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Interactive comment on “Influences of the 2010 Eyjafjallajökull volcanic plume on air quality in the northern Alpine region” by K. Schäfer et al.

Anonymous Referee #3

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In this paper, the impact of the volcanic ash plume in April 2010 on air quality in the region of Southern Germany and parts of Austria is comprehensively described. The paper is a bit lengthy but good to read and provides detailed information about this event. The paper certainly fits well into the Eyjafjallajökull special edition of ACP and should be published after minor revisions as suggested below.

Comments: In the meantime, a paper about measurements of the volcanic ash plume in Switzerland has been published in ACPD (Bukowiecki et al., 2011). It would be good to refer to this paper (e.g. at page 9096, lines 15–18, and at page 9107 lines 21/22). In addition, the results for the mass concentration of volcanic ash estimated for sites in Southern Germany (page 9000, lines 27–30 and page 9001 lines 1–2) should be compared with similar estimations for Mulhouse (France) by Colette et al. (2010) and

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The discussion about the impact on the volcanic ash plume on accumulation mode particles remains unclear and contradictory. At page 9102, line 23 the authors write that “the mass concentration of smaller particles (0.1-1um) was not increased”. At line 25 the authors say that “The small increase of this accumulation mode particles ...”, and at page 9103 at line 3 it is stated that “This is also corroborated by a small increase of accumulation mode particles”. These statements are conflicting and need to be changed. There is also no graph which shows the evolution of accumulation mode particles. This would of course help as well.

At page 9109 lines 20and 21 it is stated that “... the transported mass of particles in populated areas was largely in the size range between 2.5 and 10um. This is not clear from the presented data and the shown Figures (can e.g. not be clearly seen from Fig. 11a). It would be worth to present this more clearly as this is an interesting result.

Figs. 5 and 10 should be printed large enough so that the text and other information can be read. Especially Fig. 10 contains a lot of information and should be easily readable.

Page 9095, line 12: The word “down” can be deleted here.

Page 9098, lines 1 and 2: “The number of larger particles (PM1, PM2, PM4, PM5 and PM7.5) however increased significantly”. This phrasing is somehow confusing, PMx is typically associated to mass concentrations and not particle number concentrations and do in any case include the particles smaller than the given cut-size. The sentence should be changed, e.g. give the corresponding size bins in brackets.

Page 9098, lines 4/5 and line 25. Please provide the time resolution of the discussed SO₂ peak values (hourly or daily values?). Similarly on page 9099, line 7: Should be changed to “The composition of daily PM10 samples ...”.

Page 9100, line 13. It is stated that different elements are enriched, without defining

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what enrichment means. A definition of the used concept of enrichment is given in the legend of Table 2, I would appreciate a similar sentence here as well.

Page 9102, line 22 and following lines: This section is unclear and should be changed. The authors write that “PNC is essentially pronounced for particle sizes larger than 1um (Fig. 11a)”. The sentence itself makes not much sense, and referring to Figure 11a helps not much as in Figure 11a particle mass is shown (PM) and not PNC. In Figure 11b the label on the y-axis states “BC”, should be changed to “Sulphate”.

Page 9102, line 29: The words “was observed” should be deleted.

Page 9104, 1st line: “the dewpoint declined from about 1500m ...”. This sentence should be corrected because of the wrong unit for dewpoint.

Page 9104, lines 18: “very small aerosols” should be changed to “very small aerosol particles”. Again on page 9105, line 5.

Page 9104, lines 19: Should be corrected, the given size range in Figure 7 is 10-30nm not 10-20nm as stated here.

Page 9105, line 10: Should be in past tense, change to “dominated”.

Page 9106 lines 13/14: The elevated observation sites listed include IBK (570m a.s.l.). This is probably an error.

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