Natural Hazards and Earth System Sciences
Discussions

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Reply on RC2

Manuel Titos et al.

Author comment on "Long-term hazard assessment of explosive eruptions at Jan Mayen (Norway) and implications for air traffic in the North Atlantic" by Manuel Titos et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-264-AC3, 2021

Correction about C58. The superscripts of the upper and lower limits of the TEV for each eruptive class are not displayed correctly. Below, a corrected version:

C58: Line 366 – Add a "kg/s". The upper size of the Large class is lower than the one for the Medium class… is that an error? Maybe 1.39 is elevated to the 105 and not 106? Should they be consistent with those in table B1 or not?

Correction performed. Regarding the limits of the mass flow rate ranges in both classes, the values are correct. They were obtained in accordance with the data proposed in this work. Large eruptions may have a lower mass flow rate than Medium size eruptions mainly due to the mass fraction of tephra in the volcanic plume and the duration of the eruption.

These mass flow rates (MFR) ranges are computed from the total erupted volume (TEV) in the PDF of Figure 3. Thus, for example, the TEV for Medium-size eruptions will vary between 10^8 and $10^{8.7}$ m^3, while for Large ones, this value will vary between $10^{8.7}$ and $10^{8.9}$ m^3. To obtain the mean MFR range we need to compute the total erupted mass (TEM). This value corresponds to TEM = mass_fraction * density_average * TEV, where the density and mass fraction values are shown in Table B1, in the appendix, for both sizes.

Once the TEM is obtained, MFR is computed as MFR = TEM / eruption_duration. Thus, since the mass fraction in Medium category is much higher than in Large sizes, 0.8 against [0.05, 0.1] respectively, in the case of a medium eruption of short duration (4 days) and large TVE, the upper limit of the MFR may be greater than the upper limit of a Large one.