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Interactive comment on “Instrument inter-comparison of glyoxal, methyl glyoxal and NO₂ under simulated atmospheric conditions” by R. Thalman et al.

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Review of Instrument inter-comparison of glyoxal, methyl glyoxal and NO₂ under simulated atmospheric conditions, by R. Thalman, et al.

This paper describes the results of several experiments in two different atmospheric simulation chambers that use several instrument using similar and different techniques. The measurements of Glyoxal and Methyl Glyoxal are examined from a standpoint of validating the measurements and the techniques. The paper is mostly well written and suitable for AMT. The work addresses an important scientific problem and provides

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use data and interpretations. The methods are sound and the work is novel. The study is especially thorough for high concentrations of Glyoxal, at least, and provides conclusions that will be useful to the AMT readership. This paper should be published with minor revisions.

General comments/question:

1) This paper examines the accuracy and precision of Glyoxal and methy glyoxal at simulated ideal conditions. The relevance to the atmosphere needs to be discussed a bit more in the conclusions. From my perspective, you did a great job of validating the cross sections for DOAS and the impact of NO₂. I think this is the major point of the paper. What you have not shown as clearly is how measurements at these relatively high concentrations translates into measurements at 50 ppt in the real atmosphere. When I look at Figure 3 near the intercept, I can't help but think that there might be a very different set of results for an experiment that covers only the 0 – 100 ppt range. Do you expect these DOAS instruments to agree so well at 50 ppt? Is the absence of NO₂ interference still true when CHOCHO is only 50 ppt? A few sentences or a paragraph would be useful to me to help me understand how to connect the accuracy in these experiments to the real world measurements. 2) How do sampling artifacts affect these measurements? In general are these not a concern with CHOCHO? It seems to me that some of the measurement issues, especially with MAD-LIP are problems with implementation rather than issues that are inherent to the technique (Sec 4.2). Along these lines, might better results have been obtained under better circumstances for the Madison team? I don't believe that the DOAS instruments "benefit from direct calibration" nor do I think MAD-LIP suffers from not having what you consider a direct calibration.

I have a number of small corrections in the annotated manuscript.

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/7/C3796/2014/amtd-7-C3796-2014->



