

Interactive comment on “Spatial structure and dispersion of the 16/17 April 2010 volcanic ash cloud over Germany” by S. Emeis et al.

Anonymous Referee #2

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This investigation presents data from remote sensing observations used to evaluate the dispersion and structure of the ash cloud from Eyjafjallajökull, which has been simulated with a numerical model. The volcanic origin of the observed plume was confirmed by the depolarization ratio obtained from a multi-wavelength Raman Lidar, the properties of aerosols and gas concentrations detected in selected ground stations and a flight onboard an ultralight aircraft. The manuscript presents relevant information concerning the propagation speed and vertical structure of the plume and should therefore be published. As Flentje et al. 2010 has pointed out, this work highlights the importance of using a network of ceilometers for the surveillance of such events but go a step forward and use this information to evaluate their model results. However, the

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following changes should be taken into consideration:

Major comments

- 1) The text should be thoroughly revised for English by a native speaker in order to improve the sentence structures, grammar and make it easier to read.
- 2) It seems to me that Table 1 can be omitted and the information contained in it can be incorporated to the first paragraph of p 26121, where it has already been partly included.
- 3) It is somewhat unclear what the role of section 5.2 is concerning the results from the ultralight aircraft. Does it really support that section on the "analysis of the temporal and spatial structure of the cloud"? To me it belongs more in chapter 4 because, although the results are rather inconclusive, it seeks further support for identifying the volcanic nature of the cloud. Please clarify and change accordingly.
- 4) The figures should be significantly improved in terms of quality and label sizes, particularly figures 1, 3, 4 and 6. There is no label for the y-axis of figures 6 and 12. The authors should consider placing the Innsbruck profile (Fig. 8), as well as a cut with equivalent x and y ranges of Figure 12, within the series of profiles in Figure 7. This figure would then need a common label and would then facilitate the comparisons expressed in the text.
- 5) I don't really see a point of showing both maps in Figure 11 with different model resolutions. It is said in the text that not much is gained by simulating in a smaller grid, at least in the horizontal. However, significant improvements are expected in the vertical if the resolution is increased. The effort should be made to show this improvement maybe only for the relevant 1-day run (17 April) and shown as a time-height plot.

Minor corrections

- p 26118, l 4: remove "with" from the sentence.

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- p 26118, l14: should read "Comparison of the model results with ..."
- p 26118, l25: should read "...impacts and the technical degradation of specific instrumentation such as jet aircraft turbines."
- p 26119, l 1: is it meant "...now and then"?
- p 26119, l 7: "...has led several times to..."
- p 26119, l16: "...was after the eruption of..."
- p 26119, l20: is it meant "1.5 million"?
- p 26119, l22: "...were emitted during this period"
- p 26121, l 2: title, "2010 Eyjafjallajökull activity"
- p 26121, l21,23 : revise usage of the word "trough"
- p 26122, l 7: space missing "Europe and"
- p 26122, l22: unclosed bracket
- p 26123, l 4: specifically, the ratio of which two parameters is meant?
- p 26123, l 6: range is correct? Data for MULIS in the plot (Fig.2) is shown up to 3500 m
- p 26124, l13: "Measurement of gases and aerosol properties..." (SO₂ is mentioned in the same paragraph)
- p 26130, l 1: "...definitely not from volcanic origin"
- p 26133, l 6: period missing
- p 26136, l 1: "unpredictable, but ..."

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