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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterization of on-road vehicle emissions in the Mexico City Metropolitan Area using a mobile laboratory in chase and fleet average measurement modes during the MCMA-2003 field campaign" *by* M. Zavala et al.

Anonymous Referee #1

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Review of Paper acpd-2006-0017 "Characterization of on-road vehicle emissions in the Mexico City Metropolitan Area using a mobile laboratory in chase and fleet average measurement modes during the MCMA-2003 field campaign", by M. Zavala et al.

This paper presents a comprehensive set of emission ratios from MCMA-2003 field campaign utilizing a mobile laboratory. The data is original and interesting, the paper is well written and should be published. However, I have some serious doubts, if the

conclusions around the contribution from gas-colectivos are valid and if they are backed by data. During revision the author could consider the following points:

1.) Abstract: the abstract is very general. the authors could add some hard facts, i.e. highlight some data/results. 2.) Abstract: There is no sufficient data to draw a conclusion on "CNG-powered colectivos, are potentially significant contributors of NOx, and aldehydes in the MCMA", see comments below. 3.) page 4697, line 10-14: The authors should explicitly write what they have in mind regarding 'aerosol phase and very short-lived species', or delete this. Soot particles are certainly longer lived, and others might form at a later stage, however this is out of the scope of this paper. 4.) page 4702, line 20ff: gas powered colectivos are only 5% of the all colectivos, the conclusion this is a significant contribution to NOx (abstract) is likely exaggerated. What is the percentage of CNG versus LPG? If there is a significant share of LPG, you need to revise the text and talk about "LPG/CNG-colectivos". 5.) page 4706, 1. par.: You determine emission ratios. CNG has a lower CO2 emission per distance than gasoline. In the absence of some certification data of the colectivos, a rough estimation for passenger cars is (TtW): 168 g CO2 km-1 (gasoline), 132 g CO2 km-1 (CNG) (from WTW report EU 2005), i.e. from the lower CNG CO2 emission you can roughly explain the higher NOx, or aldehyde emission ratios. On a mole/mole basis you are right, however this is highly misleading. 6.) page 4707, li 11, Figure 3 shows emission ratios, not factors. You have used the emission factors from the other work to calculate and compare with your emission ratios. Perhaps, you want to considers converting your data to emission factors (per km), assuming fuel consumption. Then the NOx and aldehyde emission would also be seen in the right perspective. 7.) page 4709, 2. par.: A discussion of the high altitude in the MCMA and its impact on the poorer performance of combustion engines/catalytic converters is missing. 8.) page 4710, li 22: see above, you determine emission ratios and this conclusion is not possible from the presented data. 9.) page 4711 li 17: the impact of NH3 on secondary particle formation near roadways is possible, although this has to be modeled and compared to agricultural NH3 emissions. Secondary particle formation is out of the scope of this paper: remove

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sentence. 10.) Table 1: CPC: you do not show data. The given 'detection level' does not make sense 11.) Table 3: H2CO/CH3CHO units are ppb/ppb 12.) References: - Vehicle chase studies have been first reported by the U. of Minnesota (SAE 2000-01-2212) and Ford (EST, 37,4070 (2003) - Chitjian et al. (2000) is not open literature, compare Frazer/Cass EST, 32, 1053 (1998) (8800-10600 t NH3/year) - You need to compare with more engine dynamometer/ chassis dynamometer data: what are typical NOx and aldehyde emissions for a CNG, versus gasoline, versus diesel?

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 4689, 2006.