

Responses to the Topical Editor and Referees

We thank the topical editor and the reviewers for the thoughtful suggestions and insights, which have enriched the manuscript and produced a better and more balanced account of the research. We hope that the revised manuscript is now suitable for publication in your journal.

1 Response to the Topical Editor (David Carlson)

We are grateful to the topical editor for the careful review of our paper. Please see each response below and changes in the manuscript addressing all comments of the topical editor. Each number refers to each comment in an orderly manner.

1. **Comment:** Technically, version 2 should appear as default, with version 1 referred to as prior (pre-review?).

10 **Response:** When accessing the dataset by clicking the direct link of the publisher, it will go directly to the default version (Version 2). However, when accessing the dataset from the DOI referral link, it will go to the prior version (Version 1) since the DOI was created during Version 1. We added an explanation in Sect. 4.1 for the reader to choose Version 2 when accessing the dataset using the DOI link.

Changes in manuscript: Lines 274-275.

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2. **Comment:** Authors have not defined or otherwise described ‘PF’ phase? In Fig 3.

Response: Revised by adding the description of the PF phase in the caption of Fig. 3, which is a pyroclastic flow.

Changes in manuscript: Line 177.

20 3. **Comment:** Labels of individual panels (data range, season, height) not readable even at high zoom. Need a better version for publication? In Fig 4.

Response: Revised the figure to have a bigger font so the individual panel can be readable.

Changes in manuscript: Fig 3 (line 216).

25 4. **Comment:** Confusion here. First column of Fig 4 indicates 1000 hPa, e.g. lower levels. Second column indicates 250 hPa, e.g. higher levels. Text implies opposite? At line 250.

Response: Revised the figure’s caption in the text.

Changes in manuscript: Line 217-220.

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5. **Comment:** Not much indication of seasonal variation in Fig 4, particularly at 250 hPa. Agree with statement about eruption impact varying with time of year, but need a better demonstration?

Response: Revised the figure to use more distinctive colours and added explanation of the seasonal differences for both the upper altitude winds and the surface winds. The old figure had too wide colour scale resulting in unclear differences between seasons.

Changes in manuscript: Fig 3 (line 216) and lines 204-208.

6. **Comment:** Lack of international comparisons / validations? With Indonesian or Icelandic volcanoes. Authors do a reasonable description of tools but with too few comparisons to these tools applied in other locations or too ashfall accumulations modeled by other tools?

Response: Added more examples of the simulation by the model used in the manuscript in Sect. 5.

Changes in manuscript: Lines 331-336.

7. **Comment:** Needs a substantial re-write into English. Copernicus employs excellent language translators but even they will need better starting material. In many cases, authors could easily achieve 10% shortening of redundant or too-elaborate text?

Response: We removed the redundant and too-elaborate parts (both text and figures) of the manuscript and sent it to the professional proofreading service to check and enhance the final revision of the manuscript before resubmission.

Changes in manuscript: The language has been checked by a native English speaker, and extensively revised to eliminate redundant or too-elaborate text. This resulted in the word count of the manuscript being reduced by at least 10%, as requested.

2 Response to Referee #1 (Rosario Vázquez)

55 We are grateful to the referee for the careful review of our paper. Please see each response below and changes in the manuscript addressing all comments of referee #1. For the specific comments in the manuscripts, the responses are structured based on the order of the lines in the manuscript.

1. **Line 2 (Title):** Still suggesting "countermeasures".

Response: Revised the main parts about the aim of the paper and dataset and added more explanation about the how the dataset can be input to an ashfall risk assessment for development of an emergency management plan.

Changes in manuscript: Lines 57-58, 79-85, 281-283, 317-318, & 326-328.

2. **Line 18:** "we present the distribution of the calculated ashfall deposit and airborne as concentration dataset, obtained from an ash dispersal simulation considering a large-scale explosive volcanic eruption as a reference.."

Response: Revised following the suggestion.

Changes in manuscript: Line 18-20.

3. **Line 27:** "can be derived from this dataset", in order to reduce ashfall risk in Japan.

Response: Revised following the suggestion.

Changes in manuscript: Lines 26-27.

4. **Line 37:** This sentence is not well written.

Response: Revised the sentence.

Changes in manuscript: Lines 35-38.

5. **Line 49:** Yes, but again...you're not assessing nor proposing these countermeasures.

Response: Revised the sentence and added more explanation about the how the dataset can be input to an ashfall risk assessment for development of an emergency management plan.

Changes in manuscript: Lines 79-80.

6. **Line 60:** over Japan.

Response: Revised following the suggestion.

Changes in manuscript: Lines 51-52.

7. **Line 82-83:** This sentence is unfinished, as it is.

Response: Revised the sentence.

Changes in manuscript: Lines 79-80.

8. **Line 110:** “resemble”.

90

Response: Revised following the suggestion.

Changes in manuscript: Lines 97-98.

9. **Line 117:** volcanic.

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Response: Revised following the suggestion.

Changes in manuscript: Lines 103-105.

10. **Line 159:** The number of passengers.

Response: Revised following the suggestion.

Changes in manuscript: Lines 73-75.

100

11. **Line 253-255:** This is not seen in your wind rose data, at least in the upper altitude winds. In fact, the most frequent wind direction is from W-SW.

105

Response: Revised the figure to use more distinctive colours and added explanation of the seasonal differences for both the upper altitude winds and the surface winds. The old figure had too wide colour scale resulting in unclear differences between seasons.

Changes in manuscript: Fig 3 (line 216) and lines 204-208.

12. **Line 366:** There is a problem within the colors in the map...it could be a problem within the 5-25% range color scale, or within the 95-75% probability color scale...and the same issue can be signaled in figure 6.

110

Response: Revised all figures in Sect. 4.2 (Fig. 4-7) to use same colour scale as the wind rose figure (Fig. 3) for consistency.

Changes in manuscript: Fig. 4-7 in Sect. 4.2.

13. **Line 373:** A better differentiation should be made between the 95 and 75% zones.

115

Response: Revised all figures in Sect. 4.2 (Fig. 4-7) to use same colour scale as the wind rose figure (Fig. 3) for consistency.

Changes in manuscript: Fig. 4-7 in Sect. 4.2.

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14. **Line 399:** I suppose that this sentence is incomplete?

Response: Revised the sentence.

Changes in manuscript: Lines 350-351.

125 15. **Line 434:** they are not...In fact, these results are the same as the seasonal probability distribution maps that you described in Figure 6...But if you insist to describe that your results are fair enough, then you should think in using some other terminology to compare your results with the real data, such as "the outcomings from this simulation process are adequate/have a fair resemblance" or something like that, because they're definitely not "identical".

Response: Revised the sentence.

130 **Changes in manuscript:** Lines 369-371.

16. **Line 439:** That's it! They show some similarities but they're not identical.

Response: Revised the sentence.

Changes in manuscript: Lines 369-371.

135

17. **Line 440:** and mostly unnecessary.

Response: Sentences were removed in the revised version.

Changes in manuscript: Lines 368-372.

140 18. **Line 454-455:** and therefore, to the outcomes of the simulation.

Response: Revised following the suggestion.

Changes in manuscript: Lines 391-392.

19. **Line 457:** fairly well...

145 **Response:** Revised following the suggestion.

Changes in manuscript: Lines 394-396.

20. **Line 461:** duration, significantly

Response: Revised the sentence.

150 **Changes in manuscript:** Lines 396-397.

21. **Line 464:** "we used"? or "that were used"?

Response: Revised the sentence.

Changes in manuscript: Lines 398-401.

- 155 **22. Line 493:** also.
 Response: Revised the sentence.
 Changes in manuscript: Lines 425-429.
- 23. Line 518:** Rewrite the sentence, it is not understandable.
160 **Response:** Sentences were removed in the revised version.
 Changes in manuscript: Lines 449-450.
- 24. Line 523:** what do you mean by this? And how an erratic behavior can be modelled?
 Response: Revised the sentence.
165 **Changes in manuscript:** Lines 449-450.
- 25. Line 559 & 568:** how often?
 Response: Revised the sentence and added more explanation about the infrequencies of the anomalous weather
 condition during Japanese winter.
170 **Changes in manuscript:** Lines 486 & 494.

3 Response to Referee #2 (Stephen McDuffie)

We are grateful to the referee for the careful review of our paper. Please see each response below and changes in the manuscript addressing all comments of referee #2. Each number refers to each comment in an orderly manner.

175 1. **Comment:** First, portions of the paper still have poor English. The entire manuscript should be edited by a native English speaker.

Response: We used the professional proofreading service to check and enhance the final revision of the manuscript before resubmitting again to the editor.

180 **Changes in manuscript:** The language has been checked by a native English speaker and all changes from the native English speaker have been implemented in the manuscript.

2. **Comment:** Line 251 should say “the second column indicating the surface winds” rather than “the second column indicating the latter.”

Response: Revised the figure’s caption in the text.

185 **Changes in manuscript:** Line 217-220.

3. **Comment:** The reference in line 358-359 does not appear to be in the reference list.

Response: The reference for mentioned lines are already in the reference list.

Changes in manuscript: Lines 700-703.

190

4. **Comment:** Lines 398-399 have an incomplete sentence and require review.

Response: Revised the sentence.

Changes in manuscript: Lines 350-351.

195 5. **Comment:** Line 413 refers to table B3. I believe it should refer to table B2.

Response: Sentences were removed in the revised version.

Changes in manuscript: Lines 368-369.