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Interactive comment on "Potential of needle trap microextraction – portable gas chromatography – mass spectrometry for measurement of atmospheric volatile compounds" *by* Luís Miguel Feijó Barreira et al.

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(1) I would add some references in the introduction, in particular page 3 – line 1 after ". . .since the sorbent particles are protected inside the needle"

(2) A reference was added to the referred sentence.

(3) Page 2, line 34: VOCs can also be sampled by needle trap microextraction (NTME) that is considered to be more robust than other extraction techniques such as solid-phase microextraction, since the sorbent particles are protected inside the needle (Eom et al., 2008). Furthermore, because NTME is an exhaustive technique, the sensitivity

can be improved by increasing the sample volume; and capacity can be expanded by increasing the volume of the sorbent packed in the needle (Eom et al., 2012; Eom et al., 2008).

(1) Would it be possible to use a continuous analyzer of BTEX to compare the concentrations of this compounds founds by your method?

(2) A continuous analyzer of BTEX was not used during this study, but would be probably useful for comparison with results obtained for BTEX by portable GC-MS.

(3) No changes has been made.

(1) Section 2.2, page 3 – line 25: add some indications about the typical emission on the city of Tampere, allow to understand the situation around your sampling site.

(2) Major sources of air pollutants from urban areas in Finland include wood combustion and traffic.

(3) Page 3, line 29: Major sources of air pollutants from urban areas in Finland include wood combustion and traffic (e.g. Hellén et al., 2008; Taimisto et al., 2011).

(1) Section 2.3, page 4 – line 13: I understand the need of a high sampling volume however are you certain not to saturate the adsorbents in needle trap.

(2) In the corrected version of the manuscript after the first revision, information about breakthrough volume was added. Saturation was not observed for the concentrations typically founded during this study.

(3) No changes has been made, since they are already given in the previously modified manuscript version (apparently not visible for the referee #3).

(1) Section 2.3, page 4 – line 22 : you use a DVB/PDMS for the solid phase micro extraction step, have you tested other fibers ?

(2) We did not test other fibers because SPME was only applied for the verification of

studied compounds retention times and fragmentation in ion trap with authentic standards, thus any fiber with affinity for the studied compounds is suitable for this purpose.

(3) No changes has been made.

(1) Section 2.3, page 4 – line 32: the temperature program started from 50°C for 10 seconds and was increased to 270°C at 2°C /s. You write the total run time was 180 seconds, is there a problem in the total time?

(2) The total time is correct, but after reaching 270âŮęC the temperature was maintained until the end of the run.

(3) Page 5, line 13: The temperature program started from 50°C (10 seconds), and was increased to 270°C at 2°C/s, and kept at 270°C until the end of the run.

(1) Section 2.3, page 5 – line 4: after every analysis are you sure that all the compounds is totally desorbed?

(2) We are absolutely sure because we run blanks after each sample, consisting of a subsequent injection of the NTME syringe.

(3) No changes has been made.

(1) Section 2.3,page 4: why didn't you use an internal standard for the quantiïňĄcation.

(2) The purpose of this study was to prove the potential of this technique for field measurements. However, we agree that the continuous development of this method, particularly for quantitative analysis, must include the use of a proper internal standard, which is still under research.

(3) No changes has been made.

(1) Section 3, page 5 – line 15: are the measurement of temperature and particle number concentration co- located with the sampling site?

(2) The sampling device was installed a few meters away from the measurement of temperature and particle number concentration.

(3) Page 4, line 3: Measurements of temperature and particle number concentration were performed a few meters from the sampling system.

(1) Section 3.1, page 6 – line 3: have you tested the difference in fragmentation found between a conventional GC-MS and portable GC-MS or it's an observation from a bibliography?

(2) The mass spectra obtained by portable GC-MS were compared with the ones found in NIST 2014 spectral library search. We believe that these differences in fragmentation can be explained by the different types of detector used in the portable and conventional GC-MS.

(3) Page 7, line 1: This finding can be explained by the different types of detector used in the portable and conventional GC-MS.

(1) Figure 1, 2,3 and 4: are these the average temperature during the day or during the period of sampling ?

(2) The temperatures in all figures are average temperatures during the period of sampling, with exception to the figure 5 when the sampling was not performed.

(3) Page 6, line 11: Temperature (measured at 4.2 m height) and particle number concentration (available at http://avaa.tdata.fi/web/smart and provided by Junninen et al., 2009) were used for comparison with obtained results, and averaged during the period of sampling.

(1) Figure 3 : you quantiïňĄed separately the ethylbenzene and the p/m- xylene, these two compounds that are well separated on your column ? (Tr = 0,70 min and Tr = 0,72 min). Which is the factor of resolution between these two compounds? Maybe you can considered changing your column to improve the resolution.

(2) Although the two different peaks can be clearly identified, the separation between

ethylbenzene and p/m-xylene is not idyllic, with an Rs of 1.1. For future quantitation of these compounds, a different column can result in an improvement of the resolution. However, Torion has only one column option to date. The column is integrated with the “column oven” as usually in fast GC, so changing it is highly complicated if not impossible. We asked already Torion for the different column chemistries, but no progress yet.

(3) Page 8, line 17: However, a better separation of these compounds is required for quantitative purposes, and the use of another chromatographic column should be considered for improvement of the resolution.

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