Natural Hazards and Earth System Sciences Discussions

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
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Comment on nhess-2021-49

Anonymous Referee #1

Referee comment on "Quantifying location error to define uncertainty in volcanic mass flow hazard simulations" by Stuart R. Mead et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-49-RC1, 2021

This is an excellent paper which clearly outlines a new approach to quantifying uncertainty in debris flow simulation. The paper is well written and the approach is easy to follow. The outlined approach has the potential to be applied to other volcanic and non-volcanic hazards and has positive benefits for hazard mapping and hazard zone creation. The paper concludes by raising questions around acceptable risk, a potential area for future investigation.

The approach applies a 'fuzzification' to simulated flow boundaries. As the length scale of the fuzziness increases, the PPV (proportion of true positives within the simulated footprint) decreases and the hazard area is increased, thereby accounting for uncertainty. This means that as the length is increased, the model results are more conservative from a life-safety point of view.

I see very few problems with the manuscript and believe that this is an excellent contribution to the literature. Limitations are clearly elucidated.

Two small points:
Line 262 and beyond doesn't read well – referring to values up to a 10 m flow depth – may be better explained by "The depth cut-off values are the thresholds to convert simulated flow depths…"
Line 335 = "and" should be "an"