

Author's responses to referees (highlighted in red)

Referee #1

Dear authors,

your paper - Risk perception of local stakeholders on natural hazards: implications for theory and practice
- presents a great contribution to disaster studies.

Answer: We thank you for your appreciation of this work and the time and effort to review it.

Only, I would recommend you to make wider discussion related to - Preparedness levels were low, and, not for all, learning and preparatory actions are needed to withstand the negative occurrences of natural hazards - adding some research from a regional perspective. I will suggest some papers - Mano, R., Kirshcenbaum, A., & Rapaport, C. (2019). Earthquake preparedness: A Social Media Fit perspective to accessing and disseminating earthquake information. *International Journal of Disaster Risk Management*, 1(2), 19-31. <https://doi.org/10.18485/ijdrm.2019.1.2.2>; Perić, J., & Cvetković, V. (2019). Demographic, socio-economic and phycological perspective of risk perception from disasters caused by floods: case study Belgrade. *International Journal of Disaster Risk Management*, 1(2), 31-43; Öcal, A. (2019). Natural Disasters in Turkey: Social and Economic Perspective. *International Journal of Disaster Risk Management*, 1(1), 51-61. <https://doi.org/10.18485/ijdrm.2019.1.1.3>; Guo, X., & Kapucu, N. (2019). Examining Stakeholder Participation in Social Stability Risk Assessment for Mega Projects using Network Analysis. *International Journal of Disaster Risk Management*, 1(1), 1-31. Cvetković, V., Nikolić, N., Nenadić, R. U., Ocal, A., & Zečević, M. (2020). Preparedness and Preventive Behaviors for a Pandemic Disaster Caused by COVID-19 in Serbia. *International Journal of Environmental Research and Public Health*, 17(11), 4124. <https://doi.org/10.18485/ijdrm.2019.1.1.1> etc.

Answer: Indeed, the preparedness level is a crucial issue in risk perception analysis. Certain participants (especially majors and policemen) have highlighted that in the last 10-15 years local communities improved their capacity to cope with the impact of some hazards through structural measures: e.g. snowstorms by the acquisition of specific equipment, and hydro-technical works along rivers (for floods). At the same time, with few exceptions (especially for teachers), the need for a "culture of preparedness and prevention" (Ozmen, 2006; Adame, 2018) as a long-term educational, behavioral, and knowledge-based approach has been underestimated.

In the revised paper, we have added the following references that emphasize the role of preparedness measures at the local scale:

Adame, B. J.: The persuasive efficacy of real versus salient hazard scenarios in motivating citizen-level hazard preparedness, *International Journal of Disaster Risk Reduction*, 31, 292-301, <https://doi.org/10.1016/j.ijdr.2018.05.019>, 2018.

Guo, X., Kapucu, N.: Examining Stakeholder Participation in Social Stability Risk Assessment for Mega Projects using Network Analysis, *International Journal of Disaster Risk Management*, 1(1), 1-31, 2019.

Mano, R., Kirschenbaum A., Rapaport, C.: Earthquake preparedness: A Social Media Fit perspective to accessing and disseminating earthquake information, *International Journal of Disaster Risk Management*, 1(2), 19-31, 19-31. <https://doi.org/10.18485/ijdrm.2019.1.2.2>, 2019.

Öcal, A.: Natural Disasters in Turkey: Social and Economic Perspective. *International Journal of Disaster Risk Management*, 1(1), 51-61. <https://doi.org/10.18485/ijdrm.2019.1.1.3>, 2019.

Ozmen, F.: The level of preparedness of the schools for disasters from the aspect of the school's principals, *Disaster Prevention and Management*, 15(3), 383-395, DOI 10.1108/09653560610669873, 2006.

Perić, J. and Cvetković, V.: Demographic, socio-economic and phycological perspective of risk perception from disasters caused by floods: case study Belgrade. *International Journal of Disaster Risk Management*, 1(2), 31-43, <https://doi.org/10.18485/ijdrm.2019.1.2.3>, 2019.

Referee #2

Dear authors, I have read and appreciated your interesting work. The paper provides a comprehensive and extensive analysis of the risk perception of local stakeholders on natural hazards. The study involved the local stakeholders of Iași Metropolitan area for their decisional and operative role in emergencies.

The paper is well written, and well structured.

Answer: We thank you for your appreciation of this work and the time and effort to review it.

My general comments:

The initial assumptions, expressed with the three research questions, are very important and have probably guided your research. Their explanation is too concise and unclear. If it is true that they are part of the method, since they guided you in designing the interviews, they were the starting point of your research. I suggest you to give them more emphasis also in the introduction.

Answer: The three research questions guided the survey design and the methodological analysis. Thus, according to this constructive comment, we have emphasized them within the text. As for a similar recommendation from reviewer #3, we have moved them into the introduction as follows:

Lines 120-140

“The current paper has been designed to investigate stakeholders’ level of knowledge and cognitive appraisal of natural hazards to define the benchmark level and propose risk awareness strategies to help stakeholders increase the level of resilience of local communities. A set of questions has been developed and administrated face to face to selected stakeholders in the rural administrative units of the Iași metropolitan area (NE Romania). The Iași metropolitan area is one of the largest urban and rural areas in Romania (Iftimoaei and Baciu, 2019), and due to its geographic location, geomorphologic features, and climatic settings, made this area particular fragile to climate extremes and changes, threatening the sustainable economic development of the region. For all these reasons, the Iași area can be considered as a hotspot and can serve as a comparative study for similar realities in Europe. Three work questions guided this study:

RQ1: Does each stakeholder perceive natural hazards differently? The answers to this question can depict stakeholders’ decisional process and priorities, contributing to preventive behavior regarding different hazards in terms of frequency- magnitude-potential impact. Although the selected stakeholders have different roles within the communities and a different timing in the evolution and management of these hazardous events, they all bear extra responsibility (legislative, educational, communicational, and moral) compared to the lay public. In this sense, we stated the second research question:

RQ2: Do different stakeholders have different perceptions and preparedness levels on a set of natural hazards? The psychological, emotional, educational, and professional backgrounds of stakeholders are among the main drivers of preparedness activities facing natural hazards. Research results can help enhance communication of good practices before and after hazardous events, especially for those with rapid evolution, such as earthquakes or floods. Since hilly areas and floodplains characterize Iași Metropolitan Area, and during the last decades, there have been localized hazards (landslides in the hilly

areas and floods in the floodplains), which could influence the risk perception. As a consequence, we formulated another research question:

RQ3: Do topographical characteristics of locations affect stakeholder's risk perception of different natural hazards?"

Also, some punctual references to the three main research questions have been integrated into the discussion and conclusion part of the paper: lines 324, 394, 398, 399, 407, 491, 493, 544, 553, 611, 677.

You have analyzed a broad spectrum of natural hazards of different nature, frequency and severity requiring very different prevention and preparedness measures in terms of costs and operational system. The effort made is considerable but the great differences between the analyzed risks and the stakeholder institutional roles could hide a little pitfall when you compare the survey results. This matter could be more stressed in the discussion.

Answer: We agree with the reviewer. Definitely the different nature, cycle, and management measures and costs of the selected natural hazards can create difficulties in comparisons and conclusions. The need to incorporate multiple hazards starts from the necessity to avoid bias from investigating a single hazard and approach local stakeholders with the most or the least frequent ones, without cognitive or experiential biases. In addition, stakeholders are responsible for all-natural hazards; thus, the need to include them all is imperative in understanding the baseline perception and preparedness in the area. The paper is exploratory, and purposely, any specific direction has been taken. In light of this, in the discussion part, we have added the following paragraph concerning the limitation of this study and the potential input for follow-up research:

"As a limitation of the current study, we highlight the lack of an analysis of socio-demographic factors influencing the interviewees' risk perception, which is due to how the participants were selected. Another limitation of this study concerns the multiple hazards risk perception assessment, and the different nature, cycle, and management measures and costs of the natural hazards selected can find difficult comparisons and conclusions. In the meantime, the need to incorporate multiple hazards is based on the necessity to avoid bias of a single hazard and approach local stakeholders with the most and least frequent ones, without cognitive or experiential biases."

We will rewrite some parts of the discussions in order to highlight the spatial extension and lay people.

The method and the statistical analyses can beneficiate of some minor adjustments, a work flow diagram may help to better clarify the method.

Answer: We did not use any special method or statistical process that would require a workflow diagram. Despite the choice to not overload the paper (that is really long and complex); we agreed that the methodology chapter needs more clarity. For this reason, we enhanced the readability of the chapter and the statistical steps that are undertaken. Furthermore, the statistical analysis has been enhanced based on Reviewer #3 comment, increasing the readability of the statistical methodological chapter.

In the results section you should expand the description of the Correspondence Analysis biplots figures (Figs: 5, 9 and 10) that, in my opinion, is too short and concise reducing the potential interest of the analysis.

Answer: Thank you for the suggestion. In an older former version of the sub-chapter, there was an explanation of the method and of the interpretation which was scrapped to comply with the number of words. We will extend it.

In general, to increase the readability of the paper, it could be helpful to add in the text the references of the questions (Q1, Q2, etc.) when you report the percentage values of the survey results. In the supplementary material Table A2 and Table A3 have some questions that are not in Table A1.

Answer: We have referenced the questions in the main body of the manuscript. We have resolved the missing questions in Table A1 from Appendix A.

PS8: Are there any disabled or non-self-sufficient persons in your household? ☐ Yes (1) ☐ No (0)

PS9: Do you estimate your household income sufficient to meet the family's needs? [On a scale from 1 (min) to 5 (max)]

PS10: How do you assess your level of knowledge about things discussed (from 1 low to 5 high).

PS11: How do you assess your level of implication in the completion of the questionnaire (from 1 low to 5 high).

PS12: How do you assess your level of sincerity in the completion of the questionnaire (from 1 low to 5 high).

These comments and others minor were annotated and trace in the enclosed pdf file.

Answer: We thank the referee comments and suggestions that are part of the *.pdf file, and we addressed all the issues.

Comment 1: The initial assumptions, expressed with the three research questions, are very important and have partly guided your research. Their explanations too concise and unclear. If it is true that they are part of the method, they were the starting point of your research, and maybe you could mention them in the introduction to lines 100-105

Answer 1: We made the modifications to comply with the comment, and these are covered in the first answer.

Comment 2: Q1 Q2 and Q3 are also the abbreviation used for the questions asked during the interviews (Table 1A). These research questions you are citing here could be identified with another abbreviation or only numbered.

Answer 2: We used the RQ coding (Research Question) to differentiate from the coding for questionnaire questions.

Comment 3: To better describe the three main steps and the relative statistical analyses a workflow chart could be very helpful.

Answer 3: We did not use any special/new method or statistical process that would require a workflow diagram. Despite the choice to not overload the paper (that is really long and complex), we agree that the methodology chapter needs more clarity. For this reason, we enhanced the readability of the chapter and the statistical steps that were undertaken. Furthermore, the statistical analysis has been improved based on Reviewer #3 comment, increasing the readability of the statistical methodological chapter. Now Chapter 3 was heavily updated from lines 279-385.

Comment 4: I'm sorry, but I don't understand.

Answer 4: It was a mistake that we resolved: "decident" instead of "decedent".

Comment 5: Please add the number of question Q1 the plot is related. It should be done in all the next plots.

Answer 5: We agree, and we introduced the coding in the figures and for clarity we also introduced the question text.

Comment 6: Please add the number of question the plot is related.

Answer 6: We agree, and we introduced the coding in the figures and for clarity we also introduced the question text.

Comment 7: please, give the values you are referring to.

Answer 7: These values refer to the difference in mean age and are presented now in Table 5. We also extend the paragraph to explain more the age situation.

Comment 8: please, give the table or figure reference for the % values.

Answer 8: Including the frequency statistics, especially by stakeholder type, will increase the length of the Appendix.

Comment 9: In the figure caption you can add a legend to explain what is the vector (column variables) and what dots (Likert scale count) for Q1.

Answer 9: We inserted a text in the caption to reference the explanation regarding the interpretation, which is also well covered in the statistical chapter: lines 335-363.

Comment 10: Please, give figure reference (fig 4?)

Answer 10: Figure 4 should be referenced here, and we modified the text to reference it.

Comment 11: change in 1977 Vrancea earthquake.

Answer 11: We did the change.

Comment 12: Please add the number of question the plot is related.

Answer 12: We did the change.

Comment 13: Please add the number of question the plot is related.

Answer 13: We did the change.

Comment 14: Please add the number of question the plot is related.

Answer 14: We did the change.

Comment 15: please describe in more detail the two figures.

Answer 15: We did the change.

Comment 16: Please add the number of question the plot is related.

Answer 16: We did the change.

Comment 17: Please add the number of question the plot is related

Answer 17: We did the change.

Comment 18: is it a question or is a result?? Are you referring to the Interviewee person settings (PS1, PS2.....).

Answer 18: This is the PS9: Do you estimate your household income sufficient to meet the family's needs? [On a scale from 1 (min) to 5 (max)] that has been added to Table A1 as we said above.

We hope that you will find our responses to cover all the raised comments.

Referee #3

General comments:

The authors present a case study from Iasi, in Romania, where they explored local stakeholders' risk perception concerning multiple natural hazards. They conducted 118 surveys with five different types of stakeholders (school heads, priests, police officers, mayors, and farmers). They found that different stakeholders show different perceptions of risk, also due to the geographical location of their community. The idea behind the paper is interesting and relevant, as often these groups work as a bridge between authorities and local communities and play a fundamental role during disasters.

Answer: We thank you for your appreciation of this work and the time and effort to review it.

However, there are some concerning aspects that the authors should address before this paper can be considered for publication in NHESS. I will list them here, together with some minor/technical corrections.

Answer: We thank the referee for the helpful comments and suggestions, and we will respond to all the concerning aspects.

Specific comments:

1) Article structure – Section 2.1-2.2-2.3 are very detailed, so much so that the reader loses sight of what the paper is about. I think it is relevant to provide information on the geomorphology, climate and natural hazards history of the area, but this can be done more concisely. Instead, I would give more space to literature on risk perception and stakeholders role in communities during disaster, which are now confined to the short introduction and should be expanded (this is the core of the paper, after all).

Answer: Indeed, the space for presenting the study area and specific risk-related aspects seems to be a bit long. The particularities of the recent transformations of the built-up areas in Iași Metropolitan area represented a major issue that should be presented in this paper because it is part of the study's rationale. In the updated version, we give more concisely the settings of the study area (rows 143-245), and some information that is not strictly related to the risks induced by natural hazards has been removed. In the introduction and discussions we included several references (here some of the others that will be included) to enhance the literature on risk perception:

Burningham, K., Fielding, J. and Thrush D.: "It'll never happen to me": Understanding public awareness of local flood risk. *Disasters*, 32(2), 216–238, doi: 10.1111/j.1467-7717.2007.01036.x., 2008.

Grothmann, T. and Reusswig, F.: People at risk of flooding: Why some residents take precautionary actions while others do not, *Nat. Hazards*, <https://doi.org/10.1007/s11069-005-8604-638>, 101–120, 2006.

Heijmans, A.: *Vulnerability: A matter of perception*. Benfield Grelg Hazard Research Centre. London. Disaster Management Working Paper, 4, 1–17, 2001.

Plapp, T. and Werner, U.: Understanding risk perception from natural hazards: examples from Germany, in: RISK 21 – Coping with risks due to natural hazards in the 21st century, edited by Ammann, W., Dannenmann, S. and Vulliet, L., Taylor and Francis, 2006.

Plattner, T., Plapp, T., and Hebel, B.: Integrating public risk perception into formal natural hazard risk assessment, Nat. Hazards Earth Syst. Sci., 6, 471–483, <https://doi.org/10.5194/nhess-6-471-2006>, 2006.

Santoro, S., Pluchinotta, I., Pagano, A., Pengal, P., Cokan, B., Giordano, R.: Assessing stakeholders' risk perception to promote Nature Based Solutions as flood protection strategies: The case of the Glinščica river (Slovenia), Sci. Total Environ., 655, 188-201, 2019.

Schneiderbauer, S., Fontanella Pisa, P., Delves, J. L., Pedoth, L., Rufat, S. et al.: Risk perception of climate change and natural hazards in global mountain regions: A critical review, Sci. Total Environ., 146957, <https://doi.org/10.1016/j.scitotenv.2021.146957>, 2021.

Siegrist, M. and Gutscher, H.: Natural hazards and motivation for mitigation behaviour: People cannot predict the affect evoked by a severe flood. Risk Anal., 28(3), 771–778, doi: 10.1111/j.1539-6924.2008.01049.x, 2008.

Sjöberg, L.: Factors in risk perception, Risk Anal., 20(1), 1-11, <https://doi.org/10.1111/0272-4332.00001>, 2000.

Sujakhu, N. M., Ranjitkar, S., Niraula, R. R., Pokharel, B. K., Schmidt-Vogt, D. and Xu, J.: Farmers' Perceptions of and Adaptations to Changing Climate in the Melamchi Valley of Nepal. Mountain Research and Development 36, 15–30, <https://doi.org/10.1659/MRD-JOURNAL-D-15-00032.1>, 2016.

Wachinger, G., Renn, O., Begg, C. and Kuhlicke, C: The Risk Perception Paradox—Implications for Governance and Communication of Natural Hazards, Risk Anal., 33, 1049-1065, doi: 10.1111/j.1539-6924.2012.01942.x, 2013.

Also, we introduced the lines 89-109:

“Risk perception studies emphasized the role in making prudent disaster reduction decisions (Bamberg et al., 2017; Bradford et al., 2012; Buchecker et al., 2016; Rufat et al., 2020; van Valkengoed and Steg, 2019), from this point of view this issue is one of the central themes of the studies approaching climate change and natural hazards (Schneiderbauer et al., 2021). Referring to flood risk, Lechowska (2018) highlights differences between societal perceived risk and the risk level determined by the experts. Local stakeholders' risk awareness and risk governance strategies should fill this gap by improving the active involvement of stakeholders and the public (Gamper, 2008; Fleischhauer et al., 2012). Also referring to rare floods triggered by extreme weather conditions, Burningham et al. (2008) argued for more contextual research

that explores local perspectives on flooding within broader evaluations of local life. They also pointed out an underestimation of the perceived risk of these rare events, especially due to the neglect of local-scale analyses.

A key issue in risk perception approaches is related to risk communication, seen not only as a technical, a level of risk, or a potential of a negative consequence, but also the possibility, effectiveness, and cost of private precautionary measures (Grothmann and Reusswig, 2006). Also, risk communication must help people envisage natural hazards' negative emotional consequences (Siegrist and Glutcher, 2008). In a direct relationship between the level of the resilience of the local communities and the harmful effects of natural hazards is the preparedness level, which constitutes another key issue in risk perception studies, as the recent literature emphasizes (Guo and Kapucu, 2019; Mano et al., 2019; Öcal, 2019; Perić and Cvetković, 2019)."

2) Background – The paper is about risk perception, but very little literature is presented in this regard. The authors mention that the lay public “demonstrated a low perception and readiness”, but where does this information come from? The stated aim of the paper is to “investigate stakeholders’ level of knowledge and cognitive appraisal of natural hazards in order to understand if they think and act differently from the lay public [...] and understand their role during emergencies”. Yet the paper only focuses on the perception of the stakeholder, and no lay person was interviewed, making it impossible to detect any differences in perception. Second, it seems from the introduction (lines 62-75) that the role of the local stakeholders during emergencies is already known and understood.

Answer: Thank you for pointing this. Indeed, we did not include the laypeople, and we will rephrase to avoid the mentioned ambiguities. The role of stakeholders is specified by the law and was presented in the text (lines 46-73). Our study focus is on the perception of stakeholders, given their important role (lines 74-82) in risk management and community preparedness. In the introduction (lines 110-119), we have intentionally shown the level of perception and preparedness of lay people, as investigated in the Romanian literature. As mentioned before, we will add some references to risk perception studies in order to give the reader sufficient background to understand the paper. Thus, the most common drivers of risk perception and preparedness (e.g. age, gender, etc etc.) have not been addressed.

The authors investigate perceptions of seven natural hazards but divide all the communities assayed according to only three of these hazards (floods, landslides, soil erosion). How are the other hazards distributed across the communities examined? Do they affect them all with the same frequency, intensity?

Answer: Thank you for pointing these aspects. The division was made initially only to pinpoint the case of specific natural hazards because the purpose of the paper was to check whether the characteristics of natural hazards influence the perception: lines 563-597 (we updated lines 177-181 to specify this). Later, in the interpretation of the data, we also considered this factor as a group covariate. Alongside the hazards that affect large areas, at a regional/national scale (such as droughts, earthquakes), some are related to the local geomorphological settings (floods, landslides, soil erosion), and their negative consequences are felt on a local scale (rows 413-414). We finally made a synthetic description of the hazards affecting the study area (sections 2.1 and 2.2). While some references are written in Romanian, we certify that our resume shows the current knowledge from the literature about the study area.

3) Data collection – The authors mention dominant, discretionary, and dormant stakeholders, but these terms are not defined, nor used anywhere else in the paper.

Answer: We have defined the main characteristics of these types of stakeholders, according to the extended stakeholder’s salience theory of Mitchell et al, 1997 (the paper was cited: rows 247-254). According to

Mainardes et al., 2012 (paper cited: rows: 244). "this model includes stakeholder powers of negotiation, their relational legitimacy with the organization, and the urgency in attending to stakeholder requirements" and we adopted this model by considering that these characteristics can differentiate the role of local stakeholders during local crisis generated by disasters. As a consequence, the mentioned paragraph (rows 238-240) was changed, as follows:

"Local stakeholders have been selected representing different characteristics in terms of power, legitimacy, and urgency, following the stakeholder's salience theory of Mitchell et al. (1997). This model includes stakeholder powers of negotiation, their relational legitimacy with the organization, and the urgency in attending to stakeholder requirements (Mainardes et al., 2012). According to the mentioned classification, the dominant stakeholders (mayors, police officers), discretionary stakeholders (farmers), and dormant stakeholders (professors and priests) have been selected."

At the same time, in the discussion part, we make certain references to the mentioned stakeholder types in different approaches of risk perception main sections.

Figure 2 would be easier to read if it were a table. It would also be good to know the % of respondents in the HUA and FUA (e.g. priest 21% of the total, of which 60% in HUA and 40% in FUA). All this info plus that in Fig.2 plus lines 253-261 can be nicely summarized in a table.

Answer: We replaced Fig. 2. and the mentioned text with a table (see the attached file table.pdf - for now, it is provisional, we are working on an optimal better layout for the revised version of the article), adding the required percentages of HUA and FUA.

Line 251 "some stakeholders inviting other members of the community (especially the mayors) into the dialogues", do the authors mean that the mayor was invited to the interview? I think this could cause some issues as the answer of the interviewee could have been influenced by the presence of the mayor.

Answer: Thank you for pointing this; it is an error in the English translation from Romanian. All the interviews took place individually (the first part: pre-defined questions regarding assessing risk perception induced by natural hazards). In few cases, in the second part of the interview (that included discussions focused on environmental and hazardous phenomena in the area) some majors considered as beneficial for other employees (and not another stakeholder) of the mayor's office to take part in the discussion. In fact, we did not include the latter conversation in the results. We rephrased the rows 261-264, to avoid any confusion.

Lines 262-272 should go in the introduction/background.

Answer: Thank you for this suggestion, we moved and detailed the mentioned text concerning the three main research questions of the paper in the introduction part as suggested also by Referee #2).

It is unclear whether the authors conducted questionnaire surveys or semi-structured interviews. It seems to me that they conducted questionnaire surveys (considering that all the questions were close-ended), as they specify in line 246. If they also conducted semi-structured interviews, they should report the questions that were asked (at least the initial ones, but the follow-up ones should be reported too), whether the interviews were recorded, how was consent acquired, whether they were transcribed, and how data from the interviews were analysed.

Answer: Thank you for pointing this aspect. We conducted a structured questionnaire and we have specified this in the paper (the responses were recorded on the questionnaire sheet by an author while the interviewee read his own sheet; the consent was acquired previously when we arranged the meeting with the

stakeholder; we did not record the interview). However, at the end of the interview session, the interviewees were free to add any comment or to share memories or past experiences freely. We included some of those free additions to explain some statistical trends. We have clarified it into the methodology part.

Table A1 in the appendix should also report the minimum and maximum value for every question asked on a scale. What does “low-high” that sometimes appear in the second column of the table mean? Are those the extremes of the scale?

Answer: We understand the confusion about the scale of measurement used. We used a 5-point Likert scale, that qualitatively was related to: “very low, low, medium, high, very high”. To simplify the table, we used the qualitative label but eventually, we have confused the reader. We have changed the table in accordance.

Q13 asks two questions in one, this can be an issue for those respondents whose answer may change depending on the question part (reduce negative consequences of natural hazards vs it should be taken as a priority where you live).

Answer: Thank you for pointing this fact. Actually, the respondent must choose from the indicated items the one that satisfies both criteria as they are highly interconnected. That is the reason behind this wording choice. We have added a note to explain it as a footnote in the table.

4) Statistical analysis – The analysis of the data is rather shallow, often just a comparison of percentages. The contingency table tests results would be clearer if presented in the form of Chi-square values, rather than with Correspondence Analysis (CA) graphs. In my opinion, they are hard to read, not intuitive, and a distracted reader may even draw wrong conclusions from them. In addition, I don’t think it is an appropriate way to represent your results. Running some ordinal logistic regressions would add some depth to the analysis and would give additional insights on the role of type of stakeholder and geographical characteristics in influencing risk perception.

Answer: Thank you for pointing these aspects. As we pointed in the text, we did not consider the application of the parametric statistics, but of the nonparametric (lines 283-287 – old manuscript) considering the scientific literature in this regard. In order to understand which is the better methodology that can explain the results, we added the parametric methods and compared the results with the non-parametric ones. The results are very similar.

We added chi square and Kruskal-Wallis in the non-parametric analysis and ANOVA in the parametric one. In this case, ordinal logistic regressions are not considered due to the nature of the paper and its variables. The nature of the paper is exploratory regarding stakeholders and their intrinsic differences not the variables affecting the perceptions overall. Possibly another research paper can follow up with these analyses. We indeed used logistic regression only where the dichotomic data was present.

All the statistical sections were updated with the new methods applied and with the description of the possible interpretations that were referenced to the data in the results section.

5) Results – The results of the statistical analysis are reported only in terms of %, and the correlations are reported through CA graphs (such as in Fig. 5-9-10). I think a much more meaningful representation of the data would be plotting the mean responses for Q2 (perceived impact) and Q4 (perceived likelihood) for each hazard by stakeholder type. This would immediately show potential differences in risk perception and it’s more intuitive to read.

Answer: We agree, we added two plots (Fig. 3 and 9) to show the differences and we discussed them.

6) Discussion – The discussion should go more in depth, and this would be facilitated by a deeper statistical analysis. It would also help to have the discussion structured following the three research questions/themes.

Answer: We agree, we will extend the discussion part focused mainly on the research questions and findings. The statistical analysis will include also more focused methods as we previously pointed.

No limitations of the study are discussed, even though there are quite some (e.g. sample size, not surveying any lay person, statistical analysis). The discussion does not tie the results to the literature, and it is therefore hard to generalize the results and compare them with previous (and potentially future) studies.

Answer: Thank you for pointing this. In the new version of the paper, we addressed the points raised above: lines 665-729. We have purposely not interviewed lay people, because the literature is moderately rich on this, so we focused attention on the leaders of the communities since they are those who are requested to take action during hazardous events. We agree with the reviewer that the discussions had to be contextualized more with respect to other similar studies, that to authors' knowledge are very few. In this regard, some of the literature was consulted regarding stakeholder risk perception and leadership outside the natural hazard domain. The study results are somehow difficult to generalize to the specific socio-economic and political progress in Romania, however, some other considerations were drawn.

Research question – Q1 what do the authors mean with “dependency relationship between the threats of different natural hazards”?

Answer: Indeed, there is a certain ambiguity, so we modified Q1 like this: "Does each stakeholder perceive natural hazards differently?"

7) Technical corrections:

The manuscript needs in-depth proofreading, some sentence constructs are hard to follow, and there are few typos throughout the paper (I provide some examples below, but the list is not exhaustive).

Answer: We will carefully proofread the paper to avoid any misspell or error and if necessary we will rely on an external professional proofreader in a second stage if the issue is highlighted again by reviewers. The mentioned technical correction will be addressed through the paper.

Line 23: “some stakeholders”, communities and authorities are stakeholders too, so I would use “other stakeholders”

We amended this in the paper with thanks.

Line 162: I think there's a repetition in the sentence.

Amended with thanks. "Especially during the summer," was removed

Line 164: it should be “is”, not “if”

Amended with thanks. We replaced "if" with "is".

Line 203: “persons” can be removed, it's superfluous.

Amended with thanks. "Persons" was removed