**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "The impact of the 1783–1784 AD Laki eruption on global aerosol formation processes and cloud condensation nuclei" by A. Schmidt et al.

Anonymous Referee #1

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Review of "The impact of the 1783-1784 AD Laki eruption on global aerosol formation processes and cloud condensation nuclei" by Schmidt et al.

The authors used an aerosol microphysics model, called GLOMAP, implemented in a chemical transport model TOMCAT. Using this coupled model, the authors simulated the effect of the 1783-84 Laki flood lava eruption on aerosol (microphysical) properties. This study provides additional findings in the impact of the Laki flood lava eruption and so I recommend the paper for publication. However, I don't find the findings in the paper particularly interesting.

1. The findings added by the present study are meaningful if the chosen model deliv-

ers accurate simulations. The paper does not provide any solid investigation into the accuracy of the model. When GLOMAP-TOMCAT uses current aerosol emission, for example, can it realistically simulate the observed aerosol in the atmosphere? Does the model capture the observed vertical profile of aerosol? Does the model locate aerosols with respect to cloud as well as the observation?

2. The authors compare their findings with those in previous modeling studies by Stevenson et al. (2003) and Oman et al. (2006a), in section 3.3.1. First, I recommend that the comparison be made in a way that readers can better understand the overall difference. A table is a good option. Second, is GLOMAP-TOMCAT more accurate or less accurate than the other models? Just using a different model is not particularly interesting, though the chosen model gives information on aerosol microphysical properties.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 3189, 2010.