

Interactive comment on “Measuring acetic and formic acid by proton transfer reaction-mass spectrometry: sensitivity, humidity dependence, and quantifying interferences” by M. Baasandorj et al.

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We thank the referees for their valuable time and constructive comments. We addressed each of the reviewers' comments and made minor revisions to the manuscript as outlined below.

Referee #3

Referee comment: Page 10902, line 24: The phrase "materials move upward with the

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flow and increase the exposure time" means that the absorber material is bouncing by a flow rate of only 35 sccm within the trap? They authors argue that loosely packing of the adsorber material led to increased exposure time (relative to what?). Why then was glycolaldehyde lost in a tightly packed trap and not in the loosely packed version? Did the flow restriction of the tightly packed material result in even longer exposure times? Please clarify.

Author reply: A small amount of the adsorbent material is loosely packed and bouncing within the trap. It is true that tightly packing the trap did result in a flow restriction and longer exposure time. That created a problem for species like glycolaldehyde, which is not as adsorbent as AA or FA, but also not particularly volatile.

Referee comment: Chapter 3.1 Trap performance: I got a bit confused about the phrases “background” “trap” and “no trap” of Figures 8 and 9 and “trap background” (Fig. 10) “PTR-MS background measurements” on page 10904, line 12, “trap background” on page 10904 in line 16 and “background acid trap measurements” in the text referring to Fig. 10 (page 10904 in line 21). Please check for consistency. From the text I understood that Fig. 10 shows the “trap background” (i.e., “the trap background was monitored for 10 min by sending catalytically generated zero air through the acid trap and then to the PTR-MS”), followed by subsequent measurements of ambient air sent through the trap. It would be interesting to additionally plot the ambient air sampling data (bypassing the acid trap) in Fig. 10: on the one hand for better comprehension of the strategy applied, and on the other hand for information on the contribution of acids in the ambient air (i.e. difference between “trap signal” and “no trap” of ambient air showing the contribution of AA and FA, respectively)

Author reply: We checked and verified consistency in the text as requested. The phrase “no trap” in Figures 8 and 9 indicate measurements made when bypassing the trap, which can represent either the instrument background or an ambient measurement. Similarly, “Ambient and background acid trap measurements” in Page 10904 in line 21 refer to two modes of trap measurements, ambient trap and trap background. Page

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10904 Line 21: replaced “Figure 10 shows example ambient and background acid trap measurements for m/z 61 and m/z 47 obtained during SLAQRS” with “Figure 10 shows example acid trap measurements for m/z 61 and m/z 47 obtained during SLAQRS. The figure compares ambient air sampled via the acid trap (in black) with the acid trap background (in grey) for two time periods.”

Because of the many different modes of ambient and trap measurements, Figure 10 shows only the trap measurements (i.e., ambient air sampled via the acid trap, and the acid trap background). Even though adding the ambient signal when by-passing the acid trap seems logical, we found that having four different modes of measurement on the single plot was overly confusing. Therefore we elected to keep Figure 10 as it is. The subsequent figure (Fig. 11) provides a comparison between the background-corrected signals during ambient and trap measurements.

Referee comment: Else: Does the used KOH-treated CarboBlack B packing material interact with water vapor at high ambient air relative humidity, leading to respective dependence of the trapping efficiency of (partly water soluble) glycolaldehyde, ethyl acetate and 2- propanol, ethanol and DME on the relative humidity of the sample air? Surface coadsorption or capillary condensation could lead to increased uptake efficiency (negative effect on interfering species); occupation of active adsorption sites by water vapor could lead to even lower scrubbing efficiency (positive effect on interfering species).

Author reply: We did not observe a significant change in the ratio $\text{H}_2\text{O}-\text{H}_3\text{O}^+ / \text{H}_3\text{O}^+$, a proxy for humidity, during the trap measurements. This suggests that retention of water vapor in the trap, and hence its interaction with the adsorbent material, is not an issue in this case.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 10883, 2014.