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Concentrations and fluxes of aerosol particles during the LAPBIAT measurement campaign at Värriö field station

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Abstract. The LAPBIAT measurement campaign took place in the Värriö SMEAR I measurement station located in Eastern Lapland in the spring of 2003 between 26 April and 11 May. In this paper we describe the measurement campaign, concentrations and fluxes of aerosol particles, air ions and trace gases, paying special attention to an aerosol particle formation event broken by a air mass change from a clean Arctic air mass with new particle formation to polluted one approaching from industrial areas of Kola Peninsula, Russia, lacking new particle formation. Aerosol particle number flux measurements show strong downward fluxes during that time. Concentrations of coarse aerosol particles were high for 1–2 days before the nucleation event (i.e. 28–29 April), very low immediately before and during the observed aerosol particle formation event (30 April) and increased moderately from the moment of sudden break of the event. In general particle deposition measurements based on snow samples show the same changes. Measurements of the mobility distribution of air ions showed elevated concentrations of intermediate air ions during the particle formation event. We estimated the growth rates in the nucleation mode size range. For particles <10 nm, the growth rate increases with size on 30 April. Dispersion modelling made with model SILAM support the conclusion that the nucleation event was interrupted by an outbreak of sulphate-rich air mass in the evening of 30 April that originated from the industry at Kola Peninsula, Russia. The results of this campaign highlight the need for detailed research in atmospheric transport of air constituents for understanding the aerosol dynamics.

[Final Revised Paper](#) (PDF, 2708 KB) [Discussion Paper](#) (ACPD)

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