Dear editor,

We have carefully considered the comments by the additional reviewer and improved the manuscript based on them as explained in the following sections.

Yours sincerely,

Heidi Hellén

Answers to the reviewer comments:

General:

The ms by Hellén et al. is focusing on the performance of adsorbent tubes and their analysis for the detection and quantification of C10-C15 BVOC. Adsorbent tubes have been the backbone of BVOC emission studies and even nowadays as 'online-techniques' (e.g. PTR-MS) got more and more available adsorbent tube sampling is important for compound specification (as e.g. PTR-MS can't distinguish MT species sharing the same mass), for use at sites with limited infrastructure or for process studies where the focus is not on longterm monitoring. Thus, detailed information on limitations and performance of these adsorbent tubes is urgently needed by the community especially for compounds which have not been in the focus before. In this sense this paper is an important contribution useful for a wide audience. The paper in general is well written with a clear structure and contains lots of useful information for the community that helps to improve sample setups and assess methodological challenges.

However, compared with the original submission, results and discussion of the breakthrough volumes has been improved, but I think this section will benefit from adding more information. If you aim to compare self-packed and commercially packed adsorbent tubes, a possible difference in breakthrough volumes could be caused by the mass of the sorbent in the tubes or its quality. Can you please add the mass of sorbent per tube to text and/or Table S1? Also, the breakthrough will depend (besides other) on the concentration of the gas sampled, and the authors have mentioned concentrations of the sample gas of 0.2 to 10 nmol/mol (L211). I suppose this range is caused by the different compounds, and the concentration used for each individual compound during the test have been constant? Then, comparing breakthrough volumes is rather misleading, as the amount of absorbed compound would depend both on volume and concentration of the sample air (amongst other). I would ask the authors to clarify this, e.g. by adding sample air concentration per compound to table 4, or adding the total absorbed mass per tube and compound.

-We do not have the exact masses of the sorbents in the self-packed tubes. In the commercial tubes amount is usually ~200 mg/tube and for self-packed tubes similar length of the sorbent bed was used and therefore amounts are expected to be similar.

-The used amount fractions in the sampling air with methanol solution tests were very low (0.1-.0.9 nmol/mol). In the tests with ReGaS2 permeation system higher amount fractions (~10 nmol/mol) were used. This is now clarified in the manuscript on lines 203-207. Constant concentrations of the individual compounds were used during each test, but there were some variations between the

tests. Amount fractions used in each test were added to the table 4. We assumed that for the low amount fractions, breakthrough is not strongly dependent on the amount fraction, but more on the flushed volume of air. However, we added a comment to the manuscript that also, a bit lower amount fractions used for the commercial tubes in the tests with methanol solutions may have had an impact (l. 392-393).

Specific comments:

1) L13-17: I would recommend to change the order of sentences, e.g. have 'Even though online measurements…' first, then 'In this study…' to have a more logical order.

-we did this (L. 13-17)

2) L16: '…online GC…'; shouldn't that be all online techniques here, e.g. even PTR-MS? The remaining part of the sentence is unclear to me. Please rephrase.

-this is true. We removed the word 'GC'. (L. 14). We rephrased the sentence into 'Even though online measurements of BVOCs are becoming more common, the use of sorbent tubes is expected to continue because they offer greater spatial coverage compared to online measurements, and no infrastructure (e.g., electricity, housing/shelter with stable temperature and humidity, sampling lines) is required for sampling.'

3) L19-22pp: I think it would be worth stating in the abstract that no multibed configurations have been tested here.

-we added to the line 22 'No multibed configurations were tested.'

4) L31: quantify here, how good was the agreement between the two labs?

-since there were variable results for different tests and compounds, which would need explanations on the differences, we are not able to shortly quantify it here.

5) L52: one '(' too much.

-corrected (L. 52)

6) Ch 2.4, breakthrough tests: tell how many tubes were used for these experiments.

-we did not list the number of different tubes used. We used randomly the tubes, which were used also in the other tests and are listed in the Table S1.

7) L319: insert 'were' between filters' and 'inserted'

-done (L. 301)

8) Tab3: 'new filter that has been used…' is a bit awkward I think, what about 'aged or used filter' instead. Tell how long it had been used before and for which kind of measurements (low/medium/high concentrations).

We changed the text in removing "new" (Table 3). We didn't measure the aerosol's mass loaded. The selected filter was used during a one-month field campaign (medium to high concentrations).

9) L355: '…TA tubes both stored at…'

-corrected (L. 357)

10) L358: significant at which level?

-we do not have statistical data on the significance. We changed the wording to 'clear' (L 340).

11) L395: 'In earlier studies the impact…'

-corrected (L. 377)

12) L401: what is a x-fold reduction? Reduced to y %?

-Corrected to 'reduced by 92 - 95%' (L. 383)

13) Fig2: Any possibility to give the numbers of samples here? At least in the caption (N=x for …)

-We added into figure caption '(N = 4, 5, 3 and 5 for Tenax TA stainless steel commercial, Tenax TA stainless steel self-packed, Tenax TA SilcoNert 1000 self-packed and Carbopack B commercial, respectively)'

14) L402: 'For >C5 components …was detected'. By Ho et al.? Unclear what you are referring to here.

-we added a reference to Ho et al. (L 384)

15) L426: 'In tubes on Tenax TA…', connect with next sentence

-corrected (L410-411)