

Interactive comment on “Ice nucleation properties of fine ash particles from the Eyjafjallajökull eruption in April 2010” by I. Steinke et al.

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A well elaborated AIDA laboratory study is presented. Unique results of the influence of volcanic ash particles on heterogeneous ice formation are discussed.

I have only three comments (suggestions):

(1) Please do not forget to mention LIDAR in the Introduction section. LIDAR is the work horse with respect to volcanic aerosol monitoring (e.g., Jaeger et al., JGR, 2005, Mattis et al., 2010 and all the references in these papers). Only powerful lidars (in contrast to ceilometers) provide a rather detailed view of volcanic ash layer distributions and can detect traces of volcanic ash and sulphate aerosol up to 30 km height. This potential is especially required with respect to cloud research (and the study of the impact of

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traces of ash on cloud ice formation, Seifert et al., JGR, 2011, in press).

Eyjafjalla-related LIDAR publications are: Ansmann et al., GRL, 2010, JGR 2011, Gross et al., Atmos. Env., 2011, in press, Wiegner et al, Phys. Chem. Earth, 2011, Gasteiger et al., ACP 2011, Mona et al., ACPD, 2011,....., and many others submitted to be published in the Eyjafjalla special issues in Atmos. Env., JGR, and probably in the upcoming ACP special issue.

(2) Now: The paper of Seifert et al. (JGR 2011, JGR webpage, paper in press) dealing with the influence of the Eyjafjallajökull volcanic ash on heteroeogenous ice formation in ‘real world’ tropospheric clouds is available at the JGR website. The Seifert study is based on lidar observations at Leipzig and Munich in April 2010.

I recommend to discuss these observations and compare the findings with your laboratory studies. The lidar observations clearly show the strong impact of contact freezing. Not only immersion and deposition freezing take place in the atmosphere as one may conclude from the discussion in your paper. On the other hand, how can you be sure that contact freezing does not take place in your laboratory experiments? Freezing temperatures of -10C point to contact freezing according to the study of Fornea et al.

(3) In the conclusion section (a bit late to start such an important discussion in the conclusion section) IN number concentrations from FALCON aircraft observations are discussed. Seifert et al. (2011) also provides estimation of IN number concentrations, could be used in this discussion, too.

All in all, a very good paper!

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