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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 #1

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1 General Comments

The quantitative study of resuspended or wind blow volcanic ash is a relatively new field and due to the potential for the ash to impact both on human health and the environment it is an important area of study. In this paper the authors focus on a single resuspension event which involved the transportation of volcanic ash from the Patagonian Steppe to Buenos Aires. The authors describe the meteorological conditions leading to and resulting from the advected volcanic ash as well as looking at aerosol properties within Buenos Aires. In addition they explored whether the resuspension

event could be modelled using the HYSPLIT dispersion model with some modification to the surface properties utilised in the dispersion model.

The paper contains new observations of resuspended ash as well as discussion of the meteorological conditions leading to and resulting from the resuspension event and is, therefore, publishable. However, from a reader's perspective it feels as though the paper covers too many different observations/topics and as a result each area is only explained briefly. I think this paper could be greatly improved by some reorganisation of the text, as well as selecting topics/observations on which to focus and expanding the discussion on those topics. I've included some more detail on possible modifications below.

2 Specific Comments

To help the paper to flow better I would recommend that the authors move each method section next to the description of the results. For example if section 2.3 (the modelling methodology) could be moved next to section 5 (the discussion) it would be easier for readers to refer to the details of the modelling while reading the results. A similar approach could be followed with the meteorology and the different observations.

I'm not an expert on the observation techniques presented and I feel that the authors present a large number of observations but don't provide enough detail on the limitations of each observation type. I think the paper could be improved by reducing the number of observations presented but adding more detail on the detection limits, limitations, locations and interpretation assumptions for each of those observations. In addition for a number of the observation types it would be useful to see some indication of typical values for an urban area. This is particularly true in figure 5 where the peaks highlighted by the authors are modest.

Section 2.2 – 1deg by 1deg resolution seems a little coarse given the distances in-

volved. I t would be good if the authors could discuss the limitations of using such a coarse resolution meteorology. For example, the impact of a new soil scheme at higher resolution than the meteorology is going to be limited by the resolution of the meteorology particularly in the determination of surface wind speeds and stresses.

Section 2.3 – It would be helpful if the authors could provide brief details of the dust scheme in HYSPLIT as they are critical to the results presented here. Given that the authors discovered that updating the soil classification scheme was essential to the model's performance it would be useful to have more details of the reclassification. What was the resolution of the new classification? How much did it differ from the original classification? How big a difference did it make to model results presented in this paper?

2.1 Figures

I believe that figures should (to a certain extent) stand alone and that it shouldn't be necessary to read the detail of the text to find the figure description. Therefore I would find it extremely helpful if the authors could include descriptions of all the features in the figures in the figure captions. i.e.

Figure 1: Please could the authors include a description of the triangle in the figure caption

Figure 3: Please could the authors mention that the white line denotes wind speed in the figure caption.

Figure 6: It would be helpful to mention the cause of the gap in the data in the figure caption

Figure 7: Please could the cross-sections be marked on parts (a), (d) and (g).

In addition many of the figures contain numbers and text which are too small to read.

Please could the font size be increased so that the figures can be properly understood?

In Figure 2: the pink profile in part (a) is Ezezia not Santa Rosa and I think needs to be removed.

In Figure 5: I'm not an expert in particle observations but these peaks don't look very big. It might be helpful if longer term means could be included in the background of this figure to help demonstrate that the peaks the authors point to are indeed anomalous.

In Figure 7: The release locations in the HYSPLIT model look very gridded. In my experience of dispersion models particles are normally released evenly across any grid square where the meteorological conditions are optimum for resuspension. In this figure it looks like particles are only released from one point within each 1 degree grid cell. Although it won't change the message provided by the results, if possible the authors should re-run HYSPLIT allowing particles to be released evenly across each gridbox as this will greatly improve the look of the results. Alternatively if this isn't the case some explanation of the regular release pattern should be included in the discussion of the model results.

3 Technical comments

Section 3.2, Line 18: suggest replacing 500/1000 thickness with 500-1000 hPa thickness as the "/" sign is suggestive of division rather than subtraction.

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