

Interactive comment on “Calibration and intercomparison of acetic acid measurements using proton transfer reaction mass spectrometry (PTR-MS)” by K. B. Haase et al.

Anonymous Referee #1

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The manuscript by Haase and colleagues details the calibration of two PTR-MS instruments (in three configurations) for acetic acid measurement, as well as an intercomparison of the measurements of one of the above PTR-MS instruments against an established mist chamber/ion chromatography acetic acid measurement technique. The paper provides valuable information for the community of PTR-MS users, as well as those who would use PTR-MS acetic acid measurement data, and should be published in final form after a few minor corrections, as outlined below. Scientific Matters:

1. p. 4638, line 9: The authors state that estimated acetic acid sinks exceed the esti-

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mated sources by about 24 Tg C yr⁻¹, but without giving the context of the magnitude of the estimated sinks and sources. It would be generous to the reader to include those values here to put a relative importance to the overestimation.

2. p. 4645, line 12: State the value from the study by de Gouw et al. that compares well. I know it is in Table 1, but again, to be generous to the reader it could be given here as well. Then the authors can be quantitative about how well it actually does compare.

3. p. 4648, line 24: Is the measured range of acetic acid concentrations reported here from the PTR-MS measurements or the MC/IC measurements? I'm guessing it is from the former, but since both measurements were discussed, it would be appropriate to be specific. Also, is the max mixing ratio of 3.555 ± 0.327 ppbv shown in Fig. 4 a single measurement, (along with all data points shown in Fig. 4a), or are these averaged in any way?

4. One of the things that seems to be lacking from the paper is a justification for the usefulness of the PTR-MS measurement over the MC/IC measurement during the ICARTT deployment. Presumably, since the PTR-MS is a higher-rate measurement, short time periods when mixing ratios of acetic acid (and other measured compounds) are elevated can be quantified by the PTR-MS, and not with the slower-rate mist chamber. This seems like a detail that should be at least suggested, and possibly explored with actual data showing a short time period with changing air masses.

5. p. 4649, line 5: I'm not fond of the phrase “tracked those”. Corresponded to? Correlated with?

6. A quantified estimate of the impact of the sum of the potential interferences for the m/z 61 and the m/z 43 fragments would be useful to justify that they are not impacting the intercomparison, rather than simply dismissing that they aren't important in the rural troposphere. Individually they may not be important, but together they may comprise a significant sum when anthropogenic tracers are elevated.

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In addition to the broader scientific matters addressed above, a number of technical corrections should be made:

1. p. 4639, line 14: I believe it is customary to use $\text{cm}^3 \text{ molec}^{-1} \text{ s}^{-1}$ or $\text{cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$.
2. p. 4640, line 10: The text should read “Lee et al. (2006b) calibrated their instrument. . .”
3. p. 4640, lines 12: The text should read “Chemical Ionization Reaction Time-of-Flight. . .”
4. p. 4642, lines 6-7: The sentence starting “The primary ion (H_3O^+). . .” seems to be a sentence fragment, or is missing a word somewhere.
5. p. 4644, line 11: Be specific about the section (Sect. 3.?) detailing the calibration experiments.
6. p. 4647, line 10: The word “the” is missing from “consistent with result from. . .”
7. p. 4647, line 27: A full stop (period) is missing from the end of the sentence ending “. . .reaction with $\text{H}_3\text{O}^+(\text{H}_2\text{O})$. And similar to #2 above, the next sentence should read: “Hartungen et al. (2004) detected the presence. . .”
8. p. 4648, Section heading for 3.4: Appledore Island should be capitalized.
9. Table 3: The footnotes “4” are used in the header, but are not given below. I’m guessing they should be “2s”. Also, it may be favorable to use alphabetized footnotes rather than numerals, as numerals can be confused with exponents. This applies to Table 1 as well.
10. Fig. 3: It would be useful to show the 1:1 line for comparison.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 4635, 2012.