

Interactive comment on “Measurements of tropospheric HO₂ and RO₂ by oxygen dilution modulation and chemical ionization mass spectrometry” by R. S. Hornbrook et al.

Anonymous Referee #1

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This paper presents a detailed description of the improved PerCIMS instrument for the measurements of HO₂ and HO₂ + RO₂ concentrations in the troposphere. This is an important contribution, as there are still significant discrepancies between measured and modeled concentrations of HO₂ and RO₂ radicals in the atmosphere. Improving the measurement of these radicals is an important area of research in order to help identify the cause of the model-measurement discrepancies. This paper was originally submitted to ACPD, and it was recommended that it was better suited for publication in AMT. For this submission, the authors appear to have adequately addressed most of

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the points raised in the previous ACPD reviews.

As suggested by one of the previous reviewers, the paper would benefit from a discussion of the intercomparison to the HO_x measurement in the DC-8 from INTEX-B (Kleb et al., AMT, 4, 9–27, 2011). Although the authors state in their response that they plan to include this in a future paper, a recent blind intercomparison of LIF HO₂ instruments (Fuchs et al., ACP, 10, 12233–12250, 2010) revealed significant measurement differences between the instruments under some conditions, bringing into question the accuracy and reliability of peroxy radical measurements in the atmosphere. As discussed in the present paper, the PerCIMS method for HO₂ detection appears to be influenced by a number of RO₂ species, and in particular RO₂ radicals from alkene and aromatic precursors (Fig 8). A similar interference may also affect LIF HO₂ measurements (Fuchs et al., AMTD, 4, 1255–1302, 2011). Although a detailed analysis of the intercomparison is beyond the scope of the present paper, a brief discussion/statement about whether these or other potential interferences could have impacted the results would be useful. Were the concentrations of alkenes and aromatics high during the intercomparison?

Overall this is a well written paper suitable for publication in AMT.

Minor comment:

Page 419, line 5: It appears that α_{RO_2} is missing from the sentence “Most importantly, because in the HO₂ mode is only ~ 0.2 ...”

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 385, 2011.

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