

## ***Interactive comment on “Quantitative sampling and analysis of trace elements in ambient air: impactor characterization and Synchrotron-XRF mass calibration” by A. Richard et al.***

**Anonymous Referee #2**

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Full Review Questions 1. Does the paper address relevant scientific questions within the scope of AMT? Yes. 2. Does the paper present novel concepts, ideas, tools, or data? Yes. 3. Are substantial conclusions reached? Yes. 4. Are the scientific methods and assumptions valid and clearly outlined? Yes. 5. Are the results sufficient to support the interpretations and conclusions? OK, need to improve discussions concerning Figures 10 and 11. 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes. 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes. 8. Does the title clearly reflect the contents of

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the paper? Yes. 9. Does the abstract provide a concise and complete summary? Yes. 10. Is the overall presentation well structured and clear? Okay. The characterization of RDI is well organized and sufficient details are provided. The comparison with filter samples is relatively weak. If more discussions are given in results and discussion section, it will strengthen the paper, please see suggestions below. 11. Is the language fluent and precise? Yes. 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes. 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Yes. Figure 2, 10 and 11 need more discussion and clarification. 14. Are the number and quality of references appropriate? Yes. However, there seems to be a format error at the end of each reference, i.e., an extra number or two appears after the publication year. These are specified below. 15. Is the amount and quality of supplementary material appropriate? Not applicable. One way to reshape this paper is to simplify and move some of the detailed descriptions and figures to the supplemental materials and shorten it. This could result in more focused descriptions. While I understand the authors would like to provide as much details as possible to report their findings, it is equally important to let the key findings stand out. General comments The paper provides detailed descriptions of characterization of the RDI impactor since its first development reported in two earlier publications (Bukowiecki et al., 2008; Bukowiecki et al., 2009). Overall the content of the paper is pertinent for publication in AMT. However, improvements can be made to this paper prior to its publication.

1. Compared with sections 2 and 3, section 4 is relatively weak. Although there is a paragraph describing Figure 10, more discussion and description could be given. For instance, the captions of Figure 10 only mention the percentage of PM<sub>10</sub> mass. What about PM<sub>2.5</sub> and PM<sub>1</sub>? How do they compare with simultaneous filter measurements if available? Adding descriptions like these will improve the completeness of the discussion. 2. Figure 11 provides some interesting comparisons of RDI and filter data. Like reviewer 1, I feel more could be said about the discrepancy. With the modified figure in your reply to reviewer 1, 2 hr data are added. They are useful to illustrate the

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agreement of general trend of the two measurements. One needs to add legend for the 2hr data if this is going to replace Figure 11. Retaining this figure is fine, because the comparison is quite useful to illustrate the capability of RDI against the conventional filter approach. I would suggest adding scattering plot panels to compare the averaged RDI data vs. filter data for the species compared. Because this will help illustrate the similarity or dissimilarity of these data points and promote more discussion of why such discrepancy is observed. Another comment is the error bars, how do you calculate the propagated errors? Are you showing them in Figure 11 with  $\pm 1\sigma$ ? It is somewhat strange when the 2 hr data points are well spread at several points in the new Figure 1 that the error bars do not seem to include the deviation of these data points. Also, the captions of new Figure 1 need to be revised to reflect the changes or additions.

Specific editorial comments 1. p2481, line 12, (Digital), is this a vendor? Adding model number can help clarify. 2. p2482, line 22, ELPI, needs to be defined first, electrical low-pressure impactor? 3. p2496, line 20, two outlier days (7 and 9 December), it is a bit confusing using the current time format on the x-axis. Minimally, the time format should be explained in the captions to reduce confusion. It may be useful to drop the month and just use the day of the month to simplify the presentation. 4. p2497, line 11, "... properly matched the requirements", what requirements? These were not clearly specified. 5. p2497, line 27, show a good agreement, delete "a". 6. References, as mentioned above, many extra numbers at the end of each reference. p2498, line 17, 2492 7. p2498, line 20, 2493 8. p2498, line 26, 2481, 2486 9. p2499, line 1-2, 2480, 2481, 2489, 2490 10. p2499, line 6, 2480, 2481, 2484, 2485, 2486, 2497 11. p2499, line 11, 2480, 2481 12. p2499, line 14, 2480 13. p2499, line 18, 2480 14. p2499, line 21, 2496 15. p2499, line 26, 2489 16. p 2499, line 31, 2487 17. p2500, line 1, 2490 18. p2500, line 4, 2496 19. p2500, line 6, 2480 20. p2500, line 8, 2482, 2485 21. p2500, line 11, 2496 22. p2500, line 14, 2483, 2485 23. p2500, line 16, 2479 24. p2500, line 18, 2482 25. p2500, line 20, 2480 26. p2500, line 22, 2480 27. p2500, line 26, 2496 28. p2500, line 30, 2496 29. p2500, line 32, 2480 30. p2501, line 2, 2487 31. p2501, line 6, 2493 32. p2501, line 8, 2496 33. p2501, line 10, 2494 34. p2501, line 14, 2489

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