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Comment on nhess-2021-164

Anna Hicks (Referee)

Referee comment on "Risk communication successes and limits during sismo-volcanic crisis: the example of Mayotte, France" by Maud H. Devès et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-164-RC1>, 2021

General comments

This is a good paper and a valuable record and reflection of some of the formal and informal communication during a fairly long-lived volcano-seismic crisis. This paper makes an important contribution to an evidence base outlining some of the challenges of communicating 1) at the science-policy-public interface on an active volcanic ocean island that has not had an historical regional eruption; 2) in the presence of high uncertainty around the tectonic and eruptive history; 3) with a multicultural population (many of whom are vulnerable to hazards), and one with a complex governance structure.

However, the paper does need a large number of minor revisions before it should be considered for publication. None of them are major revisions in my opinion, but the number of minor revisions will take some time to address so I have suggested a resubmission. Two particular areas I feel would improve the paper would be a short reflection situating the communication efforts to the Mayotte crisis in comparison to other recent ocean-island eruptions (e.g. La Soufriere, Stromboli) and some further development of the review of literature on volcanic risk communication. The authors have mentioned a couple of studies but it needs more to elevate the paper from its current form, which as I see it, is as a chronological record of the communication of geological events by scientists and authorities to the public. It is absolutely fine to publish a record such as this, but the authors might like to situate it within the wider literature in order to develop their arguments.

Please address grammatical errors throughout (e.g. tenses). I appreciate English may be a second language for some if not all of the authors, so I would strongly recommend a thorough edit and proof reading before resubmission.

The tables and most of the figures are very good. There's some really nice points raised in Section 5, that could be signposted to earlier in the paper. There is a fair amount of redundancy in the chronology, perhaps resulting from trying to present results (section 4) and then a discussion (section 5) as per a traditional physical science paper. It might be worth considering presenting the results and discussion together to make for an easier read.

Specific comments

16-29 This research stems from such an interesting event and at the moment the abstract falls a bit flat. Its weakness in the first half is partly due to grammatical errors which could be easily rectified. The second half is slightly better, and promises the reader that the results and recommendations from this case study analysis will be situated within the wider geo-risk communication literature/case studies, which unfortunately doesn't quite come out strongly in the analysis later on (see later comments). In line 20, I would suggest revising the use of 'publications', given that the audience in this case will largely be academic and publications means something specific. I would argue that the communication strategy was not 'put in place' for the first three years of the crisis – whatever 'strategy' was designed at the outset of the crisis was clearly revised and reiterated later on. I would also urge the authors to be careful of, and revise any use of conjecture, in the abstract and elsewhere in the text e.g. "we notably stress". Do you mean, "we present evidence for the importance of?"

31 The first paragraph is very unclear and, similarly to the abstract, could present the problem and the research much better. You have a great story to tell, so open strongly! As a start, please change the phrase a 'very active seismic crisis' - this is not quite right. It would also help to refer the reader more quickly to Figure 1 (i.e. in the first sentence or two), particularly if they are unfamiliar with the geography/geology of Mayotte.

39 I would like to read a little more about the geological setting. Could the sentence beginning Mayotte become a separate paragraph and have slightly more detail added to the hypotheses for volcanism in the region? There's more information provided about the monitoring of a nearby volcano than there is about the tectonic/volcanic setting! This is an understudied region and I'm sure the readers would like to know a little more.

69 Can a reference be added to the note about the population's distrust in the authorities? How do the authors know this?

79-80 What does Tifaki Hazi do? What type of agency are they? I'd choose a different word other than 'badly' sensitised. I'm not sure who DIRMOM are, and it's not explained or referenced.

92 Who are the 'official sources'? This needs a bit of clarity.

93 Very interesting about the STTM Facebook group (I'm going to go and read Laura's paper!), perhaps a footnote could be added to give a little more information about this group?

104 I don't see how the newspaper headline highlights an inability of experts to document the felt earthquakes. I'm making the assumption that the experts were not unable, they merely may not have communicated effectively, or at all. If so, could you make this clearer?

109 Distrust in state services. Similarly to my earlier point, this is interesting and warrants a reference if you have one.

112-114 This whole quote is interesting. Is the author of the quote suggesting that the population may be evacuated ('leave the island')? Has that really happened in the past, as the quote seems to suggest? Obviously for reasons other than seismic activity! [This is merely a point of interest for me and nothing for the authors to change in the manuscript]

118 Please could you add the estimated volume of lava erupted? I would also suggest clarifying this sentence in line with the results from Cesca et al – it was the largest geophysically monitored submarine eruption to date. The comparisons with the subaerial eruption of Laki make for confusing reading.

123 The activity itself was not new, but in May 2019 the population learned what the seismic activity was related to. Please could you clarify this.

133-156 These paragraphs seem out of sync with the previous. If you're reporting on events chronologically, this should come earlier, or perhaps consider putting this as a separate subsection?

159 Please revise your use of risk reduction cycle. There is no cycle of risk reduction – you may be confusing it with disaster risk management? We should really not be thinking of cycles at all in this regard (maybe use 'phases' instead?), as any disaster management efforts should be improving what has come before.

170-174 The sentences about scientific method determining public decision making needs some further work. These studies to which you refer are not suggesting the scientific method itself determines/supports public decision making about risk as much as the wider socio-political context. It's the evidence itself, the uncertainty and how it's presented, and possibly also the scientists involved....but not so much the method...? I agree it is very complex though!

As a follow on, please could you revise your suggestion of the motivations of 'social volcanology' - which aims to sensitise researchers to the social context affected by or at risk from the volcanic hazard, and adopting methods commonly used in the social sciences to try and understand the social context better. I may have misunderstood what you are trying to discuss here, but I would urge you to be clearer. I would encourage you to look into work by Crowley, Hudson-Doyle, Haynes, Bird, and Hicks (all separate studies) to broaden and enrich this discussion (here and later in the paper) of the wider literature in volcanic risk communication. It is too brief at present.

192-200 I agree it would have been interesting to find out if the information communicated by the scientists and authorities helped people to adapt their response to the crisis, but no data has been collected to that end. The study reports on a 'feeling' of improved communication by scientists from 2019, but not behavioural changes in the population as a result of the improved communication. I'd advise you to be careful about what they are, and are not, presenting evidence for, and as such perhaps revise parts of this paragraph.

201 The figure could be improved a little to match the superb standard of the other figures (e.g. no need to use bullet points in a title and font sizes on the axes could be revised to draw attention more to the data and data captions itself)

213 I strongly urge you to think carefully about you use of social sciences here. Is this truly a social scientific study?

216 What does factually analyse mean? This is not an analytical methodology used in the social sciences.

256 Incorrect use of the word (and approach) coding. Coded data refers to a specific type of qualitative data analysis to find common themes and concepts. You have simply ordered the data by data of publication and publishing author, and not extracted themes.

277 I don't see how you have quantitatively analysed anything here. You

have visually presented the quantitative data using R, but you have not used the package to analyse data. The visual presentation of data does help you to make inferences and suggestions about how timing of earthquakes is related to communications from the scientists and authorities, but there are no stats, no modelling, no quantitative analysis. I would suggest that you don't inflate your methodological approach! This is, in my view, a completely qualitative study – it might be mixed method – but it's still qualitative....and that's ok!

292 – 294 For me it is less interesting to find out the length of the interviews as it is how representative these interviews are of the institutions that the individuals represent. How many people work for these institutions?

295 Thank you for including information about the types of questions you asked in your interviews. This is really useful!

312 What ethical procedures did you have in place prior to conducting the interviews? Did you acquire written or verbal consent from interviewees? Ethics assessments are crucial when using human subjects for data collection.

587 You state that the anecdotes have been 'quite commented on' within the scientific community. Where? How many comments? Who made them?

588-591 You mention earlier in this paragraph that the communication is marked by a sense of surprise, but the quotes you use in this paragraph do not demonstrate surprise. Another quote or two would be useful here to support your narrative.

639 The sentence 'important role in raising awareness of the importance of' leaves me hanging – what and why was it important? Did the scientists really not think this activity was important prior to the publication of Briole's blog?

674-678 You say this is worth pointing out, but I'm not sure why? A bit more information is needed here.

690 reinforce monitoring and prevention measures? What type of prevention measures? Risk reduction? Mitigation? Please be specific.

704 Communication of what to whom? Please be specific.

713 I'm not sure what you mean by "it corresponds to the bulletin of July 2019". Please could you clarify this?

734 Could you add some quotes here from your interviews to support your understanding of the tensions that existed between scientists and authorities?

821 Live comments on social media are interesting – have you a sense of whether the sceptical comments are made by a vociferous minority or representative of the wider population?

856 We may remain at odds here, but I would hesitate to use analysis in the truest sense. Had you coded the dataset into a set of themes and explored them (i.e. as in a thematic analysis), then perhaps. Perhaps you could argue it is a narrative analysis, as in you have presented a narrative of chronological events with some quotes from interviews, but I don't see a robust social scientific analytical methodology. Also, I'm not sure what you mean by quasi exhaustive documentation? Do you mean you looked at all available communication about the events, written, verbal or otherwise? It would be

great to see examples of the different types of documentation you looked at.

862 What is the evidence for persistent discontent of the population?

877 Rephrase 'information that adapts to the level of perceived danger'. It is very unclear what you mean here. Surely any perception of danger comes from personal knowledge/experience?

911-913 I can't see how this paragraph leads into subsequent sections on bias? I would suggest guiding the reader through these sections a little better. Perhaps the word bias is the confusing factor...

958 What evidence do you have that the 'population's capacity for resilience increased' as a result of sharing experiences on Facebook?

975-980 I'd highly recommend taking a look at the work of Hudson-Doyle here.

1107 Please clarify what you mean by a gap in culture between scientists, authorities and society. Motivations? Concerns? Needs? Knowledge? Worldview?

1015-1017 Risk scenarios have been mentioned at times throughout the paper, but not really explained. In this sentence are you suggesting that scientists have been focused mainly on the hazards and not so much on the risk? Are they actively working on risk assessments (i.e. assessing vulnerability, exposure etc), as you seem to suggest? Are they quantitative/qualitative or both? Who are they collaborating with on this? This is interesting!

1040-1042 Here's those three papers again....I'd advise demonstrating that you've read into the subject of volcanic risk communication more extensively.

Technical corrections

Please check all references – there are many typographical errors.

Consistency throughout with use of the word 'seismic' – sometimes you use sismic/sismo

There are several typos and grammatical corrections required. I've outlined a few below, but recommend a detailed proof read prior to the submission of the next version.

2 I would suggest using a different word other than limits. The paper does not really talk of the limits of risk communication in this case. Lessons, perhaps?

17 was shown

166 Please add a reference to this sentence

169 Add making to decision

248 remove 'made up'

559 Experts appeared puzzled to whom? And were they genuinely puzzled, rather than apparently?

564 publishes daily reports via where? Their website? Would be good to

add a link here.

599 inaccurate rather than inexact

601 is at odds

616 remains difficult is a bit ambiguous – I'd suggest a change of phrasing here.

624 Amongst the [incorrect] (or use other word) explanations...

637 November and December.

638 add (sic) after "wild"

722 I would hope that the national media were not stoned! Please could you adopt a different phrase?

914 Bias misspelling

1113 reach not cross

1123 acting qua?