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Atmospheric Chemistry and Physics Discussions

Interactive comment on "In-situ physical and chemical characterization of the Eyjafjallajökull aerosol plume in the free troposphere over Italy" *by* S. Sandrini et al.

Anonymous Referee #2

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The manuscripts gives a quite complete description of the characterization of two Eyjafjallajökull aerosol plumes detected at the climatological station of Monte Cimone, in the Italian Appennines. This is one more study on the same subject but has some peculiarities (site latitude and height, PM speciation) which, in my opinion, make it interesting and suitable for publication in ACP. The overall quality of the manuscript is good however I recommend to consider the following points/issues:

1) Pag. 5, line 16: actually the MAAP measures the aerosol absorption coefficient which is usually indicated with babs while sigmaabs is fixed in the MAAP at the value of 6.5 m2/g

2) pag 7, line 1-5: this is my major concern. The list of elements measured by PIXE/PIGE includes those for Na to K which determination by X ray fluorescence techniques is very complex when the PM is collected on quartz fiber filters (reasons are the tails of the huge Si peak and the X-ray self-attenuation in the filter thickness). As a matter of fact is nearly impossible a reliable quantification of these elements in the experimental conditions quoted in the manuscript (further problems could also come for Al and Mg due to self-attenuation in the PM grains in the coarse fraction). In the text the elemental concentration values are quoted several times and it is not clear when they have been measured by PIXE and when by ICP. Information on the particular quartz fibre filters used in the experiment should be also provided. A clear and complete discussion on this issue in this paragraph is needed while, along the text, values obtained by PIXE and ICP should be indicated. Furthermore: did PIGE play any role? If so, please discuss it otherwise it should not be mentioned.

3) pag 15 and in general ash and PM composition, Fig. 6, etc: all this parts are connected to my comments at point 2....

4) table 1: do the uncertainties quoted in the table represent the SD of the measured values?

5) pag 7, line 28: XRF should be ED-XRF

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