

Interactive comment on “Source apportionment and seasonal variation of PM_{2.5} in a Sub-Sahara African city: Nairobi, Kenya” by S. M. Gaita et al.

Responses to Anonymous Referee #3

We would like to thank the Anonymous Referee #3 for the insightful review given to our manuscript.

The responses to his/her specific comments are listed herein;

1. Abstract should be partially rewritten to reflect the major changes in the text

Response: The authors agree with the referee about revising the abstract after making the suggested changes.

2. P. 9568 lines 3-8: Chapter should be extended significantly by adding discussion about biomass burning episodes, see e.g. (Swap et al., 2003; Vakkari et al., 2014) and domestic combustion, see e.g. (Venter et al., 2012).

Response: The authors have included discussion about biomass burning especially the Southern African Regional Science Initiative – SAFARI 1992 and SAFARI 2000 campaigns (Lindesay et al., 1996; Swap et al., 2003).

3. Wind rose/roses including the wind velocities for the both measurement sites would be valuable

Response: The meteorology data was collected from Jomo Kenyatta Airport which is approximately 13 km to the southeast of the university site. Therefore, the author will include only one wind rose to represent the wind condition during the sampling period.

4. Supporting material is needed to confirm PMF solutions, see e.g. (Comero et al., 2009) including at least:
 - a. Analysis of residuals and fpeak
 - b. Q/Qexp and MaxRotMat vs. factor number plot
 - c. G space plotting

Response: The requested supporting materials will be included in the supplementary material.

5. Show the PMF results of the different number of factors (e.g. 4-6) in supplementary material and add discussion about the results when the number of sources/factors has been changed.

Response: As stated above, the requested supporting materials will be included in the supplementary material.

6. I propose that PM_{2.5} mass, elemental concentration and mass concentration variation (seasonal/weekdays) results are in the same chapter and trajectory + PMF analysis are in the new chapter named as “PM_{2.5} source apportionment”.

Response: The authors are grateful for the proposed outlines of the manuscript and will reorganize it in a manner that captures the said proposal.

7. Add a new table for the dry season/wet season comparison (mean concentrations)

Response: Given that during the sampling period (2009) there was a drought, the information in the suggested tables will not give an accurate picture. Instead the authors are of the opinion that inclusion of new graphs (see comment 9) will give a clearer picture of PM in Nairobi.

8. Plot separate ternary diagrams for the dry and wet seasons and use more easily distinguishable colors/markers (Fig 2).

Response: The authors have decided to omit the ternary diagrams and instead include two the new tables which will be included in the revised manuscript. One table will have all the data and the second one will have separate data from university and UNEP site during the common sampling period.

9. Add new graph for PM_{2.5}, BC and major trace element concentrations (time series) including mean percentage seasonal compositions (see Figs. 9, 10 and 11).

Response: The suggested graphs will be included in the revised manuscript.

- a. Fig.1: Seasonal variation of PM_{2.5} and some elements sampled at the university site. Included in the figure are the seasonal averages and standard deviations (enclosed in brackets) as well as the WHO air quality guideline for a 24 h period.

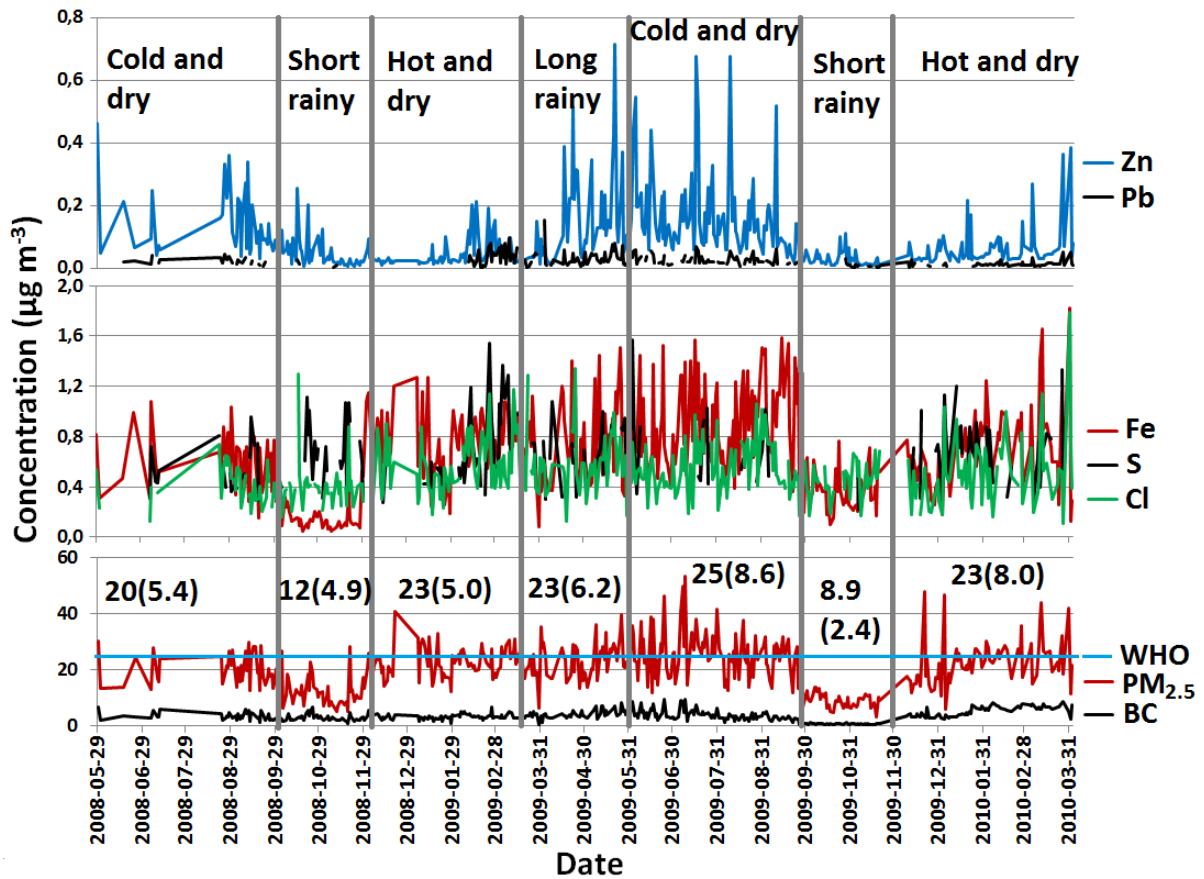


Fig. 1: Seasonal variation of PM_{2.5} and some elements sampled at the university site. Included in the figure are the seasonal averages and standard deviations (enclosed in brackets) as well as the WHO air quality guideline for a 24 h period.

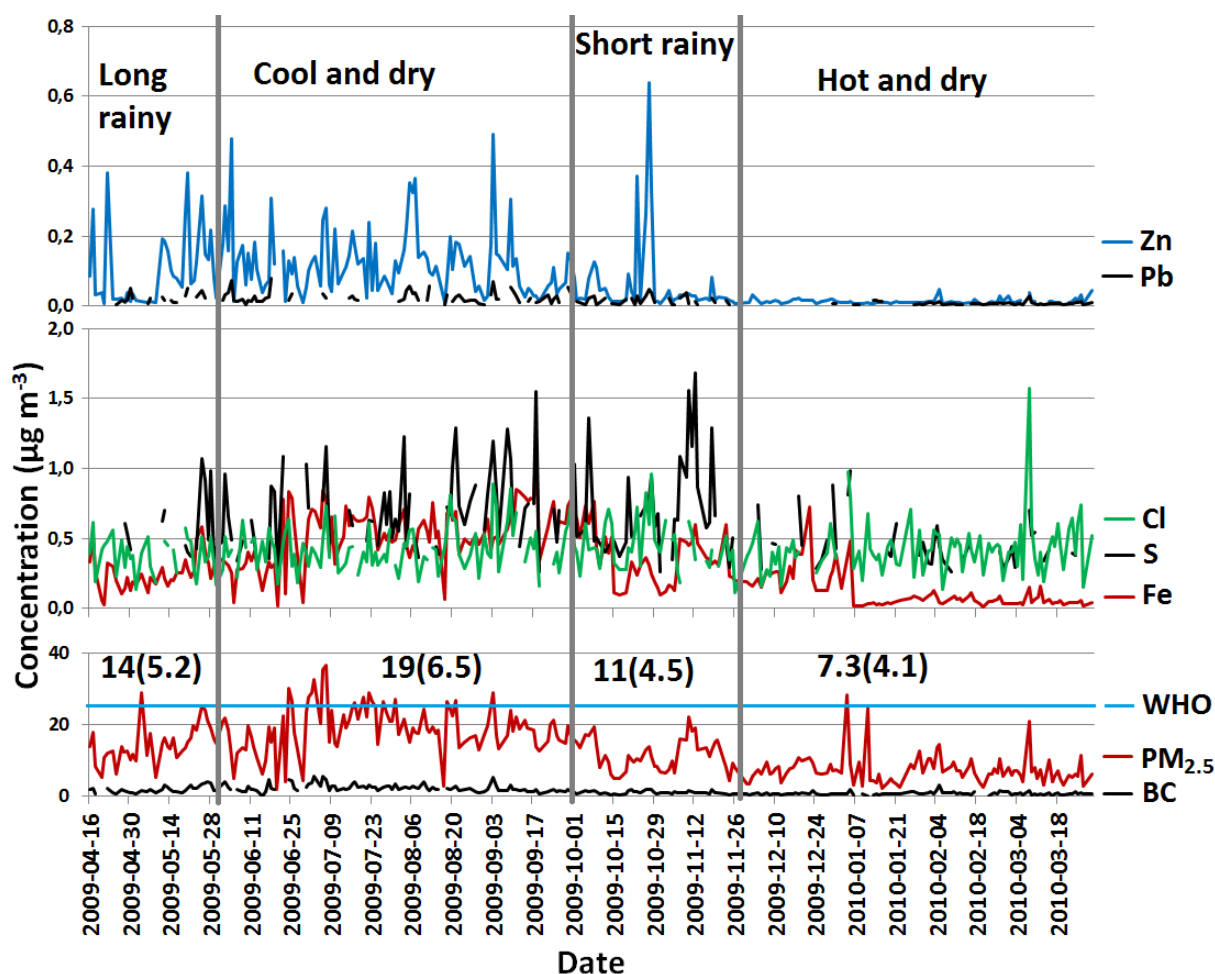


Fig. 2: Seasonal variation of $PM_{2.5}$ and some elements sampled at the UNEP site. Included in the figure are the seasonal averages and standard deviations (enclosed in brackets) as well as the WHO air quality guideline for a 24 h period.

10. Add more trajectory analysis, e.g. try to find typical time periods for the sources like biomass burning events traffic, dust event and domestic burning and compare these source identified results to other results like seasonal averages.

Response: More trajectories will be added to the revised manuscript and analyzed with respect to PM sources.

11. Check PMF analysis carefully with the supporting information and rewrite results/conclusions when necessary.

Response: Authors will have a thorough relook of the PMF analysis as suggested by the referee.

12. Add percentage compositions for each period to Figs 10 and 11.

Response: The percentage composition for each period in the said figures will be added as part of the results in the revised manuscript.

13. Present the relationships between the source contributions and wind directions, see e.g. (Zhou et al., 2005).

Response: The said relationship will be presented in the revised manuscript.

References

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