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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Atmospheric ice nuclei in the Eyjafjallajökull volcanic ash plume" *by* H. Bingemer et al.

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We thank the referee for his/her valuable comments.

»Referee: In the abstract it is mentioned that high concentrations of ice nuclei were detected with activation temperatures as high as -8C. In the method section it is stated that ice nucleus concentrations were measured at 3 different temperatures between -18C and -8C and with RH ice at 103% and 119%. This raises a number of questions. 1. So far as I can see results are only discussed in detail for -18C and water saturation including the data presented in table 1 and figures 1,3 and 4. How did the results differ for -8C and intermediate temperature and at the different relative humilities. What were the number concentrations of ice nuclei and was their composition any different ? These results need to be presented.

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Interactive Discussion

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REPLY: a) We have added data on the IN number as a function of temperature to chapter 3, and compared our freezing temperatures with the data of Durant et al. (2008) and Schnell et al. (1982), to which they agree very well.

» Referee's point 2: It is stated in the text that first nucleation was at -8C. Even a very few ice nuclei acting at temperatures slightly warmer than this can be very important because of the importance of secondary ice crystals produced by the Hallett-Mossop process. Were the authors definitely able to eliminate the existence of any ice nuclei active at even warmer temperatures in this study ? «

REPLY: Our statement on " . . .first nucleation at -8°C . . ." was misleading, and was corrected to "Minus 8°C was the highest temperature at which we processed samples in FRIDGE. Ice was observed in each of these samples. We cannot exclude the existence of ice nuclei active at even warmer temperatures than -8°C".

»Referee: The discussion of the implications of the results in the final paragraph is very brief and qualitative. Ideally I would like to see the results incorporated into a parcel model particularly as the results do have important consequences for the glaciation processes in many clouds including an impact on secondary ice. However, I accept that the results presented, if extended to cover a wider temperature range do represent an important contribution without modelling studies. «

REPLY: We agree to the referee's view. Information on IN numbers for the lower temperature has been added to chapter 3.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 2733, 2011.