**Atmospheric
Measurement
Techniques**
Discussions

Open Access

Interactive
Comment

Interactive comment on "An assessment of the stray-light in 25 years Dobson total ozone data at Athens, Greece" _by_ J. Christodoulakis et al.

Anonymous Referee #2

Received and published: 12 April 2015

The authors assess the effects of stray light to the Dobson instruments at Athens, Greece using the Basher's model. They obtain the a set of two parameters for the Basher's model using total ozone column (TOC) measurements obtained during 5 days in September 2012. For each day, they collect TOC measurements (X_{trend}) at various air masses. Then, for a number of candidate parameter sets, they calculate the hypothetical "true" TOC (X_{true}), in which the stray light effect is corrected for a given pair of R_0 and α. Finally, the authors conduct statistical tests between the observed TOCs (X_{trend}) and the corrected TOCs (X_{true}) for given parameter sets to determine the best parameter set that describes the state of stray light effects for the Dobson instrument. This subject is well suited for the scope of AMT. However, there are several points that need to be addressed before the publication in AMT.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

1) Authors need more justification for the statistical approaches used in this study. They narrow down the candidate parameter sets for the smaller root mean square difference (RMSD) and chi square, which assumes the (stray-light-affected) measured TOCs and the "true" TOCs should not have large differences. However, as shown in the Fig. 2 and 3, stray light may cause huge differences depending on the characteristics of instruments, observation geometry and air masses. By this approach, the selection of parameters may be inclined to those cause small effects, no matter what the reality is. Moreover, authors use Pearson's correlation coefficient to assess the quality of the candidate parameter sets, which works only if X_{trend} and X_{true} are linear. Again, shown in Fig. 2 and 3., I am not sure if they will be linear. I would like to see more justification for their statistical approach.

2) The "True Ozone Value" in the bottom line are from correction using the final R_0 and α values that the authors finally obtained. Although it is in the main text, it would be better to be specified in the figure caption as well.

3) Figure 3 shows theoretical TOCs (true and stray-light-affected) and actual measured (stray-light-affected) TOCs. I suggest the authors to show the "corrected" version of their measurements either in the Figure 3 or in and additional figure, which will give the readers a better idea how much the correction has improved the measurements.

4) The authors show the inter-comparison between their Dobson measurements and various satellite measurements. Although Dobson and satellite measurements show similar value and trend, it might be very hard for readers to distinguish among the lines. I suggest authors to bin the measurements into some time period bin (possibly a week or a month, or a season) that reduces the noisy behaviors of TOC while still showing seasonal and inter-annual trends well. Plus, showing the comparison of stray-light-corrected measurements to the satellite measurements as well as how much the stray light correction has improved the comparison (now it's good place to use Pearson's R) will be a good support of the results of this study.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 1987, 2015.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper