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Atmospheric Measurement Techniques
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Discussions

Interactive comment on "A versatile, refrigerant-free cryofocusing-thermodesorption unit for preconcentration of traces gases in air" *by* F. Obersteiner et al.

Anonymous Referee #3

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In this article Obersteiner and co-workers present a novel device to sample highly volatile compounds without the need of a cooling agent. Although it has been designed for two specific gc-ms systems, its use in many applications, where cooling agents are not available, is conceivable. The device has been very thoroughly characterized very and its strengths and weaknesses are described in the paper. I only have some remarks to improve the structure and the readability of the publication.

I would suggest publishing the article with minor revisions in Atmospheric Measurement Techniques.

Page 2, Line 13: The term 'direct measurement' is not unambiguous., I would rephrase this sentence.

Page 3, Line 3 Is there literature on the PerkinElmer system?

Page 4, Line 19 Write flushed in direction opposite to sampling flow (instead of backwards)

Page 5, Line 30 The term chromatographic runtime is not clear to me. Does it mean that the chromatographic separation is the time limiting step?

Page 6, Line 10 Use time resolution (instead of number of measurements per time)

Page 6, Line 16 reach (instead of reached)

Page 6, Line 11 Why should an increased preconcentration flow increase the time resolution? Is it due to the decreased size of the cold head?

Page 6, Line 18 The difference of total run time, overall cycle times and minimum cycle time is not clear to me. Is the time resolution of e.g. the GhOST-MS equivalent the minimum cycle time plus the time for cool-down, or is the cool-down phase already during the GC runtime? You write that the sample-loop cool down time is not a limiting factor. But on page 17 line 8 you write that the cycle time of the GhOST-MS is indeed limited by the cooldown of the adsorptive material. Isn't it the cooldown time? Maybe a schematic diagram of the runtime with the cool down-time, the desorption time and the chromatographic runtime could help to avoid any confusion on the different cycle times.

Page 7, Line 27 A short description of the 'stages' should be already included here.

Page 10, Lines 7-14 The importance of desorption for the chromatographic peak shapes is very nicely discussed in chapter 3.3. Hence, Figure 4 should be discussed in chapter 3.3 and not already here.

Page 10 Line 20 When atmospheric ozone is trapped in the cryofocus it can degrade the alkenes mentioned in the supplement. Has the influence of ozone on the recovery of VOCs been investigated?

Page 11, Line 1 How is the back pressure of 2.5bar generated? From figure 1 the sample loop should have ambient or reduced pressure during sampling.

Page 13, Line 14 Peak tailing is by definition on the right flank, so I would propose to simply write peak tailing or tailing.

Page 13, Line 30 You write that the tailing effect could potentially be reduced by refocusing the high-volatile analyte fraction on a second sample loop. How can this be achieved? Do you need a third valve for it, or would you place it in front of the main column?

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