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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of UV irradiances from Aura/Ozone Monitoring Instrument (OMI) with Brewer measurements at El Arenosillo (Spain) – Part 1: Analysis of parameter influence" *by* M. Antón et al.

M. Antón et al.

mananton@unex.es

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Items-by-items response to Reviewer #2

(* Reviewer comment, ++ Our response)

* Some more details concerning the data and the methodology would be welcome.

++ According the reviewer's suggestion, we have given more details about the data and methodology. In order to clarify the OMI UV datasets used in the work, we have added the following comments in the Section 2:

- "In this study, the following OMUVB products are used: OPEDRate (Overpass Erythemal Dose Rate), and OPIrd305, OPIrd310, OPIrd324 (Overpass Irradiance at 305 nm, 310 nm and 324 nm, respectively). In addition, OMUVB dataset contains LambEquRef (Lambertian Equivalent Reflectivity at 360 nm) which is used for cloud characterization."

In order to clarify the expansion of the Brewer spectral measurements to obtain UVER data, we have added the following discussion in Section 3:

- "In order to obtain UVER data from the Brewer spectrophotometer, its measurements' range has to be expanded from 363 nm (actual limit of the measurements of this instrument) up to 400 nm (upper limit of the CIE standard spectrum). This correction is performed by the software developed by Martin Stanek at the Solar and Ozone Observatory of the Czech Hydrometeorological Institute (Stanek 2007). An empirical correction of this error can be found in the work of Vilaplana et al. (2006)."

We have added the following sentence in Section 3 to comment that only one OMI pixel per day has been used in this work:

- "For each day of Brewer observations the single OMI ground pixel most closely collocated with El Arenosillo station is selected as the best match"

In order to avoid confusion regarding the time window mentioned in Section 3, we have replaced:

- "In addition, in this comparison we used the Brewer data between 12:30 and 14:30 local solar time close to the OMI overpass time at ∼13:45." By "In addition, in this comparison we used the Brewer UV-scan closest in time to the OMI overpass at ∼13:45."

* The number of days in each dataset, are listed in table 2, they should be discussed in the text; their differences can introduce a bias in the results.

++ It is true that the number of days used in each dataset is quite different. We think that the MBE and MABE parameters are not affected for this difference, since we have

a high number of data in each dataset. In contrast, the difference in the number of data for each dataset can cause a strong influence over the uncertainty of MBE and MABE parameters. In this sense, we have characterized this uncertainty by the standard error (SE), calculated as SE=SD/sqrt(N), where N is the number of data and SD is the standard deviation for each dataset.

In order to clarify this subject, we have added the following comments in the text: "In order to take into account the different number of data used in each dataset, the uncertainty of MBE and MABE is characterized by the standard error (SE), defined as:

SE=SD/sqrt(N),

where SD is the standard deviation and N is the number of data in each dataset."

* The main objective is to analyze the cloud and aerosol influence. The influence of ozone and solar elevation is wrongly mentioned on the same level in the abstract.

++ We agree that the ozone influence on OMI-Brewer differences is briefly discussed in the paper, but the influence of solar elevation has been studied in detail in an independent subsection (4.5 Seasonal dependence). In this sense, we have added the following sentence in the Abstract:

"In addition, the differences OMI-Brewer typically decrease with SZA except days with high aerosol loading, when the bias is near constant."

In addition, according to the reviewer's suggestion, we have removed the mention to ozone effects in the abstract.

* For cloudiness, the proxi used is the LER value given by OMI. Why not using the local observations?

++ We have not any ground-based system to characterize the cloudiness over El Arenosillo. The AERONET cloud-screening derived from the Cimel located at this station removes cloudiness cases in order to provide the aerosol information under cloud-

free conditions. Thus, it cannot be considered as a local observation of the cloudiness over El Arenosillo. Therefore, the LER value derived from OMI is the unique available source of cloud information in our station of study.

* Figure 2 seems at least strange!! The authors do not provide a satisfactory explanation.

++ According to the reviewer's suggestion, we have modified the explanation of this figure:

"The figure shows that the MBE parameter for UVER and the three spectral irradiances presents a stable behaviour on LER for low values of this proxy: MBE$\sim$ 5%–15% for LER<45%. It can be seen a minimum value of MBE for LER$\sim$50% (biases have both positive and negative values). In addition, it is appreciable an increase of the relative differences for high LER values (thick clouds or high cloud optical depth) with a significant noise increase (larger error bars) in agreement with previous TOMS studies (i.e., Kalliskota et al., 2000; Chubarova et al., 2002: Cede et al., 2004; Antón et al., 2007). However we must emphasize that at our site the frequency of days with LER>50% (8%) is much lower than cloud-free days (55% of days with LER<10%). "

* The analysis of aerosol impact is limited, because a companion paper on absorbing aerosols is announced; this is somewhat frustrating.

++ Effectively, this paper is the first part of a companion article, presenting a first evaluation of aerosol effects in order to compare with previous TOMS results at El Arenosillo station, reported in the work of Antón et al, 2007. The second part of the companion article (Cachorro et al., 2010) shows a more detailed analysis of absorbing aerosols effects on Brewer-OMI differences. Perhaps, you will find this frustrating but this was necessary because of the long extension of aerosol analysis. We encourage you to see the paper and to add comments.

* Check that all papers in the reference list are quoted in the text, and inversely.

++ According the reviewer's suggestion, we have checked and corrected this subject.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 6797, 2010.