

Interactive comment on “Two weather radar time series of the altitude of the volcanic plume during the May 2011 eruption of Grímsvötn, Iceland” by G. N. Petersen et al.

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Received and published: 6 September 2012

[GENERAL COMMENTS The paper is clear and interesting. Having simultaneous, comparable data from two instruments for the same eruption is rare, and the data may be used to illustrate not only the properties of the eruption but also properties of the instruments.

SPECIFIC COMMENTS Even though technical properties of Keflavik radar have been described in previous papers, it would be useful to see them in similar format to Table 1 of mobile X-band radar. For both radars, and for pulse durations of the X-band radar, a minimum detectable signal (MDS) would be interesting to see. It is usually given as a

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standard number at 1 km distance, but here calculation to the eruption distance would be more appropriate. It is also possible to calculate, at which distance the MDS meets the selected threshold of -20 dBZ.]

There is a similar table in Arason et. al (2011) for the C-band radar and we have now referred directly to that table. However, if the editor feels that the table should be reproduced here we would be happy to do so.

We thank the reviewer for noticing the absence of MDS. We have now included the MDS value for the X-band radar in Table 1 and the C-band MDS value in the text with discussion. With hindsight it is apparent that the choice of the threshold value for echo tops is too low, given the MDS. However it does not affect the estimates of echo tops. We have added this discussion to the text.

[I agree with the authors that ideally higher resolution volume data could potentially give information about the concentration and size distribution of particles, which is important for downstream dispersion analysis and forecasts. Even from this dataset, it would be interesting to see the dBZ values in a cross-section of the measurement volume ("VCUT" or "Pseudo RHI") to see the shape of the plume.]

The default configuration of the X-band radar turned out to be insufficient for recording the highest reflectivity from within the plume. Therefore data was lost and vertical cross sections are not complete. Thus VCUT will not show the highest dBZ values and such cross sections look confusing. The Icelandic Meteorological Office is now aware of this problem.

[In the dataset, the missing values are indicated within the dataset with "1000", "2000". I would prefer to see them labelled just not available (N/A) and then the quality / explanation flags in a separate column of the table. This would increase the data volume but it is not huge at the moment, and it would make the processing of the data easier and to avoid misinterpretations. (In my experience, this is the 21st century style, when data volumes are not so crucial. But I am not familiar with the conventions of this journal.)]

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The use of the code “1000” for the plume-top being below radar detection height and “2000” for plume-top altitude could not be determined due to precipitating clouds was used to make the format of the data sets identical to the ones from the eruption of Eyjafjallajökull in 2010. It is true that the same information could also be shown with “N/A” and an explanation column. If the editor believes that to be a more suitable method we would be more than happy to amend the data format, but otherwise we would like to keep the original format due to the reason stated above.

Interactive comment on Earth Syst. Sci. Data Discuss., 5, 281, 2012.