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Interactive comment on "Validation of ash optical depth and layer height retrieved from passive satellite sensors using EARLINET and airborne lidar data: The case of the Eyjafjallajökull eruption" *by* D. Balis et al.

Anonymous Referee #2

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The paper presents the validation of ash optical depth and layer height as retrieved from satellites with ground bases and airborne based lidars. I recommend the publication with some minor revisions.

Some of my questions are already raised by RC 1 and thus I do not repeat them here.

General comment:

Correlation coefficient is not enough to define the correlation between satellite retrievals and ground based/airborne based measurements. Correlation coefficient is related with the linear regression between the two sets of data which does not follow

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Discussion paper

1:1 line. A high correlation coefficient alone does not mean that it exists a good fit between the data. An analysis of the residuals is required as well. Please consider a more complete analysis. Draw regression line along 1:1 line and discuss bias, residuals etc.

Specific comments:

pp 5 l 17: define TOVS

pp 7 l 7: please describe how LR was chosen and its implication on aerosol extinction coefficient

pp 7 l 23: what do you mean by "the closest point in space and time"? please provide numbers

pp 7 l 25: when talking about spatial and temporal filtering, do you refer to the lidar data? also, please describe the technical details of the filtering (e.g. moving average, resolutions etc)

pp 9 l 28-30: talking about cloud contamination in GOME-2A: isn't possible to screen the cloudy events?

pp 10 l 21: why the number of coincidences decreases?

pp 10 l 22-23: what is the physical meaning of the "ensemble average"(over the total number of coincidences) of AOD (table IV)? I mean relative error would have been useful.

pp 10 l 26: why do you mention the height of 800 hPa while Fig. 2 is based on the height of 600 hPa?

pp 11 l 8-9: the same question for the mean of ash plume height?

pp 12 l 2: what do you mean by "the closest point in space"? Between 50 km and 200 km as mentioned earlier?

pp 13 l 26: what do you mean by "very god agreement"? Please provide r2. Why didn't

you provide a scatter plot as in the case of Earlinet comparisons?

pp 13 l 32: Please rephrase "present the validation". As seen by these results, in my opinion, the validation is not satisfactory (based on present results). It is kind of an attempt to validate... How would you define the criteria for validation?

pp 23 l2-5: please reformulate. There is no middle panel in Fig 1.

pp 30 Fig. 2: middle plots: why there are 18 cases on the left plot and 20 cases on the right plot? Then the bottom plot has 13 cases? Please explain. I am also surprised by large r for the middle and lower plots. The data may be correlated but not with respect to 1:1 line. Please comment on this. The last plot in Fig. 2 looks to me very similar with the lower plot on Fig. 3 while they have quite different r. I know we talk about different quantities in the two figures but the points are spread quite similar.

pp 32 and pp 33: scatter plots as for Earlinet, including statistics (r, N) will help comparing the results and be consistent in validation criteria

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