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Interactive comment on "Absolute absorption cross-section and photolysis rate of I_2" *by* A. Saiz-Lopez et al.

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We have identified an error in our calculation of the absolute absorption cross-section of I_2. The high resolution spectrum measured by the Fourier Transform spectrometer should have been scaled in the continuum region (470 to 500 nm) to the average of five spectra recorded using a grating spectrometer (Acton SpectraPro SP-556-I, grating 1200 grooves mm^{-1}, resolution 0.2 nm), under carefully controlled conditions (295 K, 1 atmosphere of air). Unfortunately, while the lead author (Saiz-Lopez) was in Antarctica doing fieldwork, the Fourier Transform spectrum was scaled to the wrong grating spectrum, while preparing the paper for submission. This error has now been rectified and the resulting cross-section re-evaluated. Our value for the cross-section

at 500 nm is actually 2.29 $\times$ 10^{-18} cm^2 $molecule^{-1}$ (the erroneous value was 3.01 $\times$ 10^{-18} cm^2 $molecule^{-1}$), which compares very satisfactorily with the values of 2.19 $\times$ 10^{-18} published by Tellinghuisen (1973) and 2.25 $\times$ 10^{-18} reported in the Comment by Bauer *et al* (S741-S743). The average disagreement between our cross-section and that of Tellinghuisen (1973) in the I_2 continuum between 470 and 500 nm is approx. 4%. At 436 nm, our cross-section of 1.53 x 10^{-19} is again in good agreement with the value of 1.41 $\times$ 10^{-19} cm^2 $molecule^{-1}$ from Bauer *et al*.

Integration of the convoluted $j(I_2)$ values at 1 nm resolution now gives a *J* value in the lower troposphere of 0.12 s^{-1} (compared with a value of 0.15 s^{-1} using the erroneous cross section). This is now in excellent agreement with the laboratory measurement of 0.12 $\pm$ 0.03 s^{-1} reported in the present paper.

Finally, it should be pointed out that the cross-section used for atmospheric measurements of I_2 by Differential Optical Absorption Spectroscopy (Saiz-Lopez and Plane, 2004) was the averaged grating spectrum described above.

In the final version of the paper, all diagrams will be corrected accordingly. The authors wish to apologise for any confusion caused by the error and look forward to receiving further comments on the work described in the paper. We are grateful to Prof. Tellinghuisen and Dr. Crowley for their comments which led to the finding of this error during our critical reevaluation of the data

References

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