

Home

Online Library ACP

- Recent Final Revised Papers
- Volumes and Issues**
- Special Issues
- Library Search
- Title and Author Search

Online Library ACPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact
Factor
4.865

ISI
indexed



[Volumes and Issues](#) [Contents of Issue 4](#)

Atmos. Chem. Phys., 6, 1021-1031, 2006
www.atmos-chem-phys.net/6/1021/2006/

© Author(s) 2006. This work is licensed
under a Creative Commons License.

Atmospheric number size distributions of soot particles and estimation of emission factors

D. Rose¹, B. Wehner¹, M. Ketzel², C. Engler¹, J. Voigtländer¹, T. Tuch^{1,3}, and A. Wiedensohler¹

¹Leibniz Institute for Tropospheric Research, Permoserstrasse 15, 04 318 Leipzig, Germany

²Department of Atmospheric Environment, National Environmental Research Institute, Frederiksborgvej 399, 4000 Roskilde, Denmark

³UFZ Centre of Environmental Research, Department of Human Exposure Research and Epidemiology, Permoserstrasse 15, 04 318 Leipzig, Germany

Abstract. Number fractions of externally mixed particles of four different sizes (30, 50, 80, and 150 nm in diameter) were measured using a Volatility Tandem DMA. The system was operated in a street canyon (Eisenbahnstrasse, EI) and at an urban background site (Institute for Tropospheric Research, IfT), both in the city of Leipzig, Germany as well as at a rural site (Melpitz (ME), a village near Leipzig). Intensive campaigns of 3–5 weeks each took place in summer 2003 as well as in winter 2003/04. The data set thus obtained provides mean number fractions of externally mixed soot particles of atmospheric aerosols in differently polluted areas and different seasons (e.g. at 80 nm on working days, 60% (EI), 22% (IfT), and 6% (ME) in summer and 26% (IfT), and 13% (ME) in winter). Furthermore, a new method is used to calculate the size distribution of these externally mixed soot particles from parallel number size distribution measurements. A decrease of the externally mixed soot fraction with decreasing urbanity and a diurnal variation linked to the daily traffic changes demonstrate, that the traffic emissions have a significant impact on the soot fraction in urban areas. This influence becomes less in rural areas, due to atmospheric mixing and transformation processes. For estimating the source strength of soot particles emitted by vehicles (veh), soot particle emission factors were calculated using the Operational Street Pollution Model (OSPM). The emission factor for an average vehicle was found to be $(1.5 \pm 0.4) \cdot 10^{14}$ #/(km·veh). The separation of the emission factor into passenger cars $((5.8 \pm 2) \cdot 10^{13})$ #/(km·veh) and trucks $((2.5 \pm 0.9) \cdot 10^{15}$ #/(km·veh)) yielded in a 40-times higher emission factor for trucks compared to passenger cars.

[Final Revised Paper](#) (PDF, 2013 KB) [Discussion Paper](#) (ACPD)

Citation: Rose, D., Wehner, B., Ketzel, M., Engler, C., Voigtländer, J., Tuch, T., and Wiedensohler, A.: Atmospheric number size distributions of soot particles and estimation of emission factors, Atmos. Chem. Phys., 6, 1021-1031, 2006. [Bibtex](#) [EndNote](#) [Reference Manager](#)

Search ACP

Library Search

Author Search

News

- Sister Journals AMT & GMD
- Financial Support for Authors
- Journal Impact Factor
- Public Relations & Background Information

Recent Papers

01 | ACP, 23 Dec 2008: Measurement of glyoxal using an incoherent broadband cavity enhanced absorption spectrometer

02 | ACPD, 23 Dec 2008: Single particle characterization using a light scattering module coupled to a time-of-flight aerosol mass spectrometer

03 | ACP, 23 Dec 2008: Corrigendum to "Modeling the effect of plume-rise on the transport of carbon monoxide over Africa with NCAR CAM" published in