Interactive comment on "Application of TXRF in monitoring trace metals in particulate matter and cloud water" *by* Khanneh Wadinga Fomba et al.

Anonymous Referee #3

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Recommendation: Major revision General Comments: Manuscript entitled "Application of TXRF in monitoring trace metals in particulate matter and cloud water" measured the concentrations of trace metals in the particulate matter and cloud water using a highly sensitive surface techniqueâĂŤTXRF. The authors compared the influence of different factors such as digestion procedure, filter baking, and plasma ashing on the measurement of trace metals. This is a useful fundamental work to improve the application of TXRF. However, I have several major concerns about the manuscript, besides the writing of this manuscript. Therefore, I think this manuscript needs substantial revisions.

Specific Comments: 1. If the quartz fiber filters also need digestion procedure to conduct TXRF analysis, what is the advantages of TXRF compared with ICP-MS? We know the digestion procedures waste the most time, if the digestion procedure id re-

quired, why don't I choose the ICP-MS. I think the precision of ICP-MS is much higher than TXRF. If there is a possibility that the TXRF can analyze the quartz fiber filters directly without digestion procedure? I think this may be the advantage of TXRF. 2. The figures in the manuscript need to take more time to make them more beautiful. 3. Line13: I think it is better to modify the sentence "Ambient particulate matter and cloud trace metals are considered key elements" to "Trace metals in ambient particulate matter and cloud are considered key elements" to avoid the ambiguity. 4. Line31: "Backing" should be "Baking". This mistake occurs at many places in the whole manuscript, please pay attention. 5. Line48: Please modify the sentence "Aerosols and cloud water trace metals" to avoid ambiguity. 6. Line 124-125: The symbol Ga and Y should provided in a parentheses following Gallium and Yttrium. 7. Line 173: if the diameter of the spot is 8 mm, the area should be 0.5 cm2, please to check. 8. Line 206: Please use the right symbol but not the letter x in "2 x 25" 9. Line 209: how the authors get the filed blanks of cloud water samples? Should clarify in the method section. 10. Line 210-215: the authors add 5 μl of concentrated nitric acid in the size-resolved samples, but why not for the SRM standard? 11. Line 222-223: "The maximum values of the measurements were then used for further analysis" if I have not left it out, I did not see the further analysis the whole manuscript. 12. 13. Line 28: what is the "as a total number" meaning? I can understand what the authors want to express, but the expression is not appropriate. 14. Line 109: what is the spin-up period meaning?. 15. Line 120-122: According to the example in the parentheses, the word "attributed" should be "convert"? But the authors should indicate why conduct this process? And "In the second simulation, the module marked chemical production regions of SIA", According to what, the authors can judge "the chemical production regions of SIA". 16. Line 226: why only 18 elements were analyzed, as you know, the standard has 28 elements. 17. Line 229: Please make the equation more beautiful. For Nnet and Nback, I do not understand what is the count rate meaning? 3. σblank, please write the equation correctly. 18. Line 251-252: "In the absence of certified metal concentrations on quartz fiber filters" if it is the blank filters used? 19. In my opinion, Figure 3 is not the proper type to present

the data. It is not proper to do the linear regression analysis for different elements. It is suitable for different concentrations with the same element. 20. Line 355: the authors mentioned the results of nighttime and daytime samples, I think the related figures or tables should be provided. 21. Line 358 and 371: "long-range transport from nearby cities" I think it is contradictory. When the authors discussing the source of the pollutant, I think it is better to air mass backward trajectories. 22. I am very confusing about Table 2. The content in the manuscript and in the Table were not consistent. Besides, for element Co, Cd, and Al, though their concentration below the LLD, their LLD must be exist. It id funny that the authors compared their data with Upadhyay et al. 2009, how can the authors know it is because of the application of HF lead to the increase of the blank for elements such as Ca, Ti, Fe, but not the different blank filters? 23. Line 455: the authors only compared their results with some European regions, I think more comparison should be made with the heavily polluted region, such as China and India. Reference: Li, W.; Wang, Y.; Collett, J. L.; Chen, J.; Zhang, X.; Wang, Z.; Wang, W. Microscopic evaluation of trace metals in cloud droplets in an acid precipitation region. Environ. Sci. Technol. 2013, 47, (9), 4172-4180. Liu, X.; Wai, K.; Wang, Y.; Zhou, J.; Li, P.; Guo, J.; Xu, P.; Wang, W. Evaluation of trace elements contamination in cloud/fog water at an elevated mountain site in Northern China. Chemosphere. 2012, 88, (5), 531-541. Liu, L.; Zhang, J.; Xu, L.; Yuan, Q.; Huang, D.; Chen, J.; Shi, Z.; Sun, Y.; Fu, P.; Wang, Z.; Zhang, D.; Li, W. Cloud scavenging of anthropogenic refractory particles at a mountain site in North China. Atmos. Chem. Phys. 2018, 18, (19), 14681-14693. 24. Line 474: why the author choose Ti as a reference element to calculate the EF? More explanation should be provided here.