1 19

Is not clear de descriptions of the internal and external stray light and difficult to compare with other descriptions like Scarnato 2012.

p1997 1 10

The figure 4 will be more illustrative if the ratio is shown of the satellites ozone retrieval with the corrected an uncorrected stray light from Dobson measurements. Will also be interesting to see if the correction will affect to the possible seasonality of the differences.

References

- [Mc Petters et al 2009] McPeters, R., Kroon, M., Labow, G., Brinksma, E., Balis, D., Petropavlovskikh, I., .& Levelt, P. F. (2008). Validation of the AURA Ozone Monitoring Instrument total column ozone product. *Journal of Geophysical Research: Atmospheres* (19842012), 113(D15).
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- [Bernhard et al (2003)] Bernhard, G., Booth, C.R. and McPeters, R.D. (2003). Calculation of total column ozone from global UV spectra at high latitudes. *Journal of Geophysical Research* 108: doi: 10.1029/2003JD003450. issn: 0148-0227.