Atmospheric Chemistry and Physics Discussions

Interactive
Comment

Interactive comment on "Correlation between traffic density and particle size distribution in a street canyon and the dependence on wind direction" *by* J. Voigtländer et al.

J. Voigtländer et al.

Received and published: 21 July 2006

We would like to thank the referee for his useful and insightful comments regarding this work.

We took the reference comments into regard in the following way:

"The introduction needs a slight revision to keep the flow of text and also reviewing relevant studies performed in other countries"

The introduction part was rewritten and more other studies were included in the reviewing part.

"The second and third paragraphs on page 4084 include a part of the results

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

EGU

and methodology. These two parts should be rewritten and moved to the corresponding sections"

We followed the proposal. The parts were merged into section 3.2.1.

"Section 3.1. can be merged in section 2.2.1"

We didn't follow this suggestion, because our traffic count results were measurements results and belong (in our opinion) therefore to the part of the results.

"The second and third paragraphs on page 4090 that discusses the correlations and traffic should be supported with a plot that illustrates and distinguishes between correlations with passenger cars and trucks. The authors claim that there were no differences between both correlations; reasonable reasons should be stated in their discussion."

As written in the manuscript, the error counting trucks were relative high. It varied between daytime and nighttime, but was about 25 percent, compared with manual counts. The reasons were shortly given in the paper. The high error, high correlation between passenger cars and trucks and the low number fraction of trucks (3-4 percent of all cars) were the reason, that no significant differences could be found. Because it is not possible to include a figure in an AC, only a small table with several values of SPEARMAN correlation coefficients between traffic volume and particle number concentration can be shown here (table 1).

"In section 3.2.2, where regression analysis was presented and discussed, the authors should refer to previous studies where they presented similar findings with respect to the clear dependencies of particle number size distributions on the wind parameter. Several studies were performed in Europe as well as in Scandinavian countries and North America."

We added more citations (e.g. Ketzel,2002).

"In section 3.2.3, figure 7 should be referred to at the same places where Figure

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Interactive
Comment

D_p [nm]	passenger cars	trucks
5.3	0.52	0.48
9.4	0.61	0.56
12.6	0.61	0.56
22	0.52	0.50
34	0.45	0.45
61	0.41	0.40
108	0.35	0.35
191	0.28	0.30
254	0.22	0.25
339	0.16	0.21
451	0.15	0.20
600	0.18	0.22
800	0.21	0.25

Table 1: SPEARMAN correlation coefficients between traffic volume and particle number concentration for several particle size bins.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

EGU

8 was mentioned."

The reference of fig. 7 was added.

"In the last paragraph in the results and discussion section, the authors should support their results agreement with CFD models in street canyons. References should be mentioned or an inclusion of simple model evaluation can be introduced in this study."

The CFD model, used in this paper, was originally developed for an educational work (Voigtlaender,2005) at the IfT. Of course, there already exist a large number of CFD models. The model has no advantages against other existing models, but is really limited.

The CFD-model was necessary and used to generalize the measurements of vertical wind speed, which took place at another time period (June-July04) than the traffic counts (Oct03-Mar04). We use our own model to test, if such an simplified model is able to describe the flow pattern inside the canyon. Qualitatively, it did it very well. The correlation coefficient between measurements and model was about 0.95. Thus, the model is useable for our application. We want to show, that with our measurements of horizontal roof wind speed we are able to estimate the vertical wind speed at the particle inlet in the street canyon. In the last fig. of the paper (fig. 10), measurements and calculations of vertical wind speed were compared.

"Consequently, after meeting these minor changes, the figures must be mentioned in sequential order."

We hope it was correctly done.

"In the final revision of the script, the author should fix few typos. Few to mention: P4048-line18, P4086-line20, P4090-lines1 and 3, etc."

Do the referee means 'through'? We use it instead 'to' to include the last month, respectively (e.g. Oct through Dec should include the month Oct, Nov and Dec). We

EGU

checked the manuscript again and hope, the number of typos is low.

"Figures and tables are readable, However, figure 2b is missing."

The figure was corrected, while the reference to figure 2b was removed.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 4081, 2006.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

EGU