

## ***Interactive comment on “Spatial estimation of air PM<sub>2.5</sub> emissions using activity data, local emission factors and land cover derived from satellite imagery” by Hezron P. Gibe and Mylene G. Cayetano***

**Anonymous Referee #2**

Received and published: 28 May 2017

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This is an interesting paper for those researchers interested in PM<sub>2.5</sub> emissions and learns about approaches to estimate the spatial distribution of emissions using activity data, local emission factors and land cover derived from satellite imagery. That would be of interest to the Atmospheric Measurement Techniques readership. However, the manuscript needs to be considerably improved before publication, both from the point of view of its presentation and from the amount of details provided on the data. I think the paper should be accepted after the comments and suggestions below and those

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from the other reviewer have been addressed.

Major issues: If the paper is to be published in AMT, I advise a significant revision and restructuring of the manuscript. It was at times difficult to read. The largest issue for me is that the methods section is extremely difficult to follow. The used methods of the paper must be written clearly and explicitly. I would suggest restructuring the article to better streamline the material. There is a wide combination of methods, calculations and data products used. For example, the description of the study area and Google satellite image are first introduced in Section 2.1. And additionally, the used methods have been mentioned in the same Section 2.1. Then, all details of the activity data and emission estimations are given throughout Section 2.2. My suggestion to improve readability and clarity would be to reorganize all the methods and results into the following Sections: 2. Materials and methods 2.1 Study area 2.2 Activity data (with used data and methods) 2.3 Local emission factors (with used data and methods) 2.4 Land cover classifications by using satellite imagery (with used data and methods) 2.5 Validation of emission estimation factors, ground surveys, and sensitivity analysis 3 Results and discussion 3.1 The utilizing of activity data (with the discussions) 2.3 The utilizing of local emission factors (with the discussions) 2.4 The utilizing of Land cover classifications (with the discussions) 4 Summary and conclusion The Section “4.1 Recommendations” just stand there or there are other sessions such as 4.2, 4.3? If not, it must be done with the Section 4.

The other prominent issue I have is the not precise definition of “activity data” throughout the manuscript. In page 5 (line 5-6), the “activity data” is written as follows: “this study uses “activity data” to describe this and other relevant factors pertaining to the quantity of fuel used and percentage of households using fuel”. Are the activity data estimated? And what are the significant influencing factors of the on-site specific activity data? An important concern is the emission factor. It is not clear, what is the dependence of emission factors on the fuel types. Another problem I have is that there is a little-to-no mention about the used method of land cover classification. In my opin-

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ion, the authors not clearly discussed the limitation of Google Earth. It is not clear to me whether there was used any classification method for the land cover classifications. If not, then I think a more significant treatment of the uncertainty in the classification is required. Is there the coordinate transformation considered?

Specific comments: The other reviewer provides excellent comments related to the technical correction that should be taken into account in the revision of the manuscript.

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-14, 2017.