Atmos. Chem. Phys. Discuss., 12, C1793–C1794, 2012
www.atmos-chem-phys-discuss.net/12/C1793/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "French airborne lidar measurements for Eyjafjallajökull ash plume survey" *by* P. Chazette et al.

Anonymous Referee #1

Received and published: 23 April 2012

As I can read from the second reviewer's comments, a big effort must really be put into addressing depolarization.

I would recommend better quantifying the possible errors, by propagating the influence of the uncertainties on the Brewster plate characteristics. The 1% error on Tpar becomes a 7% and 20% error on (1-T1par)(1-T2par) for the two systems, respectively. This translates in a 5% and 15% uncertainty on Rc. Same uncertainty on VDR. Therefore a 2% overestimation (your answer to point 5) seems reductive a should be revised. Note also that the "better" system (the one with Tpar = 0.9) is affected by the largest relative error.

When you align the Brewster plates, maximizing the Rayleigh scattering signal, what is your estimated positioning difference, in degrees, with respect to the laboratory de-

terminations at 56 degrees? Have you got an estimate of how this difference will affect Tpar? This could increase the above 1% uncertainty on Tpar, and then your error on VDR would grow proportionally, and could explain the difference with lidar measurements by other groups.

I think that the paper discusses some important measurements, and moreover it describes one of the available commercial lidar systems in Europe, with which several recent publications on volcanic ash have appeared. For these reasons, I think that it has the potential for being accepted for ACP.

In my opinion, the condition for acceptance is that the authors include the answers to all the questions raised by this online discussion into the article, put the necessary caveats, and estimate the uncertainties.

Regards.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 6623, 2012.