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Urban aerosol number size distributions

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Abstract. Aerosol number size distributions have been measured since 5 May 1997 in Helsinki, Finland. The presented aerosol data represents size distributions within the particle diameter size range 8-400nm during the period from May 1997 to March 2003. The daily, monthly and annual patterns of the aerosol particle number concentrations were investigated. The temporal variation of the particle number concentration showed close correlations with traffic activities. The highest total number concentrations were observed during workdays; especially on Fridays, and the lowest concentrations occurred during weekends; especially Sundays. Seasonally, the highest total number concentrations were observed during winter and spring and lower concentrations were observed during June and July. More than 80% of the number size distributions had three modes: nucleation mode ($D_p < 30\text{nm}$), Aitken mode (20-100nm) and accumulation mode ($D_p > 90\text{nm}$). Less than 20% of the number size distributions had either two modes or consisted of more than three modes. Two different measurement sites were used; in the first (Siltavuori, 5.5.1997-5.3.2001), the arithmetic means of the particle number concentrations were 7000cm^{-3} , 6500cm^{-3} , and 1000cm^{-3} respectively for nucleation, Aitken, and accumulation modes. In the second site (Kumpula, 6.3.2001-28.2.2003) they were 5500cm^{-3} , 4000cm^{-3} , and 1000cm^{-3} . The total number concentration in nucleation and Aitken modes were usually significantly higher during workdays than during weekends. The temporal variations in the accumulation mode were less pronounced. The lower concentrations at Kumpula were mainly due to building construction and also the slight overall decreasing trend during these years. During the site changing a period of simultaneous measurements over two weeks were performed showing nice correlation at both sites.

[Final Revised Paper](#) (PDF, 1230 KB) [Discussion Paper](#) (ACPD)

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