



## ***Interactive comment on “Observation of volcanic ash from Puyehue-Cordón Caulle with IASI” by L. Klüser et al.***

### **Anonymous Referee #1**

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#### General Comments

The paper "Observation of volcanic ash from Puyehue - Cordón Caulle with IASI" by L. Klüser et al. applies a SVD technique developed for AOD retrievals of dust scenes on volcanic ash observations from the 2011 Puyehue eruption. Transport is analysed using flexpart trajectories. While the methods applied in this paper are not innovative, the results are interesting. The presentation and text can however be significantly improved in several places as outlined below.

#### Specific Comments

The introduction is well written and clear.

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I don't think section 2 is understandable without reading Kluser et al. (2011) first. So either it needs to be significantly expanded, or it needs to be significantly shortened (which I think would be the best way) In particular all the text from line 11 on page 4252 to line 10 on 4255 can be replaced by one clear short paragraph summarising the method without any details. But then clearly introducing the necessity of simulating ash spectra and how this has been done.

The forward model is not well described and discussion should be expanded. What is meant by "extinction spectra"? Please give a precise definition. It seems scattering was neglected, however I couldn't find the rational of this in the given references (Hudson et al 2008a,b). Reported refractive indices of volcanic ash (e.g. the measurements of Pollack et al Icarus, 1973, 19, 372) have a significant scattering component. Neglecting all scattering will lead to large errors. Please explain/correct. Mie theory is generally believe to be a very good approximation for modelling aerosol properties in the infrared, contrary to what is claimed here. See for instance Yang, P. et al J. Aerosol. Sci.,2007, 38, 995-1014. Please expand/correct.

The role of size distribution is very important and this is not nearly enough discussed. For the forward simulation, which size distribution was applied? It would be worth doing the retrieval with different size distributions to assess the effect/associated error.

For section 3, one thing that is missing is a discussion and a comparison of total mass estimates. Please check if independent estimates are available (e.g. from SEVIRI), if this is not the case, it would be good to have a comparison with other eruptions in the past ten years (e.g. from Eyjafjalla, Etna, Chaiten, etc..). Is 30 MT a lot or not, please give some ballpark numbers if you can? Can you compare it with how much sand is transported into the Atlantic each year?

In the analysis of the ash trajectory, it seems two (related) approaches were applied and illustrated in figure 8 and 9. Since both use flexpart, I would expect very similar results. Can you explain the difference between the two different methods and why two

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different methods were applied in the first place? They are not introduced sufficiently.

The discussion and conclusion part is really too long. A lot of text is dedicated to things that the authors would like to do rather than what has been achieved. I think merging these two sections and shortening them significantly would improve the paper.

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Interactive comment on Atmos. Meas. Tech. Discuss., 5, 4249, 2012.

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