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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The role of atmospheric ions in aerosol nucleation – a review" *by* M. B. Enghoff and H. Svensmark

M. B. Enghoff and H. Svensmark

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Thank you for the critique of our paper. Please find our answers below.

Comment: "The summary is too brief. It is important and necessary to have a more detailed summary to describe the main insights obtained from the review of various publications relevant to the topics of ion-induced nucleation. More specifically, the authors should address the following questions in the summary section: (1) What is current knowledge about the role of ions in aerosol formation? (2) What are the evidences supporting or against the importance of ion-induced nucleation in the atmosphere? (3) The authors pointed out both in the abstract and summary that 'the exact mechanism for the nucleation is not known'. What does the statement refer to?"

Response: We agree that the summary could be more detailed. In the final version we

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will extend it and attempt to cover the questions raised by the referee in more detail.

Comment: "Page 7482, lines 9-10. It has been pointed out in Horrak et al. (ACP, 8, 655, 2008) that 'an extra ion loss term of the same magnitude as the ion loss onto aerosol particles is needed for a quantitative explanation of the observations. This term is presumably due to the small ion deposition on coniferous forest.' The work of Horrak et al. should be discussed here."

Response: A good point. An additional loss mechanism in Eq. 1 on p. 7481 will lead to a higher calculated value for the ion production, thus making the calculated value more in line with the observation.

Comment: "(2) Page 7483, lines 3-4. As I understand, '26%' and '22%' refer to the percentage of total analyzed days (including event, undefined, non-event days). It will be more useful to give the percentage of EVENT days that were associated with positive and negative ions."

Response: You are thinking of comparing the number of event days for charged particles as measured with the BSMA with the number of event days measured with the DMPS-system, as reported by Dal Maso et al (Bor. Env. Res. 10, 323-336, 2005)? According to table 2 of the discussed Hirsikko et al paper there is an overlap between BSMA and DMPS event days of 74 out of 102 DMPS event days for the first year of analysis and 95 of 111 and 60 of 73 on the following years. We will try to incorporate this in our discussion of the paper.

Comment: "(3) Page 7489, line 14. Should add another item '(4) scavenging by pre-existing particles' "

Response: This will be done.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 7477, 2008.

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