Natural Hazards
and Earth System
Sciences

Discussions

Interactive comment on "Modeling volcanic ash resuspension – application to the 14–18 October 2011 outbreak episode in Central Patagonia, Argentina" *by* A. Folch et al.

A. Folch et al.

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We appreciate the positive and constructive review by M.Hort. Below we detail how the comments/suggestions have been addressed during the revision:

General Comments The assertion that there is no operational re-suspension forecast is incorrect. Since 2011 London VAAC/UK Met Office have been providing an operational warning forecast service for re-suspended ash to IMO (Icelandic Met Office). This service is follows along the work published by Leadbetter et al. This is now mentioned. In the introduction, the sentence "At present, no VATDM is used operationally to forecast

ash resuspension events" has been removed. The sentence "This has been used by the London VAAC/UK Met Office to provide an operational warning forecast service for re-suspended ash to IMO (Icelandic Met Office)" has been added.

Specific comments

Page 4567 Line 2 - Change in to on ok Line 9 - Change In opposition to as opposed ok Line 11 - Insert re-suspended between for and volcanic ok Line 11 - No operational service - Not correct. See General Comment This sentence should be removed or modified Sentence has been removed Page 4568 Line 1 Change affectation to disruption ok Line 4 - Change at to over ok Line 8 Remove a combination adequate Changed to favorable Line 9 - Change Originated to resulted in Ok Line 15 Change or to and Ok Line 19 Change outbreaks to impacts Changed to disruptions Line 29 - It is not correct that no TTDM are used operationally in this way. London VAAC/UK Met Office NAME model is used This is now mentioned. Page 4569 Line 8 - the scheme also uses the occurrence of precipitation to control resuspension Sentence has been modified to add: "…scheme to compute the mass flux of resuspended ash depending on the wind friction velocity and the occurrence of precipitation" Line 13 - I assume that this station is measuring composition as well as meteorological parameters? It would be useful to describe what measurement is being made/used as it is not common practice for Met stations to record composition data. Yes. This is also an air quality station, as explained in detail in section 5. Page 4571 Line 12 - Insert the between of and wind Ok Line 13 - Remove of from requires of data Ok Line 14 - Many national met service weather forecast models use and calculate this information at a variety of scales that in many would be considered 'local'. I would therefore not say 'often' though I appreciate this will not be the case everywhere. I think the major issue here is that those models will use the data for the underlying soil type to determine drainage rates and soil moisture which is not related to the characteristics of the ash deposit. This is one of the major reasons why your use of NWP soil moisture later in the paper does not work well. Agree. We have changed "which are often.." to "which may be unavailable…". The

second aspect was already pointed out in section 2, previous considerations. Page 4576 Line 12, 15 and 18 - Change on to of Ok Line 23 - change 'determined comparing model with' to 'determined by comparing model values with' ok Pg 4577 Line 6 Change sparse to sparsely scattered Changed to "spread sparsely across" Line 18 Change hardly harmed to had little impact on Changed to "This disruption affected the transportation" Page 4578 Line 4. Change 'only on Sunday 16th' to 'on Sunday 16th alone' Ok Page 4579 Section 5.1. I understand and agree, in this case, with using the model to define the deposit. However there are a number of reasons why this will result in a deposit map with varying degrees of error e.g. TSG, winds, disaggregation, etc. some of these you do mention. Your scaling, will also act as a correction of these errors but obviously only for the limited case used to produce the scaling. Did you do any verification of the model deposit map with deposit measurements to assess these issues. Some more exploration of the sources/reasons for uncertainties would be useful. Only in part. The deposit simulation follows the work of Collini et al. (2013) and Osores et al. (2012) for which some model validation was done. However, given that the are is large, remote, and mostly unaccecible, in-situ validation is not straightforward. Line 8 - Insert they after because ok Line 9 - Change desegregation to disaggregation ok Line 10 - Change break when grounding to impact the ground Ok Line 14 - Change along to over Ok Pg 4580 Line 2 - So do the resuspension emissions occur uniformly from 0-250m agl? Yes Why do you do this and not just emit at the surface (or over just the first grid box/point) and leave the model diffusion/winds to provide all the vertical spread/movement? Releasing at up to 250 may result in different transport directions and speeds depending on the variation of the met with height. It also may not dependent on conditions. True, but this is not a trivial issue. Injection height depends on several meteorological/terrain aspects unresolved by the model. For this reason this parameter is left as an input, selected by the user. We also tried other lower values, but best agreement was found with 250m, which affects 4 model layers rather tan one. Line 6 - Insert they after because Ok Line 7 - Do you assume/impose this or does it happen due to gravitational settling? We verified tan this happen due to settling, so

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larger particles were not included in the final runs. Line 21 - Change on to at Ok Page 4583 Line 14. Change can to may I don't think that it is possible to make the explicit link without more analysis Ok Line 15 - Are the model outputs also grouped into the two size ranges or are they total? Grouped. Line 24 - This is based on mineral dust and the PSD is rather different I think (from memory). This is likely to significantly effect an visibility based validation. Errors in this are likely to be far larger than the other observations you compare against. Yes, but unfortunately this is the variable reported by ground weater stations in Argentina. Page 4584 Line 21 - Change in to for Ok

Finally, corrections to figures have been done, according also other referee's suggestions.