

Interactive comment on “Characterization of road freight transportation and its impact on the national emission inventory in China” by X. F. Yang et al.

Anonymous Referee #1

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General comments

Description: This manuscript describes development of a mobile source emission inventory for on-road freight traffic in China. The researchers gathered data from questionnaires and GPS units to estimate the fleet composition and typical speeds on different types of roads. The inventory included NO_x and PM_{2.5} and was built from kilometers of certain types of roads and corresponding distance-based emission factors. The resulting inventory was 28 percent higher for NO_x and 57 percent lower than the Ministry of Environmental Protection's estimates. Differences stemmed from simultaneous consideration of vehicle type, vehicle age, distance traveled on specific types of

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roads, and emission factors for specific types of roads. Maps showed that emissions were concentrated around areas of high population density but were also substantial along freeways and national roads.

Relevance: Diesel trucks are responsible for well over half of mobile source emissions of NO_x and PM_{2.5} in China, and both pollutants are highly problematic in many cities. The work contributes a detailed understanding of the age, activity, and emissions distributions of trucks on different types of roads, and results could lead to interventions to reduce on-road, freight-related emissions.

Assessment: The manuscript contains much useful, new data about diesel truck emissions in China. Indeed it seems much more sensible to apportion emissions spatially by the places where trucks are driven rather than where they are registered, although the more significant contribution of the work is information about driving conditions by truck type, age, and road type and how these factors influence the emission inventory. The writing and figures are clear, with a few exceptions, and the research appears to have been executed carefully.

Specific comments

1. (p. 15223, line 26) Clarify whether the classification of trucks into the four types was based on the 1060 questionnaire results or some other data source.
2. (p. 15224, line 2) “Because the MiniT population only consist of a very small proportion. . .” How small is this proportion?
3. (p. 15226, line 3) It would be useful to include in the supplementary information a table or figure showing the emission rates by operating mode bin.
4. (p. 15229, line 14) “. . .therefore meet the China 3 tailpipe emissions standard.” Provide a brief description of China's tailpipe emissions standards.
5. (p. 15233, line 2) “. . .long idling time without shutting down the engine. . .” The GPS data alone cannot reveal whether the engine is on or not. Does this claim stem from

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the questionnaires or some other observation?

6. (p. 15232, line 21) "The distribution of bins on each type of road is shown in Fig. 4. . ." Fig. 4 shows the proportion of running time on different types of roads by truck type and not the distribution claimed.

7. (p. 15233, line 8) ". . .urban or suburban roads where the driving conditions are relatively worse." Are suburban roads lumped together with urban roads?

8. (p. 15233, line 14) Please explain briefly the inputs and methods used by the MEP to estimate emissions so that readers can better understand the differences between the two inventories.

9. (p. 15233, line 15) "The NO_x number is a little higher than the MEP's estimation. . ." Calculate how much higher these NO_x emissions are relative to the MEP's inventory.

10. (p. 15233, line 22) The finding that NO_x reduction from diesel trucks was not as successful as expected seems worthy of being mentioned in the Conclusions section, for its policy-making implications.

11. (p. 15236, line 15) According to Figure 10, Henan ranks 3rd in NO_x emissions and 3rd in PM_{2.5}, not 3rd and 5th. Other claims in the following 10 lines are also not supported by the figure. A difference in ranking of one place does not seem like it would be significant.

12. (Figure 3) Much more explanation of the legend colors and pie charts is needed. Same comment for Figure 7.

Technical corrections

13. (p. 15223, line 18) Should "at all" be "all at"?

14. (p. 15224, line 1) "ton" should be "tons".

15. (p. 15231, line 17) Change "statistic" to "statistical".

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16. (p. 15235, line 9) Change "emission" to "emissions".

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