**Atmospheric
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Discussions**

Interactive
Comment

Interactive comment on "Dispersion of traffic-related exhaust particles near the Berlin urban motorway: estimation of fleet emission factors" *by* W. Birmili et al.

Anonymous Referee #4

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General comments:

The authors present a very well written and well structured paper on a relevant topic containing an excellent dataset and comprehensive analysis. This work can certainly be recommended for publication in ACP after considering the following comments.

Specific comments:

Section 3.2 / Figure 3, the 'amazingly similar' structure of the size distributions in the background and distant background points more towards a regional phenomenon than to a local source (the plume from the highway should be substantially diluted between

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the two stations). This regional event could be the general background pollution in the city or even some 'regional nucleation event' Have such been observed during the measuring period?

Sections 4.1 and 4.4 are suggested to keep in the chapter on Dispersion modelling; switching 4.3 and 4.2 seems more logical.

Section 4.4 p.15556 l.12-16: The higher wind speeds in the simulations especially at the background side might be result of the too small roughness in the model. Fig. 1 indicates some trees that might substantially reduce the wind speed locally. The authors should discuss in the validity and consequences of the uniform assumed roughness (0.1m) in the model.

Figure 5.1 The analysis of the emission factors from background only (Figure 10b) could be skipped or should at least regarded as a kind of 'test' and discussed in the context of much higher uncertainties due to the much weaker signal in the measurements, much higher uncertainties in the model results and the assumption on the moving 24h minimum as background measure.

Section 5.1 p.15559. The drop of the emission factor around 13:00 might be caused by the additional dilution due to thermal instability during the sunny days. The model considers neutral temperature profile and might therefore underestimate the dilution, this again leading to lower emission factors. The authors might check the influence by comparing the diurnal variation of the emission factor on cloudy and sunny days and discuss the validity of the assumed neutral profile.

Section 5.3 /conclusion It is a bit surprising or not plausible that the two lognormal modes together $(1.5+3.3)e14$ km-1; give more than the double of the average emission factor $(2.1 e14$ km-1). Check this for consistency regarding the assumed equation, selection etc. Part of the reason could be the lower cut-off at 10nm, but this should be discussed and maybe the value for the nucleation mode for $>$10nm should be given as well.

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Technical corrections:

Figure 7. The A100 in black is very hard to distinguish from the other gray areas, maybe another colour could be used.

Figure 8 caption and Table 4 uses 'C' for the road side while the text and the Figure itself 'R' is used; this should be harmonised.

Figure 11. Why does the Weekdays curve not agree with the Eq.8 curve in Fig 10a? Both the shape of the curve and the absolute values of the emission factor do not match?! For the red and blue curves the colour changes between the thin and thick sections, this is probably not the intention.

Figure 12. The soot mode has in the figure legend an emission factor of 1.5 e12 veh-1 km-1 while in several places in the text and tables 1.5 e14 veh-1km-1 is used. This should be harmonised.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 15537, 2008.

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