

Interactive comment on “Measurement on PM and its chemical compositions for real-world emissions from non-road and on-road diesel vehicles” by Min Cui et al.

Anonymous Referee #2

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Cui et al. present data from measurements of particulate matter emissions and composition from real-world testing of a suite of on- and non-road diesel vehicles. They find that PM emissions, while variable, exhibit trends with fuel quality and emissions standard. Although these data add to the literature and will eventually help build more realistic emissions inventories for China, I do not recommend publication of this version of the manuscript in ACP. I have two major comments and numerous minor comments.

Major comments:

Fit: The manuscript, in my opinion, does not fit the research foci of publications typically accepted in ACP and I wonder if another journal would offer a better fit for this research. Here are my arguments against publication in ACP: (1) no new methods/instruments

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were used that make the data novel, (2) the measurements were performed on a very small cross-section and are not necessarily representative of the on- and off-road fleet in China, (3) the small sample size, small cross-section, and large variability do not suggest large shifts/trends in emissions (or at least make them hard to observe), (4) comparisons with literature data are not very insightful. While the data add to the literature in terms of quantifying emission factors of PM from a modern set of vehicles under real-world conditions, the scientific contributions in this research effort are lean. The data need to be published but this journal may not be the right target.

Writing: The quality of technical communication is very poor. This suggests one or all of the following: (a) the first author was rushed to write and submit this manuscript, (b) the senior authors have not read through this manuscript, (c) the authors place no emphasis on clear and effective communication. The manuscript needs to be significantly improved by the senior authors to meet the expectations of an English language publication in a high impact journal. If the manuscript is not heavily edited for English, this would be reason enough for rejecting the manuscript from publication. Here are a few examples from just the first few pages: a. Page 1, line 24: ‘involving wide-range emission standards’

b. Page 2, line 11: ‘PM compositions emitted from excavators dominated’

c. Page 2, line 23: ‘the complex of operating modes’

d. Page 3, line 7: ‘diesel vehicles exhaust is a major source of emissions in ambient PM’

e. Page 3, line 9: ‘30% of emissions in ambient PM’

f. Page 3, line 18: ‘causing severe emission situation’

g. Page 3, line 23: ‘almost higher than 90% of PM came from on-road diesel vehicles emission’

h. Page 3, line 27: ‘349 thousand tons PM emission’

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- i. Page 5, line 23: 'organic matters'?
- j. Page 5, line 26: 'impact factors of PM'; what does that mean?

Minor Comments:

1. Emissions standards: It might be worthwhile to describe the on-road and off-road emissions standards (e.g., Stages and China) and their emissions limits for PM (and other pollutants too) at the beginning of the manuscript through a Table. This would help orient the reader and also allow easy comparison with the EPA and EURO standards.
2. Page 2, line 9: Did vehicle exhaust contribute to 30% of the PM concentrations or emissions? Unclear; please clarify.
3. Page 4, line 3: construction equipment might be better word
4. Page 3, line 16 to page 4, line 5: It might be better if the number of vehicles, fuel consumption and PM emissions in China were represented through a table or figure, alongside the relative importance of trucks and excavators to justify the use of those vehicle types in this research.
5. Page 4, line 18 to page 5, 10: The authors have only cited other people's work but have not paraphrased their findings. Hence, it is unclear what the gaps and motivation for this work is.
6. Page 6, line 19: I did not understand how the duration of the different modes were determined. Also, what torque-speed ratings do the idling, moving, and working mode correspond to?
7. Page 7, line 28: Why did the researchers use quartz-fiber filters? My understanding is that the fibers can tear off during handling and bias the gravimetric measurement. Do the authors mean Teflon-coated quartz fiber filters?
8. Section 2.4.3: The BaP_{eq} method needs to be discussed in detail for the reader to

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follow the calculation.

9. Section 3.1: What fraction of the improvement between pre-stage 1 and stage 2 can be attributed to better quality fuel as opposed to the emission standard?

10. Section 3.2: Given that there was only one China IV truck, how confident are the authors in their assessment that China IV trucks are better compared to the China III trucks. Similarly, is the China II truck any different than the China III trucks. Can the authors comment on how the small sample size could affect their conclusion?

11. Section 3.3: Is the lack of a mass closure on the PM filter a result of using a quartz-fiber filter for gravimetric analysis?

12. P_{ry}, Fluo etc.: Repeatedly, the authors have used abbreviated names to refer to various PM species. Using the full name of the species might improve readability.

13. Sections 3.3, 3.4 and 3.5: The authors have compared the PM composition data amongst the excavators and trucks and to literature data. However, it was hard for me to glean anything meaningful from all those comparisons and the ensuing discussion. I recommend that the authors spend some more time trying to make the interpretation more palatable to the reader.

14. Page 18, line 26 to page 19, line 2: The health relevant calculations, comparisons, and following discussion were too hard to follow and seemed like they were added to the manuscript as an afterthought.

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