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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Factors influencing the contribution of ion-induced nucleation in a boreal forest, Finland" *by* S. Gagné et al.

Anonymous Referee #2

Received and published: 5 March 2010

Overall comment:

The paper describes a vast set of field site measurement data on ultrafine particles. The particles have been measured by a DMPS instrument with and without a radioactive neutralizer, obtaining fairly high time resolution data on the electrical charging state of the particles. The IIN vs. neutral nucleation is concluded to vary with the temperature, solar radiation and humidity. The dataset and the conclusions which have been made here should be published, but this manuscript should be slightly improved to meet the quality of the dataset itself.

Specific comments:

Why were the days when different polarities did not agree, discarded? I would as-

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sume that appearance of the case one polarity being overcharged and the other undercharged, would give exceptional information of the unbalance of the IIN of different polarity. The whole assumption is that the particles remain charged after being nucleated by IIN. And, did the discarded days have temperature difference in respect with any other group of data?

Row 358 states that 'NAIS data came only from spring days'. The reader is confused. So, NAIS was not measuring the whole period of 2 years 7 months? Please, make a clear summary of the measurement periods for different instruments.

The temperature averages of the event days differ for overcharged and undercharged, as shown by Figs 3a and 3b. But, also the time of year i.e. the seasons when they occur, are different. Please specify, again, which fraction is actually assumed to be driven by the temperature and which fraction by the season. Can the method of Fig 3b be repeated for solar radiation and relative humidity as well? Frankly speaking, I'm not fully convinced of the plain temperature difference being the main reason, just based on Fig 3b. Isn't the seasonal variation still somewhat 'built in' in the data presented in Fig 3b, although the (arithmetic) delta T is considered? Undercharged events do occur on seasons which tend to be colder, right? To my opinion, it should be stated already in the abstract that yes, IIN was higher on warmer and sunnier days, but also a clear seasonal difference was found, even slightly updated from results by Gagne et al Tellus 2008.

Minor comments: Row 108 supposed to read: "...two plain aspiration-type DMAs" Rows 356- 358 Unclear sentence ending with 'that'. Row 587 McMurry, P.H. Row 573 McMurry, P.H. Row 692 supposed to read ". . . new particle formation events. "

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 25799, 2009.

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