

Interactive comment on “Atmospheric number size distributions of soot particles and estimation of emission factors” by D. Rose et al.

Anonymous Referee #2

Received and published: 23 December 2005

Overall this paper brings an important contribution to our understanding of the sources, transformation and fate of the soot in European urban environment. It is well structured and in most of the addressed issues also clear and descriptive. However there are certain points, which need attention.

- At the very end of the paper authors claim that measured soot fractions can be seen as a standard for different polluted aerosols, seasons, or size ranges and could be used in future transport studies (p 10142, line 13-15). Here authors extend their observations too much. The approach they have used is widely applicable, but not the observations, which might be representative for Germany or countries with similar meteorology and similar structure of the car park. Therefore authors should on my opinion soften this

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

conclusion.

- Continuing on temporal level, it is not clearly stated when campaigns took place. From page 10138 one can derive that summer measurements took place during August and September, however information about traffic volume was derived from later periods. No information given about the time period for winter campaign. As far as I can see, at least ij of the summer period covered summer holidays. Did authors observed difference in soot concentrations and distribution compared to the rest of the period? If so, was it significant and taken into account?

- Unless it is shown that campaign periods represented well mean seasonal conditions or demonstrated long term data from Melpitz site for example, extrapolation on annual/seasonal basis should be avoided.

- Authors paid attention to explain differences between soot fractions observed during summer and winter periods at different sites. However, there are no error and uncertainty estimations for observations itself as well as for extrapolations they did to calculate soot fractions. Soot fraction was measured only at 4 sizes and then extrapolated over the whole size distribution measured with DMPS. Including the natural variability through summer and winter, which 4 week campaign cannot cover, are the reported differences (p. 10141 l. 9 and 10, p. 10132 l. 24 and p. 10133 l. 5) really significant?

- The average vehicle emission factor reported on p. 10142 l. 1 ($1.5 \pm 0.4 \cdot 10^{14} \text{ \#}/\text{km}^*\text{veh}$) is different from emission factor on p. 10138 l. 14. What is the difference?

- On Fig. 8 the mode of the soot emissions size distributions is the same for all kind of vehicles, however I would expect shift towards higher sizes in case of heavy-duty vehicles

- Fig. 7. Why the emission factor during working days is lower during morning hours compared to the night hours when share of heavy duty vehicles is larger during morning hours compared to the night and one might expect also more smooth flow traffic during

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

the night?

- Concerning the data from Saturday? Can authors at least shortly report why data are different and why they are omitted? Arguing that they are different and therefore we exclude them does not sound convincing

Minor comments:

- p.10133 l.15. Why authors use word probably? Heavy duty vehicles represent significant fraction of soot particles.

- Fig 4 will be also more informative is uncertainty levels will be shown.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 10125, 2005.

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper