**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

Interactive comment on "Comparison of OMI ozone and UV irradiance data with ground-based measurements at two French sites" *by* V. Buchard et al.

Anonymous Referee #1

Received and published: 17 April 2008

General comments:

The manuscript presents a comparison of ground-based measurements of ozone and UV irradiance at two French sites with OMI satellite estimates. This kind of comparison is a complicated but useful task, since the spatial distribution of solar UV irradiance received at the ground is mainly controlled by the variability of total ozone and clouds. The manuscript addresses relevant scientific questions within the scope of ACP, but major revisions are needed before final publication.

Specific Comments:

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1. Numbers, describing more explicitly the differences between the ground-based measurements and the satellite estimates, should be mentioned in the abstract and conclusions paragraphs, derived (at least for ozone) from Tables 1 and 2. A significant lack of quantitative results is observed also in the results paragraph.

2. The comparison of ground-based and satellite ozone and UV data has been extensively studied during the last 15 years. In contrast, only two references (corresponding to UV effects and instrument uncertainties) are reported in the introduction paragraph. This paragraph should be extended, in order to give proper credit to related studies and present some of their main findings. The reviewer could propose the recent studies of Balis et al., (2007), Kazantzidis et al.,(2006) and all references therein.

3. Page 4312, lines 22-24: the authors compare momentary ozone retrievals from OMI with daily averages of ground-based data. In case that it is possible, average values of the total ozone column, close to the satellite overpass time, should be used for this study.

4. There are too many figures and they do not discussed extensively. Figures 1a, 2a, 2d, 3a, 3b, 4a, 4b, 4d, 5a and 5c could be omitted. The results of those figures could be easily described in the text and presented in a table. In addition, the percentage differences between the ground-based and the satellite data could be still observed and examined as a function of quantities like SZA, Julian Day etc., using the rest of the figures.

5. Page 4316, lines 6-14: The authors report that the percentage difference between total ozone values from the spectroradiometer and OMI has not any seasonal dependence for clear sky data. In addition, they report that the dependence with solar zenith angle is small. According to the opinion of the reviewer, there is a seasonal dependence, although it is not as obvious as at VdA (figure 2b). And, is there any explanation for this result? The satellite estimation of total ozone derived from the same algorithm that was used also for TOMS. In this case, a comparison of results from previous stud-

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ies at other sites (or even at this site) could be further discussed.

6. The previous comment responds also to all results derived from the validation of all UV satellite products; further and in depth discussion of the outcomes of this manuscript should be added.

7. Section 3.2: At least for the UV quantities, the percentage difference between the satellite and the ground-based measurements should be normalized with the satellite estimates and not with the ground based measurements. The reason for this was extensively discussed in Fioletov et al., (Optical Engineering, 2002, pp. 3057-3058). The authors are encouraged to adapt that aspect of validating UV satellite data and perform new calculations.

8. Page 4318, lines 17-19: it is reported that there is no correlation between the distance of OMI pixel and the VdA site. At same sites there is a correlation with the geographical position of the OMI pixel relative to the site (if it is at the North, South, East or West). A possible correlation (derived as an impact of topography) could be examined.

9. Page 4319, lines 8-12: the problem of the TOMS (and OMI) algorithm in distinguishing between snow cover and clouds has been discussed also in other studies (e.g. Fioletov et al., 2004, Kalliskota et al., 2000). The authors could compare their findings and extend the discussion also on this topic, using the outcomes of the previous studies.

10. Page 4320, lines 14-16: the reduced effect of the SZA effect in the new version of data has not been discussed in the previous sections. A proper documentation or reference could be added or the sentence could be omitted.

Technical corrections:

Page 4310, line 3: replace 'things' with 'atmospheric and radiometric quantities'.

Give full names for the acronyms NPL, NIST, QASUME, FWHM.

Page 4312, line 2: please provide some references about the QASUME project results

Page 4312, line 9: please specify the COST number (726?) and provide some references about this action and the August 2006 campaign.

Page 4310, line 11: the institute where the instrument belongs is not necessary to be included in the abstract, so the sentence could be omitted.

Page 4313, line 2: replace 'rate' with 'rates'.

Page 4313, line 3: the reference of Diffey and McKinlay is missing.

Page 4317, line 27: the reference of Brogniez et al., 2008 is missing.

Page 4319, line 19: Table 2 is referenced here, but the statistical quantities are explained in the summary section. The text of the manuscript or the Table captions should be modified accordingly.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 4309, 2008.