

Interactive comment on “Black carbon, particle number concentration and nitrogen oxide emission factors of random in-use vehicles measured with the on-road chasing method” by I. Ježek et al.

Anonymous Referee #2

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This paper provides new insights of relevant emission factors (BC, NO_x, PN) over a significant/representative range of in-use vehicles and demonstrates, from experimental data, their dependence as a function of fuel type, model, age, power, etc. It shows consistencies with the few existing data available in the literature and highlights the major contribution of super emitters. This paper is well written (although it may benefit from few English corrections). Results are clearly presented (Figures, Tables). The general discussion is well organized and of good quality. I recommend this paper for publication after having addressed the few minor comments reported below.

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General comments:

- Few lines should be added to extend the added value of using the chasing method compared to other methods (remote sensing) and its potentials (in future).
- The authors have spent a lot of efforts to demonstrate that the fleet composition they have investigated is representative at a national/EU level. I do not understand the purpose. As long as you investigate a sufficient number of vehicles for every category (and get corresponding EF), there is no need here to mimic the fleet composition. Hence this section (2.3) may bring to the idea that the results shown in the paper are representative for every category of the fleet. This may not be the case given the limited number of vehicles investigated in some subcategories.
- More efforts should be put in the paper regarding uncertainties associated with 1) measurements, 2) the impact of limited number of investigated vehicles (e.g. representativeness). We have no idea how “stable” are emissions during the chasing phase. Although this technique is described elsewhere, it would help the reader to know more on how stable (representative) are emissions taken from one vehicle during the measurement phase.
- Aerosol size distribution may change from one type of vehicle to another (i.e. gasoline to diesel). This point was not discussed here but should be mentioned as it has some implication (for health for instance). Also can the author provide a reference to state that the mass absorption efficiency used here (i.e. the same for every type of vehicle) is not dependent of the aerosol size distribution (e.g. may not be biased by the type of vehicle investigated gasoline vs diesel).
- EF differences from one category to another are more in the range of tens of percent than orders of magnitude. The figures displaying EF should be consistent with this and should rather be in linear scale (and not log). Although I agree that box plots are relevant, the figures currently prevent from comparing easily medians (as discussed in the text). The same stands for the dispersion of EF values (Fig. 2); it is difficult here

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to evaluate here how far the super emitters from the median are. Last but not least, there are no 'statistical' discussions comparing average/median, dispersion (standard deviation), etc.

- The way the fleet is categorized here is not conventional. Although it is fully justified, correspondence with EURO is coming late in the paper. It should be earlier. The same stands for the reason why the paper is investigating the ratio of maximum engine power to vehicle curb weight. Explanations are provided but almost in the end of the paper.

- It would have been interesting to compare the EF results with those available for instance in COPERT (V4) which is often used to feed models dedicated to traffic emissions.

Specific comments and technical corrections :

- Is there another word to describe the fleet of "goods" vehicle? This term is not easy to understand (especially in the abstract).

- Be consistent through the manuscript when using hyphen (e.g. "real world" and "real-world").

- Several terms may not be adequate. For instance, "resemble" which is used 5 times in pages 15371-1732. "In this segment ..." (page 15373), "... arranging ..." (line 17, page 15377)

- Page 15362, line 17: "... the Slovenian vehicle fleets stills from the measurements ...". I do not understand this sentence.

- Page 15362, line 19. Probably a dot is missing after "region"

- Page 15363 line 11; "sizer" instead of "seizer"

- Page 15366, line 20. No end in the sentence "Emission factor measurement results"

- Page 15367 line 25. "... good agreement ...". It is more related to the representa-

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tiveness than agreement.

- Page 15374, line 29. I believe that the values taken here (0.7 and 43.95) were from Fig. 3. It should be better stated.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 15355, 2015.

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