Subject: Revised manuscript with the reference number: nhess-2021-351

We would like to thank you for giving us an opportunity to revise our manuscript. We have addressed all the concerns comments and would like to submit our revised manuscript entitled " **Probabilistic Fault Displacement Hazard Analysis for North Tabriz Fault**" for further consideration. We have modified the manuscript thoroughly by considering all of the comments raised by the reviewers and editor which indeed improved the manuscript. In the following we respond to the comments in details.

Sincerely

Habib Rahimi

1) The introduction is missing of several worth-to-mention papers and should be improved accordingly.

According to your comment, several papers (mentioned below) have been reviewed and the introduction of the manuscript is revised accordingly. Please see the introduction of the annotated manuscript.

*1.Baize, S., Nurminen, F., Sarmiento, A., Dawson, T., Takao, M., Scotti, O., Azuma, T., Boncio, P., Champenois, J., Cinti, F.R. and Civico, R., 2020, A worldwide and unified database of surface ruptures (SURE) for fault displacement hazard analyses: Seismol. Res. Lett, **91(**1), 499-520.*

2.Goda, K., 2021, Potential Fault Displacement Hazard Assessment Using Stochastic Source Models: A Retrospective Evaluation for the 1999 Hector Mine Earthquake: GeoHazards, 2(4), .398-414. https://doi.org/10.3390/geohazards2040022.

3.Nurminen, F., Boncio, P., Visini, F., Pace, B., Valentini, A., Baize, S. and Scotti, O., 2020. Probability of occurrence and displacement regression of distributed surface rupturing for reverse earthquakes: Front. Earth Sci. 8, 456.

4.Katona, T.J., 2020, Safety of Nuclear Power Plants with Respect to the Fault Displacement Hazard. Appl. Sci. 2020, 10, 3624.

2) The input data must be clearly described both in the main text and in the figure. Fault length and selected site are just two examples.

In this section, in addition to re-editing the figures of the manuscript (figure 1), to introduce the input parameters, we also briefly explained these parameters in the introduction. Please see the introduction of the annotated manuscript.

3) The section Methodology of probabilistic fault displacement hazard analysis needs a deep review. I suggest to focus only on the approach used (i.e., Petersen at al.) and I would like to see all equations used (and how).

Yes – It is done. Please see the " **Methodology of probabilistic fault displacement hazard analysis** " of the annotated manuscript.

4) The section Results and Discussions is very poor. There is no discussion about the results and, for me, it has been very hard to understand how input parameters are considered and which equations are used. This paper could help the seismic hazard local community but it need a major review in order to make the manuscript clear and readable. Reading the paper I have the feeling that most of things are omitted and not well described.

Yes – This section is completely revised according your comments.
To explain the results obtained more clearly, we added Figure 9 which examines and compares the results obtained for two different scenarios and identifies the worst case and will have a better description of the results obtained. Please see the "Results and Discussions" of the annotated manuscript.

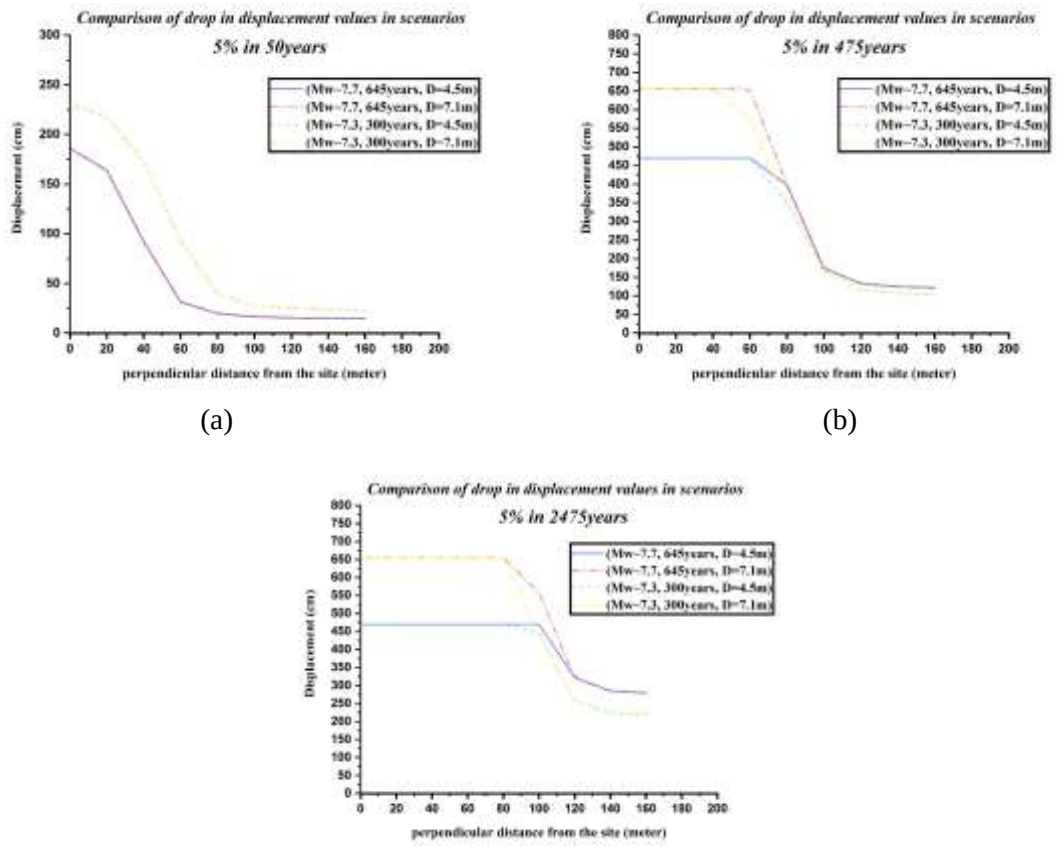

Figure 9. Comparison of drop in displacement values in scenarios, a) 50years, b) 475years, c) 2475years

5) As it is, this work is just an application of an already published work (Petersen et al., 2011). Which is the contribute to the scientific community? even if the authors are in position that they cannot contribute from a methodological point of view, a good discussion section can help to improve the quality of the manuscript, for example, highlighting the critical aspects of this approach, the difficulties that they have found in its application, area that need further and future works, implication in the hazard of the area, and so on.

This comment of yours was very effective and useful for us. we examined the strengths and weaknesses of the work and also examined the applications of this method in northwestern Iran, how they can be effective in the future. In fact, this fault has a high level of risk and lacks high instrumental data and causes uncertainty in studies. For this reason, different scenarios have been considered for displacement estimates.

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6) Several references (more than 15!!) are in the reference list but they are not in the manuscript. This is a little bit embarrassing. Reference list is important as well figure and main text as.

Yes – we are sorry. All of the mentioned comments are considered and the manuscript is revised accordingly.