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## Mode resolved density of atmospheric aerosol particles

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**Abstract.** In this study, we investigate the mode resolved density of ultrafine atmospheric particles measured in boreal forest environment. The method used here enables us to find the distinct density information for each mode in atmospheric fine particle population: the density values for nucleation, Aitken, and accumulation mode particles are presented. The experimental data was gained during 2 May 2005–19 May 2005 at the boreal forest measurement station "SMEAR II" in Hyytiälä, Southern Finland. The density values for accumulation mode varied from 1.1 to 2 g/cm<sup>3</sup> (average 1.5 g/cm<sup>3</sup>) and for Aitken mode from 0.4 to 2 g/cm<sup>3</sup> (average 0.97 g/cm<sup>3</sup>). As an overall trend during the two weeks campaign, the density value of Aitken mode was seen to gradually increase. With the present method, the time dependent behaviour of the particle density can be investigated in the time scale of 10 min. This allows us to follow the density evolution of the nucleation mode particles during the particle growth process following the nucleation burst. The density of nucleation mode particles decreased during the growth process. The density values for 15 nm particles were 1.2–1.5 g/cm<sup>3</sup> and for grown 30 nm particles 0.5–1 g/cm<sup>3</sup>. These values are consistent with the present knowledge that the condensing species are semi-volatile organics, emitted from the boreal forest.

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