

Overview:

This paper provides an expanded approach to calculating truck freight emissions throughout China. New information from surveys and GPS measurements is provided and combined with extensive review of the literature to improve the state of this portion of this emission inventory.

Specific comments:

The abstract needs to be tightened so that more of the interesting findings and novel approach of this study are highlighted. Not so much background is needed in the abstract.

Page 15221 Line 8: "Compared with former studies..." Please provide some quantitative information about how emissions have shifted.

Page 15226: calculation of representative emission rate for each bin. Was this calculation done in this study, or was it done by the other studies cited here? Such a calculation is a major undertaking. If it was done for this study, then much more information is needed to describe the results. If it was done in another study, that should be made clear.

Page 15228, Line 17: "However, this research founded an acceptable empirical summary for trucks at different ages." Authors have not given any information about statistical validity. So, one cannot say that it is acceptable. If there is no other information, and the surveys provided here are the only data available, authors could say so.

Section 3.1: Activity level

A lot of valuable information is found from the surveys, and used in the emission inventory. However this information is not provided in the paper, and thus it is impossible for readers to take advantage of it, or to compare it with previous research. How much does mileage reduce as trucks age? Does this differ for different types of trucks? What is the survival probability for the different types of trucks in China? This information could be given in tables, even in supplementary information, but the basic information really needs to be provided. Figure 4 is a good example.

Some of this information could be gleaned from figures 3a and 3b. But the implied survival curves look odd. What is the reason for the large jump in 2009 vehicles compared with 2008? It implies that there was a huge purchase in 2009, or that vehicles retire within 3 years.

Section 3.2: Driving characteristics

The GPS data were taken on 16 trucks in 15 provinces (according to table 1). This means that 1 truck per province was tested, and about 30 hours per truck. I don't think this number of GPS data could be considered sufficient to characterize all of

China. It seems reasonable for this study, which is extensive in other ways, but it should be recommended that more GPS studies could be done. It seems likely that different truck sizes, cities, etc. could have different practices and perhaps the GPS data collected here do not fully capture these, especially idling time which is mentioned in the next section.

It is also not discussed whether the frequency of speed on different types of roads is the same for each province. I don't think it needs to be discussed here, but I encourage the authors to exploit the collected data in a later paper.

Section 3.4: effect of older truck mileage on inventory. This is an important point and it is nice to see it quantified.

Emission comparison between this method (distribution by roads, compared with registration province). This is also an important point. Is it possible to compare quantitatively as was done with the truck mileage? How much would each province differ under the traditional versus this method?

Also, I recognize that this distribution method is likely better. But it still contains significant uncertainty; I think it means that all roads are assumed to have equal congestion. It might be a better assumption, but it is still an assumption. Authors should state the limitations clearly.

Section 3.5 Uncertainty analysis: Table 3 gives the inputs but no support for why they were chosen! The uncertainties seem rather low. Please discuss which uncertainties were included, and which were not included.

Editorial comments

Page 15220 (the "printer-friendly" version)

Line 11: "long-range freight activities are complicated"—in an abstract, be specific about what kinds of complexity create difficulties in this effort.

Line 12: "much of the basic data remain unclear"—again, explain what "basic data" are

Line 12: "Most of" should be "Most"

Line 14: "conducting" is not an appropriate verb

Lines 18-20: Neither questionnaires nor GPS measure emissions, and thus, they cannot indicate anything about emissions. They could indicate that there *are* different driving conditions.

Line 26: “Depending on the results in this research”—You probably mean “Based on the results...” What does this sentence mean? Differences among emission factors for what?

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Line 3-5: “...different road infrastructure would have different impacts for NO_x and PM_{2.5} emissions.” I don’t understand this claim. It is true that different types of roads have different emissions, but one can’t simply replace urban roads with open highways, as they have different purposes.

Line 24: “Previous work has...” I do not think this sentence is necessary.

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Line 6: “where most research is studied...” I think you mean where most research occurred.

Line 9: “conclusions may be partly biased by placing excessive emphasis on the urban emissions.” This sentence is not supported, unless the studies on urban emissions have excluded the factors just cited. And in that case, the emphasis isn’t the problem.

Page 15224, Line 18: perhaps “when the engine of the truck under investigation is running”

Page 15221 Line 16 “particular matter” should be “particulate matter”

Page 15235 Line 3 “Pear” should be “Pearl”

Page 15235 Line 15 “greatest” should be “most”