

## ***Interactive comment on “Comparison of different real time VOC measurement techniques in a ponderosa pine forest” by L. Kaser et al.***

**Anonymous Referee #2**

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Authors compare field measurements data between different instruments and show good agreements for some compounds. Comparisons between on-site GCMS and PTR-TOF-MS and between PTR-MS and PTR-TOF-MS are interesting. I would like to ask authors to consider comments below.

Some papers show, in PTR-based systems, that relative abundances of molecular ion and major fragment ion are affected by E/N and humidity. Compounds MAC and cymene produce significant amount of fragment ions. Sensitivity of molecular ions of the compounds measured in the study is also not constant across humidity, in particular at lower E/N (<110 Td). Authors need to check difference in mixing ratio of water vapor between calibration and field air. As humidity affects relative abundances of molecular ion and major fragment ion, this also may cause error in determining the concentration.

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Method section. 1 What was the range of humidity (or mixing ratio of water vapor) in the field air and various calibration air? As it affects PTR-MS sensitivity and abundance of fragmentation, it should be mentioned in manuscript.

2 How did the authors determine PTR sensitivities for MAC? MAC is not included in the compounds used for calibration.

Result and discussion. 3 Isoprene. Some data were far from 1:1 line. Some are quite higher in PTR-MS and others higher in PTR-TOF-MS (Fig. 2). Authors should mention the difference and address the reason.

4 Monoterpene. P27972, line 12-13 “due to the uncertainties in the calibration factors used for the remaining monoterpenes.” Tell us the detail please. Reaction rate constant or relative abundance of m/z 81+137?

5 MAC and MVK. Does MAC produce a fragment ion of m/z 43? The relative abundances of molecular ion and the fragment ion are affected by humidity. The abundance of the molecular ion was higher under higher humidity conditions and lower E/N value. How much degree are PTR sensitivities for molecular ions of the 2 compounds affected by humidity? Humidity difference between calibration and field air and between individual measurements may cause significant error. If the author monitored the molecular ion only, the concentration of MAC+MVK might have been overestimated.

6 Toluene (Cymene). Same suggestion is given for cymene. Humidity difference between calibration and measurement air and between individual measurements may cause error in determining contribution of m/z 93 originated from cymene. The 2 E/N values give different relative abundance of m/z 93 ion.

7 Conclusion. Line 7 “At this site were MBO and monoterpene emissions are dominating” The word “were” should be replaced by “where”?

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