

## ***Interactive comment on “Measurements of UV irradiance within the area of one satellite pixel” by P. Weihs et al.***

**P. Weihs et al.**

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### ANSWERS TO REFEREE 2

First of all we would like to thank the reviewer for the comprehensive review and constructive remarks and suggestions that will help to improve the quality of the revised manuscript.

Here follow the answers to the reviewer remarks:

P. 3695, line 16: the paper Tanskanen et al., 2008, does not concern TOMS.

Answer: yes it concerns OMI. Will be corrected in text.

P. 3697, line 6: Station Bad Voeslau is already...., what does already mean in this sentence?

Answer: yes already can be removed from the sentence.

P. 3697, line 7 and 8: It could be used ... in Vienna. What is the aim of such a sentence since finally, as I understand BOKU is chosen as a reference?

Answer: This is correct. Our first thought was to use this station located outside of Vienna as a reference station. But it proved to be a wrong guess that this location would not be affected by anthropogenic pollution and would not be affected by the blanket of smoke. Following the reviewers suggestion this sentence will be therefore left out.

P. 3697, line 15: it would be interesting to compare these cloudiness conditions to the cloudiness flags from OMI to obtain info on cloudiness over the other sites;

Answer: Yes we think that it is possible. We could add a table about this comparison.

P. 3698, line 7 and 8: fig. 3 compares AOD at BOKU and TGM. In 2.1. it was not stated that TGM was equipped with a sunphotometer. The authors say that the figure shows no distinctive difference between...;

Answer: The measurements were performed with a portable NOLL sunphotometer. This sunphotometer is less accurate than the PFR. Using the parallel measurements of NOLL and PFR at BOKU station a more precise estimation of the AOD uncertainties will be made.

Why the authors do not compare the AOT at 368nm rather than at 500 nm

Answer: AOT measurements were also performed at 368 nm. But here the noise to signal ratio of the NOLL sunphotometer is much larger, so the measurement accuracy is less good. We therefore use the 500 nm AOT. For the PFR the signal to noise ratio is much better and accuracy is sufficient. This information will be included in the manuscript.

P.3698, line 20: the ozone data are taken from OMI, that means they correspond to

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average values over the pixel,..... estimate the impact of the approximation on the homogenization performed.

Answer: I think that the reviewer will agree that differences in ozone between the stations may only be connected to differences in tropospheric ozone over the stations. Here we will try, by using ground ozone data, to estimate what could be the impact of differences in tropospheric ozone between the stations on the accuracy of the homogenisation.

P. 3698, line 24: here the wavelength used is 368 nm.

Answer: Accuracy of PFR in the UV is sufficient (see remark above).

P. 3699, line 7: which data are comparable to the clear sky data? To support the discussion that follows it would be better to show a figure.

Answer: Data for days with partial cloudiness are shown in fig. 2 b. The meaning of our sentence was that - very roughly - the magnitude of the UV index for partial cloudiness corresponds to the magnitude of the clear sky UV index. We think that we should rewrite this sentence since it is very misleading.

P. 3700, line 1: around a mean systematic bias. Rmean is rather only a mean value and doesnt show always a bias.

Answer: Yes. The variability of station x is determined by comparing the ratios to the average ratio of x to BOKU. Systematic bias will be replaced by mean ratio or mean value.

P. 3700, line 8: it is not clear for me if fig. 5 shows the variability for clear sky, partly cloudy and overcast.....

Answer: the explanation in the caption is missing. The upper plot shows results for clear sky the lower one for cloudy conditions.

P. 3701 The number of events given in lines 7, 8 are repeated in line 11.... Answer:

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yes, thank you will be corrected.

P. 3702, lines 1-2: I am not convinced that the discrepancy between OMI UV and ground based measurements seems larger for  $SZA > 30^\circ$ . Again uncertainty estimation on the ratios is needed. The AOD is at 368 nm, that confirms that fig 3 would show that AOD rather than AOD at 500nm.

Answer: Concerning the wavelength of the AOD which is shown, it will be rechecked whether the information given on the figures is correct, but please also look at my answer concerning the use of AOD at 500 nm above. An uncertainty estimate of the ratios will be made based on the measurement accuracy of the biometers. Concerning the difference between ratios at  $SZA > 30$  and  $SZA < 30$  we will test the statistical significance of this difference.

P. 3704, lines 1-3: under partly cloudy conditions more data on COD are not sufficient to test the OMI algorithm, it is necessary to know if the sun is hidden or not.

Answer: Yes it is correct, our statements will be changed accordingly.

All suggestions for technical corrections will be taken into account.

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