

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Comment on nhess-2021-45

Anonymous Referee #2

Referee comment on "A new approach to assess the impact of extreme temperature conditions on social vulnerability" by Ibolya Török et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-45-RC2>, 2021

The manuscript can be impactful in the scientific community because of the type of hazard selected. However, it lacks novelty regarding the methodology (using a standard set of variables that have a stretched connection with extreme temperatures) and potential outcomes. It considers a very small study area for which any justification has been given. Here some general comments:

1) Although the introduction is perfectly organized and well document the progress and directions of social vulnerability, it fails to include key concepts on (socio) vulnerability and extremes temperatures. Some crucial papers in this context are (but not limited to):

- Uejio, Christopher K., et al. "Intra-urban societal vulnerability to extreme heat: the role of heat exposure and the built environment, socioeconomics, and neighbourhood stability." *Health and Place*, 17.2 (2011): 498-507.
- Conlon, Kathryn C., et al. "Mapping human vulnerability to extreme heat: a critical assessment of heat vulnerability indices created using principal components analysis" *Environmental Health perspectives* 128.9 (2020): 097001.
- Hansen, Alana, et al. "Vulnerability to extreme heat and climate change: is ethnicity a factor?." *Global health action* 6.1 (2013): 21364.

2) The study area is described very vaguely, and any mention is given to the vulnerability of extreme temperatures. Is the area frequently exposed to extreme temperatures? What are the consequences detected in the last decades (considering the economy, the health, etc.)? There is a need for a substantial justification behind the selection of such a small scale of analysis. The methodology is not at all new; thus, a small spatial scale is not enough. Why don't you run the analysis considering Romania as a whole?

3) Another important point is the choice of the variables. It seems that a standard set of variables has been included, and some of them have not direct relation with extreme temperatures vulnerability. By exploring the literature, variables, in this case, are concrete and need to be justified and contextualized. Otherwise, "the peculiar socio-cultural characteristics of the study area" are not met in the analysis.

4) In the "methodology" chapter, many references are missing regarding the database consulted. I expect to find the link in the reference list. Also, which year or years have been considered for data collection? It is not mentioned anywhere.

5) I don't understand the connection with precipitation and the inclusion of even precipitation graphs within the manuscript. I recommend deleting those unless adequately justified.

6) Any information is mentioned regarding the indices. Can you introduce the paragraph with a general statement by giving the researchers' proper credits for who first developed them? I also feel some confusion when explaining the database used (e.g. (i) when creating the DEVI, the authors amended one database with another one; or (ii) when included in the SEVI index another index -the Local Human Development Index). How is it possible to have an index into another index? This also reveals another critical flaw in the methodology. Do the authors perform a multicollinearity analysis? I guess that some of the variables may be explained by some others, double-counting them into the equation. I am quite sure that within the 13 weather-related variables, some of them present some collinearity. Likewise income and social welfare, or the Local development index with some others.

7) Chapter 3 and 4 are divided into many subchapters that sometimes account for just a single paragraph. This makes them very difficult to read.

8) "4.4 Analysis of BEVI": the authors state: "On the one hand, limited access to basic services like access to piped water and sewage network, the share of wooden houses make people more vulnerable, especially those from rural areas and highly isolated mountainous regions (southwestern and northeastern parts of the county)". How can the lack of basic sanitation influence the vulnerability of people to extreme temperatures? And more, are urban agglomerates more fragile to extremes temperatures because of lesser evapotranspiration rather than rural and mountainous areas? These very vague sentences make me feel that the variables' choice has been made without a proper understanding of the hazard selected. Running a social vulnerability analysis is not just a PCA; it is how the chosen variables interact in the current socio-cultural and economic environment.

9) What is the demographic dependency ratio and rate of natural increase? What is the social welfare ratio?

10) The discussion is somehow discussing the whole of Romania. Thus I would change the study area and make it wider

11) In the conclusion, the authors mention that: "[...] the results of this research were obtained based on a significant selection of socio-economic and climate-related variables, an improved methodological assessment, and a GIS-based approach". Any GIS approach has been performed in the current manuscript. The display of the vulnerability into a map is not a GIS approach, nor it is new.

11) The legends of the figures are missing the unit of measurement

I feel that much more is needed, starting from a deep study on the physical characteristics of extremes temperature and how this hazard may be impacted and can impact people and targeted groups.