

Reply to comments by Referee #2

General comments.

This work presents a study to characterize several filter radiometers which are used to measured $j(O1D)$. After a characterization in the laboratory and the obtaining of correction factors, measurements from an experimental field have been revaluated. The paper is well written and structured. A sufficient number of references is cited. I suggest to the authors to clarify the goal of this paper. When you read the Introduction and Experimental sections, for me is not clear the objective. It has been necessary to read all the paper to understand the scientific interest. For example you can say: "The goal of this work is to perform a characterization of the several filter radiometers in the laboratory, definition of correction factors and their application, in order to reevaluate the experimental data obtained in a field campaign".

Reply: We thank referee #2 for the positive evaluation and give detailed answers to specific questions and recommendations below.

(1) Pag. 2. Lines 29-30. "These absolute techniques require complex instrumentation and are therefore not maintained by many groups". I suggest to the authors to remove this sentence.

Reply: The sentence was removed.

(2) Pag. 2. Lines 30. ": : :that utilize PDA or CCD: : :". Maybe, you can change this sentence as ": : :that utilize photodiode arrays (PDA) or charge coupled devices (CCD): : :".

Reply: The sentence was changed accordingly.

(3) Pag. 3. Lines 16. ": : :European project ACCENT,: : :". Meaning of ACCENT??

Reply: The acronym is explained now (Atmospheric Composition Change - The European Network of Excellence).

(4) Pag. 3. Lines 28-32. I suggest to say in a line and clearly the goal of this work.

Reply: In the second to last paragraph of the introduction we explained the intention of this work in a very similar way as suggested in the referee's general comment. We agree that this information may be missed upon first reading because it is attached to the review of the

results of the previous ACCENT field campaign. In order to make it more clear, we split the paragraph and start the second part with “In this work...”:

“In this work, the spectral sensitivities of six $j(\text{O}^1\text{D})$ filter radiometers that took part in the previous ACCENT comparison were determined in the laboratory and updated correction factors were derived to reevaluate the $j(\text{O}^1\text{D})$ field data. Moreover, to improve the spectral properties of all instruments, interference filters were exchanged, spectral characterisation procedures were repeated and new correction factors were calculated for the modified instruments. Successive field comparisons with a spectroradiometer reference were then consulted to verify the quality of upgraded instruments.”

(5) *Pag. 4. Line 15. “Photograph”. Image??*

Reply: We use “image” now.

(6) *Pag. 4. Line 19. “: : previously (Hofzumahaus et al., 1999; Bohn et al., 2008)”. I suggest “: : previously by Hofzumahaus et al. (1999) and Bohn et al. (2008)”.*

Reply: Changed as recommended.

(7) *Pag. 5. Line 6. “A high-pressure Xe arc lamp was used as a light source”. What about the characteristics of Xe lamp?*

Reply: We added a sentence: “This type of lamp emits a high-intensity, almost continuous spectrum in a range 200-1200 nm.”

(8) *Pag. 5. “Section 3.1. Spectral sensitivities”. What temperature was the laboratory during the characterization? You do comments in Pag. 6, lines 32-33.*

Reply: Temperature in the laboratory during the characterisations was around normal room temperature ($\approx 22^\circ$) but it plays no role. For the interference filters a very low temperature response is specified. In separate experiments it was tested that the slight heating ($\approx 30^\circ$) that is performed to prevent condensation of moisture in the outdoor units, does not influence the PMT response. Therefore no significant temperature effect on the radiation measurements is expected. The remark on page 6 refers to the temperature dependence of $j(\text{O}^1\text{D})$ that results from the temperature dependence of O^1D quantum yields and of O_3 absorption cross

sections. As explained in the text this temperature effect is completely separable from the measurements.

(9) Pag. 9. Lines 30-34 and Pag. 10. Lines 1-2. I look very interesting the recommendations performed by the authors about the maintenance of the filters radiometers for long-term measurement periods.

Reply: We gave these instructions because there are various options users may consider to ensure data quality.

(10) Pag. 10. "Conclusions section". In my opinion, more conclusions should be added. This section is very short, only a paragraph.

Reply: We extended the conclusions section which is also in line with suggestions by Referee 1:

"These calibrations ensure that the measured data are accurate, in particular under conditions of small solar zenith angles when $j(\text{O}^1\text{D})$ is high and important, e.g. for predictions of noontime OH radical concentrations and the atmospheric oxidizing capacity. The complementary correction factors gain significance under conditions with low sun when $j(\text{O}^1\text{D})$ is getting smaller which is important, e.g. for an accurate assessment of ozone photolysis compared to other primary radical sources like HNO_2 or ClNO_2 photolysis in the early morning. Overall, filter radiometers are suitable to accurately measure $j(\text{O}^1\text{D})$ in a wide dynamic range. In this work previously described deficiencies of the investigated instruments were examined and widely removed. However, these deficiencies are considered moderate and require no major revision of previous work caused by incorrect $j(\text{O}^1\text{D})$."