

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC3
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Comment on nhess-2021-287

Anonymous Referee #3

Referee comment on "Brief Communication: A case study of risk assessment for facilities associated with earthquake-induced liquefaction potential in Kimhae City, South Korea " by Sang-Soo Jeon et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-287-RC3>, 2021

General comments

The paper describes a study where the liquefaction potential of soils in the Kimhae City, South Korea, is assessed concerning two seismic scenarios of moment magnitude 5.0 and 6.5, respectively. The paper undoubtedly addressed relevant scientific and technical questions within the scope of NHESS, because it presents new data and investigates a new case study. Even though scientific significance can be detected in the current version of the manuscript, the scientific and presentation quality needs a wide and accurate revision. The adopted technical approach based on the LPI index is well-established in the current state of practice, but a systematic literature review of the most recent and innovative methods for soil liquefaction assessment is completely missing. In addition, the background for the considered case study needs to be integrated with the findings of previous studies, if existing, or the absence of previous works should be likewise highlighted. This is relevant for understanding the importance and the scope of the proposed study.

The criticisms that should be addressed in the revised paper are further detailed in the next section "Specific comments", while the main "technical corrections" are also summarized in the next. Finally, the size, quality, and readability of each figure are not adequate to the type and quantity of data presented and an extensive revision is required.

Specific comments

- Line 14-26: The abstract does not provide a concise, complete, and unambiguous

summary of the work done and the results obtained. In particular, the 2016 Gyeongju earthquake mentioned in the abstract is not mentioned in the ensuing paper. Please, revise the abstract so that is going to reflect the paper contents;

- Line 35: Since the study is going to be published in an international journal, a figure introducing the study area in the geographical context of South Korea will be greatly appreciated;
- Lines 36-38: In the paper, the most recent seismic events that induced liquefaction are not mentioned, e.g., 2018 Palu, Indonesia earthquake; 2020 Petrinja, Croatia earthquake;
- Line 46: The adopted LPI index has multiple drawbacks, widely known in the literature. At least a review of the most recent indexes should be included in the revised paper (e.g., (Sonmez 2003; van Ballegooy et al. 2014; Chiaradonna et al. 2020);
- Line 85-92: The description of the safety factor calculation is too approximate. The results are largely affected by the results (see Ramos et al. 2021 for instance), so the empirical method adopted for the calculation is not a secondary piece of information, and it needs to be specified;
- The English language can be improved (e.g., line 15);

Technical corrections

- Line 3: "potential" can be omitted;
- Line 35: Pohang EQ is not introduced in the text. Please, add details (e.g., magnitude, date, epicenter) about this seismic event at the first mention in the body text;
- Line 49: FS is not defined;
- Figure 1. The flow chart is not properly discussed in the text. In particular, some parameters reported in the flow chart " S_C , S_D , S_E , S_F " remain undefined. Please, clarify this point.
- Figure 2b. The centroids of the administrative areas are not visible. Please, move the centroid layer above the shaded area of study;
- Table 2. The administrative districts are listed in Table but cannot be visualized in Figure 2. Please, rearrange the map in Figure 2a so that the name and boundary of each district can be identified;
- Figure 3. Labels in the legend cannot be read. Please, increase the figure resolution. However, the law by Choi et al. (2005) seems not reported, differently from what is said in the text. Please, revise accordingly;
- Table 3. Numbers in table 3 are not readable. Please, revise;
- Figure 4. It is too small and the legend is unreadable. Please, enlarge the figure and increase the resolution;
- Section 4. Line 184: The current section consists of one sentence and one table. Too short to be considered a stand-alone paragraph of the paper. Please, revise adding a detailed description of the facilities or moving the table elsewhere.
- Figures 6 are too small and the facilities are unreadable in many cases. Please, revise.

