

Interactive comment on “Mapping Accessibility in the Historic Urban Center of Bucharest for Earthquake Hazard Response” by Ioan Ianoş et al.

Anonymous Referee #2

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Referee report on ms nhess-2017-13 “Mapping Accessibility in the Historic Urban Center of Bucharest for Earthquake Hazard Response”, submitted to Natural Hazards and Earth System Sciences Discussion

July 24, 2017

The authors present a study on post-disaster accessibility of the historical centre of Bucharest using an earthquake scenario affecting the city. Accessibility was computed by means of GIS using the geometric structure of the transport network, and taking into account possible network interruptions as a result of a seismic event. The accessibility was calculated as a function of the distances between different residential areas and hospitals areas and of the time necessary for these movements using isochrones. As such, the topic is of relevance for the target journal. However, before the manuscript may become acceptable for publication in NHESD, the following shortcomings should be addressed in order to increase the accessibility of the work.

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0.0.1 *Introduction*

The introduction of the article outlines the importance of risk management for seismic hazards, the preparation of precise emergency plans and the use of GIS methods to obtain these plans.

- Please carefully review the consistent use of definitions and formulation in this section (e.g. p.2. l.3-5, p.2 l.13-14 or p.2 l.27-28).

0.0.2 *Case Study*

The case study fits the topic in general because of the described high exposure for earthquakes and the dense urban structure in the city core of Bucharest with an old building stock. The description of the case study is detailed.

- The text and the caption of Fig.2 refers to a different year (1972 and 1977)
- Statements such as p.3 l.15-16 need an explanation: Why is it interesting for this study?

0.0.3 *Data and methods*

The section presents the used data sets and methods of the study. I think some points of these paragraphs need more explanation to make the study fully understandable.

- The authors may wish not to over-emphasise the use of GIS in their analysis since this is a tool widely accepted in the research community (and in practice) for geospatial analysis.

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- The description of the used data is insufficient. Please name the sources of the datasets and their background. Especially a description of the dataset “buildings subject to seismic risk” is missing. How seismic risk for this buildings was calculated? Is it only a binary dataset? Was seismic risk analysed using an appropriate earthquake model?
- The methods section (p.5) is not really coherent. Please assign the different tools to the described working steps (p.5 l.23-29) to make your research reproducible.
- Ad. step f): How did you identify locations of congestions? Please describe the workflow.
- Ad. step g) (in the text f) again): Do you follow the assumption that every building from your dataset will collapse in case of an earthquake? So is it a one scenario/worst-case analysis? Can you establish a connection between the intensity of an event and the collapsing buildings (based on structure, age, exposure,...)?
- It remains unclear how the described traffic data was added in the analysis?

0.0.4 *Results and Discussion*

The section presents the results of the network analysis. The accessibilities before and after an earthquake event are briefly discussed.

- Fig.3, Fig.4 and Fig.5 all show the distribution of the building stock with a high seismic risk. Fig.3 is very hard to read and is not really necessary when there is Fig.5. Fig.4 additionally shows the traffic. A big improvement would be the homogenization of Fig.4 and Fig.5 regarding the scale and the extent of the maps to make them comparable. Please reconsider the colour ramp of Fig.5 – the map has too many classes and no intuitive colouring.

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- Please name what density estimation you used for Fig.5 in the text or figure caption
- Fig.6 and Fig.7: Why you use a 3D visualisation? Please do not use a scale bar in a 3D map. To improve the figures also adapt scale and extent to the same as in Fig.5 and make the maps simply 2D.
- For Fig.6 and Fig.7 there is no description how you calculated the results, is it a casual service area analysis?
- The references to the Figures do not fit on p.7, there is no Fig.10.
- The results of Fig.8 and Fig.9 are comprehensible. How you got these results, please add a description of the approach in the text – otherwise I have to emphasise that the methods are not fully mirrored in the results and as such the paper cannot be accepted. Why there are areas in the direct neighbourhood of hospitals or firefighters with a low accessibility, although there are no buildings at risk (around Kogalniceanu Square)? And areas far away from the station with a lot of buildings at risk around that area with a high accessibility (north and east of Romana Square)?
- Improve Fig.8 and Fig.9 by homogenisation of scale, extent and look.
- Please indicate given region names (p.7 l.27) on one of the maps.

0.0.5 *General notes*

- The application of network analysis for mapping accessibilities is common sense. The methodological approach of the study utilizes buildings with seismic risks as potential road blocks in case of an earthquake event. To improve the method the application of different scenarios (based on earthquake intensity or building indicators) is recommended.

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- The part of the study with policy recommendations is rather short, how the produced maps and results can be used in the future?
- The article does not discuss validity and accuracy.
- Moreover, I kindly would like to recommend a sound proofreading of the manuscript by a native speaker, even if proofing is also offered by Copernicus.

These shortcomings should be carefully addressed before the material may become acceptable for final publication in NHESS. Therefore, I recommend major revisions.

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