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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.

Anonymous Referee #2

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This paper presents some interesting results concerning very high numbers of ice nuclei detected within the plume from this eruption. The association of the high IN concentration with the plume from the volcano is convincingly shown and the techniques to detect the ice nuclei are sound and established. I recommend publication subject to some additional results being provided. The paper is very brief. 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 and intermediate temperature and at the different relative humilities. What were the number concentra-

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tions of ice nuclei and was their composition any different ? These results need to be presented. 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 ?

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.

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