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## Comment on nhess-2022-217

Emma Hudson-Doyle (Referee)

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Referee comment on "Differences in volcanic risk perception among Goma's population before the Nyiragongo eruption of May 2021, Virunga volcanic province (DR Congo)" by Blaise Mafuko Nyandwi et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-217-RC2>, 2022

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Manuscript review – NHESS-2022-217

This is a very well written and well-structured paper, extensively grounded in the literature, with a thorough methodology and a clear presentation of results. It was a pleasure to read! I can see this being the basis for future longitudinal studies given the timing of the survey and the May 2021 eruption – what fortuitous timing. I do hope the authors will consider a follow up study in future.

I had a few very minor suggestions to improve the manuscript, as follows:

- In the manuscript, and on line 18 of the abstract, you mention “height representative” neighbourhoods – could you clarify what this means?
- In the Introduction, you discuss the PMT threat appraisal, but it would be good to add a line outlining the other models in this space and being more explicit as to why PMT was chosen over the other models that exist for risk perception and action (e.g., Community Engagement theory, Paton, 2013; Protective Action Decision Model, PADM, Lindell & Perry, 2012, or theory of planned behavior, Vinnell et al 2021). These do not need to be discussed extensively, but the PMT needs to be placed in the wider context of them.
- In paragraph ending line 62 – could you add to that sentence the typical volumes/speeds/durations of lava flows seen previously at Nyiragongo – this will help add some contextual understanding.
- In line 89 and elsewhere I think there needs to be a bit more care in the description of vulnerability and how that relates to exposure, these are different concepts but at times it felt they were being conflated.
- In paragraph starting line 120, I think you could add more here on the privilege needed to prepare and what that means for risk perception and actions (e.g., Blake et al 2017, <https://linkinghub.elsevier.com/retrieve/pii/S221242091730242X>), plus also it's worth

mentioning here or elsewhere that a significant limitation of many existing risk perception studies is that participants come from WEIRD demographics (Western, Educated, Industrialised, Rich, and Democratic ; see Henrich et al, 2010 <https://doi.org/10.1017/S0140525X0999152X> or Jones, 2010 <https://www.science.org/doi/10.1126/science.328.5986.1627> ), which is important to consider when relating the findings here to that existing body of work. (Also in paragraph starting line 444)

- Line 139 – it is amazing to read of the city doubling since 2002, I wondered what that meant for risk perception and community and generational knowledge of risks. Is this growth predominantly from migration, or birth/family growth? If the former, that could have a significant impact on risk knowledge and perceptions.
- Line 174 – in future it could be useful to include in the survey demographics the ownership vs rental status of homes, and the duration of time living in home/neighbourhood/city. This can provide a further factor to investigate with regards to risk perception.
- Line 178, and elsewhere in results: could you explain the aggregation process for the indicator more? How were they aggregated? And why were they aggregated in that way?
- Line 194 – it will read a bit clearer to reframe this paragraph like the previous 3, so what is being assessed is upfront.
- Figure 2 is a great figure, really informative and clear!
- Can the authors provide the survey questions in an appendix or supplementary materials? This will help readers assess and understand the results.
- Related to that – line 200 discusses “the availability of environmental cues” – I struggled to understand quite what was being asked of participants here. Clarification will help.
- Line 253 – you mention informed consent, but can you please include information on the ethics process? (low risk notification or full review, etc).
- Line 320 to 322 is a really important finding – I would highlight this more in abstract / conclusion etc – plus in discussion briefly explore why this might be and what the implications of this finding are.
- For the tables (e.g., table 2) I think it would be clearer to include the p values in the table, rather than using asterisks, ditto line 371 and 372.
- Line 372 – 376 is such an interesting finding: are they more concerned about loss as they have more to lose? Are they actually rating for *impact* rather than *likelihood* in their responses and conflating these two concepts? The influence of ‘outcome severity’ is discussed in the communication literature, and may(?) be contributing to this result too? (e.g., Bruine De Bruin et al., 2000; Patt & Dessai, 2005)
  - In addition, I wondered if the phrase “perceived likelihood of being personally impacted” is directing them towards the impact more than the likelihood (assuming this was the phrase in the survey). Perhaps future research could test out different phrasings for this question.
- Paragraph starting 387 needs a bit of rewording for clarity.
- Line 435: what do you mean by “restricted” family?
- Line 493 – this is interesting as false alarms can also lead to normalisation of the risk (see e.g., Shepperd et al 2013 <https://doi.org/10.1177/1745691613485247> , Mileti & O’Brien, 1992 <https://doi.org/10.1525/sp.1992.39.1.03x0062j> ) which would be associated with a reduction in anxiety.
- Line 505 – I wondered if there had been any felt earthquakes experienced? If so, when and how large? This would also impact risk perceptions.
- Line 528/529 seems to contradict line 508/509 – can you clarify?
- Line 540 – what do you mean by ‘stigma’ of the lava flows?
- Line 549/550 – this is another area where I think the severity of impact (and vulnerability to that impact) might be being conflated by participants with likelihood. See comment above re: line 372 on outcome severity affecting likelihood perceptions.
- Line 558: So, could a potential reason for this be that the fear of potential poverty is

higher than the fear/concern of risk to life? Does this relate to more collective vs individual thinking and impact on family group? If relevant, here and elsewhere there could be a bit more discussion of collectivist and individualistic cultures, and what that means for risk perception and action (e.g., Note this very recent article by Wu & Zhong, 2022, that may be useful

[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4129159](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4129159) ), and how that can also impact comparisons between studies conducted in different cultural contexts.

- Also is insurance common or rare? That would impact this finding too.
- It would be good to include a bit more in the discussion on the limitations and future research needed – some is scattered throughout the manuscript, but a more explicit (and slightly expanded) section on limitations and future research would be good.
- The authors might be interested in future in exploring the notion of vicarious experience a bit more. I note that this has been cited in the references, but it could be discussed / referenced a little bit more as this will relate to the risk perceptions of the different neighbourhoods. (e.g., Becker et al., 2017, <https://www.sciencedirect.com/science/article/pii/S2212420916303296> which discusses at length prior experience for earthquake preparedness and discusses life vs. vicarious experience on risk perception)

Lastly, there were a few places where there were some minor grammar errors (e.g., missing bridging words like 'the' or needing pluralisation) – it would be good to run through a grammar checker a final time before final submission.