Interactive comment on "Measurement report: Size-resolved chemical characterisation of aerosols in low-income urban settlements in South Africa" by Constance Keitumetse Segakweng et al. (Ref. No.: acp-2021-1026)

(Reviewers' comments are indicated in black and the response to reviewers are indicated in blue)

Anonymous Referee #1

Received and published: 15 Mar 2022

This paper is the first comprehensive report of aerosol composition based on samples collected on the South African Highveld in four low-income urban settlements each of which represents an important pollution source region from economic and elemental points of view. Thirty-five trace elements are analyzed as well as Organic and Elemental carbon (OC, EC). Comparisons are made with similar studies for other South African regions, west Africa and on Europe (e.g., Spain) and Asia (India, China). The methods are well-established and the assembly of data is clear. Comparisons are made in Tables of summary data. Although characterizing exposure of the population is the goal of the project, few interpretations are made; hence the title "Measurement Report." With a few grammatical changes, marked on a separate copy, the paper is suitable for publication in *ACP* and will be very welcome by the aerosol community as well as policymakers within South Africa.

We would like to thank Referee #1 for the very positive review of this paper and deeming our paper suitable for publication in ACP. We also thank Referee #1 for acknowledging the relevance of this scientific work. Minor suggestions made were addressed/implemented. Below is a point-by-point response to each of these comments/questions. In addition, a marked-up version of the revised manuscript is also provided indicating all changes made throughout the manuscript.

Delete "within these settlements"

Deleted

Advise to list the 4 locations after a colon.

We agree with Referee #1 and have listed for locations in the Abstract as follows:

"…were collected during summer and winter in four low-income urban settlements located in the north-eastern interior on the South African Highveld, i.e. Kwadela, Kwazamokuhle, Zamdela and Jouberton. The mass concentration and chemical…"

should be reflect not reflects

Corrected.

Remove comma after especially

Removed.

reflect, not reflects

Corrected.

dominates, not dominate

Corrected.

coarse, not course

Corrected.

are generally, not is generally

Corrected.

was, not were

Corrected.

insert "in" the larger...

Inserted.

“Tiital et al., (2014)”

Corrected.

corresponds, not correspond

Corrected.

in a number of places it says similar "than" but should be "similar to". Do a global search and replace, please

We thank Referee #1 for pointing this out. “Similar than” was replaced with “similar to” throughout the manuscript.

spelling on areas

Corrected.

is "this remote site" still referring to Himalayas? Not clear

This sentence was changes as follows for clarity:

“…of the world. However, OC and EC concentrations for this remote site in the Himalayan region were still higher…”

Anonymous Referee #2

Received and published: 21 Mar 2022

Overall, really well-written paper! The methods were especially clear and detailed, and a wonderfully thorough discussion of results. Also interesting how higher indoor concentrations seem to be characteristic of South African studies/industrial activity. I think it is an excellent reference for detailed analyses of various kinds of pollutants and health hazards.

We would like to thank Referee #2 for the very positive review of this paper and recommending publication of the manuscript. Minor suggestions made were addressed/implemented. Below is a point-by-point response to each of these comments/questions. In addition, a marked-up version of the revised manuscript is also provided indicating all changes made throughout the manuscript.

Minor comments:

- Lines 317-318 were a bit confusing to me, I'm not sure which two size distributions (or indoor vs. outdoor?) "higher" is relating, and if "while" suggests that there should be different behavior between the summer and winter indoor data for the PM2.5-10 bracket

We agree with Referee #2 that this sentence is confusing and have changed it as follows:

"…collected during summer. However, the $PM_{2.5-10}$ size fraction had the highest mass concentration for indoor samples collected during winter as mentioned above. The lowest mass concentrations…"

- additional discussion of the validity/limits of using an ion balance to calculate the acidity of the aerosol

As indicated in this paper, acidity of aerosols was estimated similarly to the approach followed by Tiitta et al., (2014) and Venter et al., (2018). In the paper of Tiitta et al., (2014) the following sentence with regard to validity of this approach is included: "This approach is valid if the influence of metal ions, as well as organic acids and bases on NH^{+}_{4} concentration is negligible (Zhang et al., 2007b)"

- some grammatical issues, not sure if related to local writing conventions vs. those in the US

Small grammatical issues have been addressed, while the manuscript was also language edited by a professional language editor. The paper was written in UK English.