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Atmospheric Measurement Techniques Discussions

# *Interactive comment on* "OH clock determination by proton transfer reaction mass spectrometry at an environmental chamber" *by* P. Barmet et al.

**Anonymous Referee #2**

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This paper presents measurements of the decay of several potential tracers using PTR-MS as a test of their usefulness as a measure of OH exposure time in environmental chambers. The authors tested several potential tracers for OH exposure in an $\alpha$-pinene ozonolysis experiment, including 3-pentanol, which was added to the chamber, 3-pentanone which is a direct oxidation product of the reaction of 3-pentanol with OH radicals, and pinonaldehyde which is a product of $\alpha$-pinene ozonolysis. Their results suggest that 3-pentanol was not a useful tracer due to significant interferences with similar m/z signals from the products of $\alpha$-pinene ozonolysis. They conclude that 3-pentanone and pinonaldehyde were useful OH tracers as there was little interference associated with the m/z signals for these compounds, although these compounds are not ideal as tracers as the concentration of pinonaldehyde depends on the initial con-



centration of $\alpha$-pinene in the experiment while measurements of 3-pentanone does suffer from interferences from oxidation products with similar m/z signals.

The authors propose that a deuterated tracer such as butanol-d9 could be used as a universal tracer for OH exposure in complex chamber experiments due to its somewhat unique m/z ratio. They present relative rate measurements of the rate constant for the reaction of OH with butanol-d9 as well as a preliminary application of butanol-d9 as a measure of OH exposure in a moped exhaust experiment. The authors find that the OH exposure time determined using butanol-d9 was in good agreement with that obtained using toluene as the tracer except at long reaction time, perhaps due to interferences with the m/z signal for toluene from an unknown compound.

Although the use of a reactive tracer as measure of OH exposure is not new (as discussed in the manuscript), the authors do make a case for the use of a common universal tracer in complex chamber experiments in order to be able to compare different experiments with different OH radical concentrations, and present a potential universal tracer. As a result this paper is suitable for publication in AMT.

Minor comments:

Page 7475 line 9: "Direct OH concentration measurement in chambers are difficult to maintain over long time periods, as very high flow rates are required." The authors should clarify that high flow rates are only required by certain more portable OH measurement techniques (such as LIF-FAGE) not by DOAS.

Page 7479 line 1: "PTR-MS shows on most even m/z low signal intensities." This seems like a sentence fragment.

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 7471, 2011.