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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Aerosol properties and meteorological conditions in the city of Buenos Aires, Argentina during the resuspension of volcanic ash from the Puyehue-Cordón Caulle eruption" *by* A. G. Ulke et al.

Anonymous Referee #2

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In this paper the authors analyze the resuspension episode occurred in mid-October 2011 which impacted the city of Buenos Aires and resulted in the closure of airports. Authors explore the meteorological conditions that led to the episode of volcanic ash resuspension and its transport to the city of Buenos Aires using measurements of aerosol properties carried out at Ciudad Universitaria. Moreover, they use the HYSPLIT model with the dust storm module to simulate the episode finding a good correlation. I recommend the publication after that the authors clarify some specific points:

1) Abstracts: the authors should add what are the implications of their study.

2) A detail description of the eruption features is lacking and should be added in the Introduction section or in a new paragraph.

3) In the Measurements and methodology, a brief description of the instrumentation and data quality should be added, even if already reported in Ulke et al. (2011) and Raga et al. (2013). Moreover, the authors should give details on the properties that were measured. Perhaps a table with the type of measurements reported in the paper and their explanation could be useful.

4) In the modelling approach, an improved description of sensitivity tests carried out in the paper will be valuable.

5) Several sentences reported in the discussion section show results plotted in figures. They should be moved to a new section and deleted from the discussion.

6) The discussion should be rewritten. Many sentences of the discussion can be moved to the Results section. A comparison with results reported in Folch et al. (2014) should be also reported.

Technical corrections

Abstract

P3L9. What airports? Two or more? Specify.

P3L9. Add the location where the thermodynamic soundings and measurements of aerosol properties were done.

P3L15. Were the reports available only for one airport?

P3L15. Add the location of the airport.

Introduction

P3L24. Add references about eruption description.

P4L12. Specify the four case studies that were analyzed.

P4L13. 'Vertical profiles of aerosol backscatter, measured with a ceilometer, clearly identified the presence of the volcanic ash'. Is it the result of this study? If yes, delete from the Introduction section.

P5L19. The moisture content is not present in the Result section. Add the graph or delete from the Introduction.

2. Measurements and methodology

P6L11. How do the authors identify volcanic ash from the dust by MODIS images? May they add some other analysis (T2-T1 difference channels? e.g. Corradini et al. (2010)) or some references from other satellite studies?

P6L13. What is it reported in this technical report? Add more data or delete the sentence.

P6L21. 'Condensation nuclei (CN) larger than approximately 50 nm'..what is the greatest size that can be detected?

P6L10. All the locations reported in the text should be added in the map (e.g. Figure 1a).

P6L15. What multiple wavelengths could the AERONET sun-photometer give?

P6L18. Already written in the previous paragraph. Again, how do the author distinguish volcanic ash from dust? Channels at 11 and 12 micron are usually used to identify volcanic ash.

P8L15. May the authors give detail on color ratio and why this type of measurement is useful?

P8L23-P9L10. Are the authors using the same method? If yes, improve the method description used in this analysis.

P9L8-9. Delete the sentence. No pertinent with the Measurements and methodology

section.

P9L20. Add the location in Figure 1a.

P9L20. Specify the meaning for METAR, SPECI, TAF, SIGMET.

P9L21.What is SMN for?

P9L22. Add Ezeiza location in Figure 1a.

P10L3. What approach are the authors using in their analysis?

P10L4-6. Why don't the authors compare data taken in their measurement station.

P10L10. What do you mean for 'the optimum setup'?

P10L10. How was the default land use file modified?

P11L4. May the authors add the main differences between the default land use file and the new one?

P12L12. How much dryer?

P13L21. What is METAR/SPECI?

4. Analysis of the measurements from the field campaign

P14L6. Add the location of the research site in Ciudad Universitaria.

P14L15. May the authors add the value of the correlation coefficient?

P15L4. The value of 240 μgm$-$3 is not reported in the La Boca station in Figure 5. Why?

P15L9. Add the hourly value maximum of PM10.

P15L26. May the authors show in the figure the "filament-like" plumes?

P16L1. Add the Aeroparque location in Figure 1a.

P16L20. What is the implication about coarse and fine mode?

5. Discussion

P17L15. Figure 7 is not well described. A description of the input run in the HYSPLIT simulation is necessary.

P17L17. Add from CALIPSO.

P17L20. May the authors highlight the area where aerosol are retrieved in Figure 8? It is not clearly visible.

P17-L28. Large size respect to what?

P17L10-L2. Those sentences should be moved from the Discussion to the Result sections.

P18L15-L19. Those sentences should be moved from the Discussion to the Result sections.

P18L22-P19L28. Those sentences should be moved from the Discussion to the Result sections.

P19L9. Explain the vertical feature mask. Add this feature in the plot.

P19L10. May the authors describe the corresponding aerosol inversion algorithms that they used?

P19L28. Figure 8e?

5. Conclusions

P20L25. How much far?

P21L10. Add references.

Figures and Tables

Figure 1a. To be improved including the bar scale. All the locations reported in the text should be added in Figure 1. May the authors identify volcanic ash with some standard techniques (e.g. Corradini et al., 2010)?

Figure 2. The size of characters are small. Explain the legend.

Figure 3. In the caption, add that the wind speed is plotted with the white line.

Figure 4. Are the Figure 4 (b), (d) and (f) necessary? I suggest to delete or improve them.

Figure 5. BC in the legend is for eBC?

Figure 6. The plot should be improved.

Figure 7. May the authors change the blue color with another colour (e.g. green?). The integrate particle cross-section could be deleted.

Figure 8. All the maps of the CALIPSO overpassing should be redone. The size of the characters in the x and y scales are small. In the caption Figure 8b is lacking.

In general, may the authors change the doy scale with UTC time?

References

Corradini, S., L. Merucci, A.J. Prata and A. Piscin, Volcanic ash and SO2 in the 2008 Kasatochi eruption: Retrievals comparison from different IR satellite sensors, J. Geophys. Res., 115, D00L21; doi:10.1029/2009JD013634, 2010.

Folch, A., Mingari, L., Osores, M. S., and Collini, E.: Modeling volcanic ash resuspension – application to the 14–18 October 2011 outbreak episode in central Patagonia, Argentina, Nat. Hazards Earth Syst. Sci., 14, 119–133, doi:10.5194/nhess-14-119-2014, 2014.

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