

Interactive comment on “Evaluation of mobile emissions contributions to Mexico City’s emissions inventory using on-road and cross-road emission measurements and ambient data” by M. Zavala et al.

M. Zavala

miguelz@mit.edu

Received and published: 14 July 2009

The authors would like to thank the reviewer for his comments and suggestions on the manuscript. We describe below the modifications made to the manuscript for its improvement.

This paper successfully analyses recent trends of mobile emissions in Mexico City. It also provides useful comparisons with other studies and data of latest Emission

C2849

Inventories. Based on these facts it should be accepted in the ACP journal. The authors seem to be experienced and well versed in different aspects of atmospheric chemistry, emissions measurements and car emissions, thus providing insightful conclusions. Nevertheless the following general comments should be considered:

1. - I think that the decrease in percentage of vehicles without emission controls thanks to the introduction of newer cars is as relevant as the rate of removal of older cars. It should be a two thronged policy. I disagree with the conclusion that the introduction of new cars with better emissions controls is not as relevant.

[Response] The decrease in the percentage of vehicles without emission control technologies occurs by the two reasons mentioned: the introduction of new cars and the removal of older cars. Our point is that, in terms of reducing mass emissions, a policy strategy aimed for a faster-than-normal removal of old cars would be highly efficient. Both effects are somewhat related because the removal of old cars implies faster introduction of newer cars and changes in transportation mode.

2. - Although the increase of Diesel sales relative to gasoline is a hard number, other reasons could add to the explanation on the increase of NO_x levels such as:

Proliferation of air conditioning availability in private cars in Mexico City. This adds to the burden (about 2KW) of internal combustion engines increasing NO emissions. NO removal efficiency of catalytic converters tend to decrease faster than for HC’s and CO. Related to this is the contents of sulfur in the gasoline of Mexico that may change the behavior and reduce the overall efficiency of catalytic converters. These issues are not commented in the text.

[Response] We thank the reviewer for suggesting these two points, we have added

C2850

them to the discussion of NOx variability in the revised manuscript.

3. - *The geographical distribution of brand and age of cars in Mexico City (as in many cities) tends to be inhomogeneous: affluent neighborhoods will have newer less polluting cars, with different CO, CO's and other ratios than in poor neighborhoods. This fact adds to the uncertainty of conclusions based on-road and cross-road measurements and in general to all efforts of obtaining EI. In the text it should be mentioned if the authors considered this aspect in their field experiments and if so how.*

[Response] That is absolutely true. Our study does not specifically explore that effect and a statement on that regard has been added. From a series of remote sensing measurements at four sites in Mexico (Schifter et al, 2003; 2005) we can observe that the measured emission ratios are consistently between the 95 percentile CI among the sites. It would be interesting to design an experiment to explore this topic.

Some specific comments are:

In the abstract paragraph 15 p.6364 overpredictions are expressed as a percentage and underpredictions as a factor. Same in paragraph 15 p.6381. Authors should be consistent.

[Response] Very often studies refer to over-predictions in that way, so we prefer to keep it as it is.

In paragraph 10 p.6365, and paragraph 5 p.6367 the authors should give numeric data when referring to contribution of pollutants in Mexico City by mobile sources.

[Response] We have included these emissions contributions in the revised manuscript.

C2851

In paragraph 5 or 10 p. 6366 the following reference on the topic of motor stress and emissions should be included: A Vehicle Emissions System Using a Car Simulator and a Geographical Information System: Part 1 – System Description and Testing Aron D. Jazcilevich, Alejandro García-Fragoso, Agustín García Reynoso, Michel Grutter, Ulises Diego-Ayala, Jim Lents and Nicole Davis Journal of the Air Waste Management Association, Volume 57, October 2007 Also a reference on this topic is the International Vehicle Emission Model of ISSRC, <http://www.issrc.org> currently being used to obtain vehicle emissions in Mexico City taking into account motor stress.

[Response] Thanks for the references.

In paragraph 5 p. 6371 are there or are there not sufficient data to compare emissions between 2003 and 2006? At some points the authors say there are and here they hesitate.

[Response] We have clarified that statement indicating that it is referring to the observed changes (not data) of on-road measurements of NO only.

In paragraph 10 p.6372 it is stated that VOCs increased 4.6 percent a year in Mexico City. This contradicts previous statements in the paper.

[Response] Please see our response for reviewer 1 on the same issue.

In paragraph 15 p. 6375 it should be revised: The sentence does not give a context of the aircraft measurements.

C2852

[Response] We have expanded the description of the aircraft measurements used for the comparisons of OA/CO ratios.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 6363, 2009.