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Interactive comment on "Updated ozone absorption cross section will reduce air quality compliance" *by* E. D. Sofen et al.

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We thank the reviewer for their detailed comments on our manuscript. We provide our their comments and our responses below (**bolded**).

Reviewer 1:

The authors consider the impact that adoption of the revised value for the 253.65 nm ozone absorption cross-section recently re-measured by (Viallon et al., 2015) would have on regulatory monitoring in the U.S., Canada, and the E.U. This cross-section is 1.8

The authors suggest that adopting the new cross-section value would have serious

implications for regulatory agencies. They illustrate this with maps showing how the number of monitoring stations in exceedance of the current standards would increase in the U.S., Canada, and the E.U. if the reported concentrations were adjusted to reflect the new cross-section value. For the U.S., they conclude that 179 of the 2326 monitoring stations active between 2010 and 2012 did not meet the 2008 EPA standard of 0.075 ppm for that period, and assert that an additional 33 monitors would not have met the standard if the new cross-section were adopted. Certainly, an 18

The current (2008) 8-h primary and secondary National Ambient Air Quality Standards (NAAQS) in the U.S. are 0.075 ppm, expressed to the third decimal place. The current NAAQS rule (40 CFR Parts 50 and 58 [EPA–HQ–OAR–2005–0172; FRL–8544–3] RIN 2060–AN24) states: ". . . in calculating 8-hour average O3 concentrations from hourly data, any calculated digits beyond the third decimal place would be truncated, preserving the number of digits in the reported data." Similar procedures are used when calculating the 3-yr averages and different results can be obtained if these rounding and truncation conventions are not adhered to. For example, Figure 1a erroneously shows a filled red circle in SE Arizona corresponding to the monitor at the Chiricahua National Monument, which according to the EPA had a 2012 DV of 0.073 ppm. The new cross-section would increase this DV to 0.074 ppm, which still does not exceed the standard. The same is true for Seiling, OK, the northwestern most point in that state, which is also represented by a filled red circle in Figure 1a. The 2010-2012 DV at Death Valley National Park, near the border between California and Nevada, would only increase from 0.072 to 0.073 ppm, removing another red point from the plot. There are, no doubt, other examples arising from the averaging methods used by the authors and similar considerations are likely to apply for the data from Canada and the E.U. These inconsistencies should be corrected before the article proceeds further since the significance for regulatory monitoring hinges on these results.

We agree with the reviewer that there are complex data processing rules used by the regulatory agencies to assess compliance. The reviewer points out some

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specific peculiarities in the United States associated with averaging methods used by the EPA for compliance assessment.

It was not our intention to conduct a numerical analysis of potential new exceedences that meet specific national statutory or legal requirements in each geographic region where we have examined data. This would lead to us applying different averaging or data handling in different international jurisdictions, something that would greatly complicate the paper and potentially mislead readers. Furthermore, the details of the requirements for these calculations are often poorly documented in obscure legislation or rules, as illustrated by the reviewer. Instead, we have taken the publically available information on ozone for each country and applied a consistent data averaging approach to all, following the stated air quality standards. We describe this averaging in the paper and apply it consistently to all data. We recognize that there are additional details of how a change in absorption cross section will impact statutory regulatory standards that remain to be addressed, but feel that these are best handled by the particular regulatory agencies.

We have however added text to section 2 of the paper that highlights the importance of data averaging / processing and signposts the reader to some of the country-specific requirements and possible implications.

We hope that our work inspires the regulatory agencies to investigate the impact of O3 calibration uncertainty on air quality exceedences and they are best placed to implement the detailed regulations regarding the processing of data.

Finally, 40 CFR Parts 50 and 58 to which the reviewer refers are not the current NAAQS for ozone. They are the 1997 rule that specify a threshold of 80 ppb (or 0.08 ppm formally) and were revised in 2008, illustrating the challenges of chasing down all of the complete details of the air quality regulations.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 19537, 2015.