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Interactive comment on "Characterization of air ions in boreal forest air during BIOFOR III campaign" *by* U. Hõrrak et al.

Anonymous Referee #2

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First I want to throw the light upon the content of the present paper in the following:

Hõrrak, Salm, Mäkelä, Laakso and Kulmala show in their article number acpd-2005-0026 "Characterization of air ions in boreal forest air during BIOFOR III campaign" the behavior of the concentration of positive small air ions and naturally charged nanometer aerosol particles on the basis of measurements carried out in a boreal forest. Atmospheric ions are very dependent on the particle distribution and this has been studied during the last decades. The authors have choosed a very good method for the coninuous determination of the properties of small ions. Statistical characteristics of the concentrations of cluster ions and the quantities that determine the balance of small ions in the atmosphere have been given for the nucleation event days and non-event

days. The dependence of small ion concentration on the ion loss, here they indicated this as a sink, due to aerosol particles, was investigated applying a model of bipolar diffusion charging of particles by small ions. They showed that small ion concentration and the ion sink were closely correlated when the fog events and the hours of high relative humidity, as well as nocturnal calms and weak wind had been excluded. In the case of nucleation burst events, variations in the concentration of small positive ions were in accordance with the changes caused by the ion sink due to aerosols. Their study of the charging state of nanometer aerosol particles revealed a strong correlation between the concentrations of particles and their charged fraction during nucleation bursts. The estimated charged fraction of particles confirms that these particles are almost quasi-steady state charged.

The interpretations and conclusions in the paper seem to be adequately supported by the presented material and the paper shows new results. The paper is also clearly and concisely written and the abstract clearly and concisely summarizes the paper and states the main result. The number of figures and tables are sufficient. The tables contain a lot of useful statistics.

The authors give a reference (Aalto et al., 2001) in explaining method of ion measurements. It would be valuable if the authors can give little more information on the methods and the measurement site.

I have no possibility to express how appropriate the use of the English language is in the article.

As a conclusion I think the article represents a substantial contribution to the scientific progress and the methods used are valid. My opinion is, therefore, that the manuscript is worth a publication.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 2749, 2005.

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