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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Personal exposure to $PM_{2.5}$ emitted from typical anthropogenic sources in Southern West Africa (SWA): Chemical characteristics and associated health risks" *by* Hongmei Xu et al.

Anonymous Referee #1

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Review of 'Personal exposure to PM2.5 emitted from typical anthropogenic sources in Southern West Africa (SWA): Chemical characteristics and associated health risks' by H. Xu et al.

Megacities are developing rapidly in the developing world and South West Africa is no exception. This rapid urbanization is putting huge demands on the ill-adapted infrastructure. A major matter of concern for the local populations and policy-makers is the quantification of the impact of poor air-quality on human health. When they exist, the measurements performed by the stations of the air-quality monitoring networks provide

a good estimate of the ambient pollutants concentrations. However, because of their individual activities a significant fraction of the population is thought to be exposed to concentrations much larger than suggested by these routine measurements. In South West Africa, data are cruelly lacking and this question is still largely open. Therefore, the authors pursue in their present work three different objectives. First, they want to quantify the personal exposure to PM2.5 of women working in an outdoor grilling place, students living close to a landfill in which waste is being burnt, and taxi drivers who spend long working hours in the middle of a very dense traffic. The participants to the study were equipped with personal sampling devices that they carried continuously for two different weeks (one in the dry, and one the wet, seasons). The daily samples collected during these periods were carefully analyzed in the lab, and their composition determined. Finally, an attempt is made to assess the health risk resulting from this exposure to large pollutants concentrations. My opinion is that with its very important and quite novel subject this work has the potential to become a very interesting one. However, it currently suffers from several flaws (see below) that need being addressed before it can be accepted for publication.

Comments and suggestions for improvement: - I understand that the authors are not native speakers but in some parts of the manuscript, the clumsy phrasing hinders comprehension. This point should be taken care of. - In the chemical analysis, I am surprised by the choice of Fe as a tracer of the crustal component of the aerosol. It is well known that at least a part of its concentration is contributed by anthropogenic activities. Wouldn't Al or Ca be a better choice? By the way, why were these elements not quantified by the XRF analysis? - In the health risk assessment, it would be useful to detail the type of risk quantified. The categories 'cancer-risk' and 'non cancer-risk' are very broad. Also, is the risk a long-term or a short-term one? Why did you assess only the risks resulting from exposure to Mn, Ni, Zn, Pb, the PAHs and the PAEs? There is also a risk due to exposure to PM2.5 and given the large concentrations reported in your work, I expect this one might be very important. - In the results section (line 328-330), you cannot extrapolate to the whole SWA region your results collected during two

weeks at three very specific locations. - Line 400: you say that total carbon was the most important chemical species in PE PM2.5 but it contributes only about 20% to the mass concentration. Isn't this contradictory? What about mineral dust? - Paragraph 705-724: First, you say that there is no non-carcinogenic risk linked with the exposure to Mn, Pb, Ni, and Zn (line 709), then you discuss the fact that the risk is much higher in the dry season (line 718). What is the point of discussing the magnitude of this risk, especially before repeating (line 723-724) that it is negligible?

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