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Atmospheric Measurement Techniques Discussions
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Interactive comment on "Using in situ GC-MS for analysis of C_2-C_7 volatile organic acids in ambient air of a boreal forest site" *by* Heidi Hellén et al.

Anonymous Referee #3

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The paper describes the development and application of an in situ method for the measurement of C2-C7 monocarboxylic acids (VOAs). The method is based on direct sampling into a commercial cold trap of a thermal desorption unit followed by GC-MS. The authors present results of laboratory experiments to validate the method and apply the method for a series of ambient air samples (boreal forest, June 2015). One focus of the manuscript is for example the investigation of the recoveries of the analytes from FEP and stainless steel inlets. In conclusion the manuscript reports detection limits between 1 and 130 pptv and a total uncertainty of the concentration measurements of about 16–76 percent. Finally, the authors compare the results for selected analytes measured by the GC-MS method PTR-TOF-MS measurements and observe large discrepancies between both techniques. The quantitative determination of organic compounds in ambient air is still a challenging task, especially if a higher time resolution is

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Discussion paper

required. Therefore, the topic of the manuscript is well suited to be published in AMT. However, several parts of the manuscript should be improved before final acceptance.

One of my major concern is the question how quantitative is the presented method for the target analytes. The authors report by themselves that especially acetic acid showed a problematic behavior and that large deviations were observed. Just considering the sampling step in the "cold" trap at 25°C (to avoid water interference) in combination with the calibration using liquid standards injected into adsorbent tubes (purged with nitrogen – again to avoid water interference) results in the inherent difficulty to estimate a reliable recovery, since for both steps losses of the analyte (e.g. espercially acetic acid) cannot be excluded (or better have to be expected!?). If no additional experiments can be performed, at least a comprehensive discussion about such losses are needed, which would certainly improve the manuscript.

Specific remarks:

Page 6: "Some memory effect was found . . .". Please describe more quantitative these effects since especially for the highly polar and sticky analyte molecules such a behavior has to be known in detail.

Page 8, line 20: As also discussed later in the manuscript: High concentrations during nighttime are not necessarily a consequence of nitrate chemistry (e.g. transport).

Please check the whole text for typos (using a spell checker!?).

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