Earth Syst. Sci. Data Discuss., 4, C8–C9, 2011
www.earth-syst-sci-data-discuss.net/4/C8/2011/

Earth System
Science Data
Discussions

Interactive comment on "Observations of the altitude of the volcanic plume during the eruption of Eyjafjallajökull, April–May 2010" *by* P. Arason et al.

L. Mastin (Referee)

lgmastin@usgs.gov

Received and published: 9 July 2011

This paper describes data on the height of the Eyjafjallajökull volcanic plume in April and May 2010 as measured by the Icelandic C-band radar and a nearby webcam located at Hvolsvöllur, Iceland. I've heard much informal discussion and some uncertainty among volcanologists regarding how plume heights measured by nearby radar systems might compare with other measurements. This is the first systematic comparison of radar with visible plume heights that I know of, and for this reason it is worthy of publication. The paper is well organized, clearly written, not overly long, and contains figures that are clear and well described. I have only a few minor suggestions for im-

provements before it is published: 1) The abstract should contain a few sentences that describe the results of the comparison. 2) In Section 2.1 and perhaps in Table 1 there should be some mention of the time taken per revolution of the radar beam. There should also be a few sentences in Section 5 about the meaning of "simultaneous", when webcam images are being compared with radar plume heights. The webcam images are taken more or less instantaneously, but the radar echo-top heights are presumably constructed by combining scan angles which could be separated by minutes. If it takes the radar beam a minute or so per revolution, is it possible that the plume height changed significantly during the time of a single reflectivity scan? Over what time scale was the plume height observed to vary when directly observed? (I've heard that such observations have been noted). 3) In section 3, the authors note that the top of the plume was sometimes 5 km downwind of the summit. Can you confirm this? I've heard other members of IMO mention that the highest point in the plume was sometimes tens of kilometers downwind. 4) I've heard some volcanologists express uncertainty about whether a white, ash-poor plume would be visible in radar images, or whether the white, vapor-rich top of an ash-rich plume would be recorded as a radar plume top. Does this dataset contain any observations that could address these questions? 5) In Figure 9, the triangles and pluses are sometimes hard to distinguish from one another. Enlarging the triangles would make them easier to differentiate.

I have also checked the online dataset and found it to be well organized and well documented. Overall I think this manuscript is in good shape and will make a valuable contribution to the literature.

Please also note the supplement to this comment:
http://www.earth-syst-sci-data-discuss.net/4/C8/2011/essdd-4-C8-2011-supplement.pdf

Interactive comment on Earth Syst. Sci. Data Discuss., 4, 1, 2011.