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Interactive comment on "Field and laboratory evaluation of a high time resolution x-ray fluorescence instrument for determining the elemental composition of ambient aerosols" *by* Anja H. Tremper et al.

Anonymous Referee #4

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Overall the manuscript presents relevant results in a comprehensive and well-organized manner. So the publication in AMT is recommended. Still some conclusions need to be revised or softened, or better supported. Please see the comments below.

- Abstract. State which elements are compared with ICP and which with 'other high time resolution measurements', because the differences in slopes (median 1.07 vs 1.41-4.6) may be due to the different elements being assessed rather than to differences between techniques?

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Discussion paper

- Page 3. Line 4. The positive and negative sampling artefacts are true for some species but not for others, e.g. metals concentrations determined on filter samples by digestion+ICP do not suffer from sampling artefacts.
- Page 3. Lines 34-36. Furger et al. (2017) used both ICP-OES and ICP-MS, not only ICP-MS for the list of elements reported in this manuscript.
- Page 6. Lines 39-40 and page 7, line 1. Wasn't the RIE for ammonium calculated from the calibration with ammonium nitrate? And hence only the RIE for sulphate calculated from calibration with ammonium sulphate? Please correct if necessary.
- Page 9, lines 22-23. Please modify the sentence. As written now it seems you are still taking about the Ni, and according to Table 4, Ni concentration is reported to be 20 and min and max 0.24 and 320. Hence, from Table 4, one can see that 0.24-5200 is the range of mean concentrations for all the species analysed, but from the text is not clear at all.
- Page 9, line 25. The reason for high Cl concentration is not only the PM10 head, as at Tinsley the head was also PM10 but Cl is not so high. I guess the proximity to ocean played a role here.
- Page 10, line 2. With hourly concentration ranging…? Is it hourly? Or?
- Page 10, line 8. They are not ICP-MS digestion methods, they are digestion methods. The ICP-MS is used afterwards. Please re-write.
- It is not so clear that the differences XACT vs ICP can be attributed to the recovery rates in the digestion processes prior to ICP analysis. Please amend through the manuscript this explanation (especially conclusions, page 12 lines 15 and following, line 28). One needs to asses this statement based on the individual elements. If that statement was true, the elements with the lowest recovery rates would have highest slopes, but this is not the case e.g. recovery for Ni (HF/HClO4) is 87- In the conclusions, again, please make sure you don not attribute the difference between XACT and ICP to filter artefacts when you discuss elements that do not suffer from filter artefacts (page 12, line 28, among others).
- Conclusions, page 12, lines 17-18. If the sampling size was different and it is true

that the size range 1-2-5 um has so much sulphate, then the 1.68 is not a bias. The 1.68 is not a bias but would have actual meaning. Please re-phrase.

Technical corrections:
- Page 7, line 8. Shouldn't it say "...described in Beccaceci et al. (2015)"?
- Page 8, line 11. Remove 1 point after "Table 3".
- Page 8, line 13. A space is missing before "For".

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