

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC3  
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## Comment on nhess-2022-100

Anonymous Referee #2

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Referee comment on "Assessing minimum pyroclastic density current mass to impact critical infrastructures: example from Aso caldera (Japan)" by Andrea Bevilacqua et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-100-RC3>, 2022

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The manuscript presents a probabilistic approach to estimate the mass of pyroclastic density current needed to impact three different targets in the Aso Caldera, in Japan, adopting different approaches.

The reviewer considers the aim of the paper well stated, and appreciates the deep insight into the state of the art of the different models. Though, some concerns arise about the proposed simulations:

- While model 1 is sufficiently clear to the reviewer, the way of using model 2 (in its variants 2a, 2b and 2c) is not so easy to understand. Which kind of simulation has been performed? Which are the characteristics of the models that have been run? Fluid-dynamic simulations? Something like a black box? The authors are required to provide more information about this point.
  - If fluid dynamic models have been run, please add some information about the adopted method, the governing equations, and eventually, the computational cost, the number of required simulations to build the probabilistic approach.
  - If 'reduced' models have been used, please clarify the kind of model, discussing the validity of the model itself with respect to physical based models.
  - With model 2 (a, b, c), how it is computed the probability of impact on the target site
- The author is required to discuss how the topographic situation is taken into account in the different adopted models.

In conclusion, the reviewer suggests a minor revision of the present manuscript, provided that the above-mentioned comments are sufficiently discussed