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Interactive comment on "Particle number, particle mass and NO_x emission factors at a highway and an urban street in Copenhagen" *by* F. Wang et al.

Anonymous Referee #2

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The paper reports the results of a four week monitoring program of particle number, mass and NOx concentrations at four sites in Copenhagen, aimed at estimating traffic contribution to these pollutants, as well as of particle mass and number emission factors. The experimental part of the work was carefully designed, which resulted in a good body of data that was extensively analysed and interpreted. The paper is well written. While this work does not contribute any specific new scientific knowledge, it contributes to a body of data on particle characteristics of traffic emissions in the urban environment. Since this knowledge is still somewhat limited, this paper is of a value and therefore, I recommend its publication after addressing several minor points outlined below.

In general, my main concern relates to the method for estimation of the emission fac-

tors. Firstly, in addition to the primary road next to the Copenhagen urban area kerbside station (the H.C. Andersons Boulevard), there are also some other roads close by, which would also contribute to the measured particles, however they were not accounted for (only traffic at the main road is accounted for). In addition, the traffic flow rate was not monitored in the study, but the Copenhagen municipality data was used. This data by itself is not comprehensive, only one or two days of monitoring. Without good quantification of the traffic flow rate, estimates of the emission factors are not very accurate. Additionally, if the background stations are too close to the roads in question, which may be the case here (at 200 m impact of the road is still present), the contribution from traffic is underestimated, and so are the emission factors.

Abstract, first paragraph, sentence: "In this study we further estimate...". What does "further" refer to? Has already some work been published based on this research?

Introduction Second paragraph, sentence: "In comparison, Jayaratne et al (2005) demonstrated a box model... ". This statement is incorrect, as Jayaratne did not use a box model, but carbon dioxide as a tracer in determination of particle number emission factors from heavy duty diesel emissions. This method is similar to the one employed by the authors of the manuscript: instead of CO2, they used NOx to account for dilution. A box model was used by another group of authors for estimating vehicle emission factors of urban fleet: Jamriska et al 2001, "A model for determination of motor vehicle emission factors from on-road measurements with a focus on submicrometer particles" in Science of the Total Environment. This model was later used by for example Morawska et al, 2005, "Quantification of particle number emission factors for motor vehicles from on road measurements" in Environmental Science and Technology.

Second paragraph, sentence: "Most of the above mentioned studies are based on a short period of several hours or several days of measurements...". Most but not all. For example the measurement duration at each of the sites in the above mentioned study by Morawska et al, 2005 was about three months, which is longer than in this work.

ACPD

9, C6940–C6942, 2009

Fourth paragraph. The aim of the work should be better formulated. Is this study aimed at improving methods for emission factor estimation (as it could be deducted from the comments expressed by the last sentence of paragraph two of the introduction), or at obtaining data on highway emission factors? If the later (which I think is the case), there needs to be better emphasised the need for this kind of knowledge.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 19545, 2009.