

Referee comment of the manuscript:

AMT-2015-343: The impact of the ozone effective temperature on satellite validation using the Dobson spectrophotometer network - M.E. Koukouli, M. Zara, C. Lerot, K. Fragkos, D. S. Balis, and M. Van Roozendael

General comments:

The content of the paper is a very interesting contribution to the issue of data quality in the Dobson spectrophotometer network. The presentation is well structured, thus it is no problem to understand and to follow the intention of the paper and the results of the proposed improvements.

*We would like to warmly thank referee #2 for his/her valuable comments towards the improvement of our paper.*

Specific comments:

i. Minor Issues:

Solar zenith angle dependency often mentioned in the text as known, but no possible explanation given for the remaining dependency after Teff-correction.

*A relevant paragraph was added in the text.*

Replace “early 1980s” by “late late 1970s” on page 2, line 11: TOMS on Nimbus 7 already starts measurements in 1978.

*Thank you for noticing this, a small typo was all it was.*

Replace “Since year 1958” by “Since 1957/1958” on page 2, line 15. Reference “Brönnimann et al, (=Staehelin, Farmer, Cain, Svendby and Svenoe), Total ozone observations prior to the IGY I: A history, Q.J.R. Meteorol. Soc. 2003 as related reference would be nice.

*Thank you for bringing this very informative reference to our attention, added as requested.*

The effect of the Teff-is described as seasonal several times (e.g. on page 6, line 4 – 5), but it can also effect the ozone observations on a daily base (rapid, intense change of weather situation). This time scale should be mentioned too.

*A comment to that effect, as well as a reference, was added to the text.*

As one example of time series Ny Alesund is shown (page 8). Fortunately only the agreement of the various Teffs in the annual course is shown. However, Thule (Dobson operation recently ceased) or Reykjavik (still active) might be better stations, as Dobson No. 008 at Spitsbergen has been out of operation since many years

*For this part of the study, we were mostly concerned with locating stations with a long, as well as gap-free, time series of ozonesonde data. No ozonesonde fly out of Reykjavik or Thule,*

*to the best of our knowledge. Both the NDACC and the WOUDC repositories were searched for an appropriate, typical, Arctic location and we agreed that Ny Alesund fits the bill. We hence consider that this station may be representative of the region and hence provide the ozonsonde vs ECMWF vs satellite algorithm comparison.*

ii. Major issues:

It is nowhere mentioned that the Bass/Paur absorption coefficients are still in use in the Dobson and Brewer Spectrometer algorithms. Planned introduction of ozone new cross sections/absorption coefficients (University Bremen) might change the results. Redondas et al is already mentioned, but not in this context.

*A relevant section discussing the different absorption cross-sections and their reported effective temperature dependence was added in the text.*

It is also nowhere mentioned which ozone cross sections are used in the satellite algorithms (old???, already new, but not Uni Bremen???)

*The relevant information was added in the text.*

Explanation of the Teff effect on ozone values (page 4, lines 19 to 21) is a little bit confusing. Colder temperatures cause reduction in real absorption coefficients, which would give increased ozone. The Dobson however still uses larger absorption coefficients, thus the observed Dobson ozone values are lower and this causes the annual pattern in the Dobson- Brewer difference.

*Text updated as requested.*

Technical corrections:

References:

- Anton et al 2009 is missing in references(cited on page 4, line 2)
- Labow et al 2013 is missing in references (cited on page 4, line 2)
- van Roozendaal et al. 2008 is missing in references (cited on page 4, line 12/13, van roozendaal et al. 1998 in references?)

*References added and corrected.*

Is bottom left panel of Figure 5 (on page 12, line 17 and page 13) not bottom right panel of Figure 5?.

*Reference corrected.*