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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Airborne observations of the Eyjafjalla volcano ash cloud over Europe during air space closure in April and May 2010" *by* U. Schumann et al.

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We thank for the positive comments and constructive critics given by the reviewer.

We accept the point that parts of section 3.4 are too detailed. At the time of writing some of the details were more important than they look today, 7 months after the event.

We also agree to the suggestion that any support by other observations should be presented in addition. We will try to do so as much as possible; details depend on material available in other papers and on cooperation with colleagues.

The reviewer also raised several issues under the heading "Details" (we agree on those

not explicitly addressed below):

Introduction: The maximum plume altitude of 15.2 km for Kasatochi is cited form the paper Schmale et al. (2010).

Section 2.1.3: The impact of particle shape on the retrieval uncertainty was discussed in Section 3.2, page 22157, lines 11-15. We will refer to this discussion earlier.

Section 3.1: The D_eff definition was correct as given in the paper. Note, that we refer to the projected cross-section area A = pi*r*r, not to the surface area S= 4*pi* r*r.

Section 3.3 and first part of Section 4.1.: This is an important suggestion. We will discuss this comparison with our Lidar colleagues and will see what we can do without extending and delaying the paper too much.

Page 22178. In the geometrics optics limit, i.e. for Q_eff=2, the volume/extinction ratio equals 2 D_eff / (3 Q_ext). Hence, any difference in this ratio between various analysis results is basically a consequence of different D_eff values. Apparently, our D_eff values are larger than those implied by the results of Ansmann et al. (2010) and what the reviewer concludes from AERONET data. Also the results of Gasteiger et al. (Atmos. Chem. Phys. Discuss., 10, 26705–26750, 2010) on D_eff and on the ratio of mass concentration to extinction coefficient go into the same direction. This suggests again that the lower bound mass concentration and D_eff results are the more realistic ones. We will discuss this in the revised paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 22131, 2010.