

## ***Interactive comment on “Cost effective determination of vehicle emission factors using on-road measurements” by N. Hudda et al.***

**Anonymous Referee #2**

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The authors conduct a solid analysis of on-road data collected in different freeways of Los Angeles/California to obtain EF and ER in this area. It is important that issues like this analysis are raised and discussed to enable future research into real-world emissions in order to benefit from this kind of experience. However, certain details should be addressed to facilitate understanding of the research and possible limitations of the methodology employed.

1- As it is extensively reported in the article, the study captures the variability in EFs due to inter-vehicle differences (P18716L11, P18720L4 and P18724L5, Discussion Paper). The final results show very large deviations for some pollutants in some conditions. I suggest the authors to specify more exactly the causes of this variability depending on: a) Weather conditions. b) Background pollutant concentrations. c) Traffic conditions. I

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guess that in a highly congested traffic state, the variability of EFs will increase due to pollutant contributions from other vehicles. d) Quality of the plume or plume size. Absolutely critical aspect when conducting experiments with other methodologies (RSD). e) EFs variability due to speed and/or acceleration conditions (see point 3).

As soon as the possible external reasons for the variability of the emission factors are detailed and limited, it will be easier to conclude that there is variability in EFs due to inter-vehicle differences.

Nevertheless, I think it would be interesting in the EFs study (perhaps in a future article) to use OCR cameras for license plate recognition and to calculate EFs according to vehicle category (age, vehicles' engine technology, vehicle's weight class) and independent operating conditions of the vehicle (speed, acceleration, and slope).

2- Does this technique recognize high emitting vehicles? - If this is the case, what percentage of vehicles are high emitters? How high emitters contribute to EFs and ERs? - Otherwise, it must be recognized in the article that this is a limitation.

3- It would be interesting to find a correlation ( $R^2$ ) between the average speed for each segment and the emission factor. Although this is not the aim of this study, it could represent an important scientific contribution and could give very realistic data values as input in emission models.

4- According to what was said by referee #4, I find absolutely necessary to indicate how this methodology would be put into practice in a mixed fleet gasoline-diesel. Could this methodology be used in other places such as Europe?.

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