COMMENTS for manuscript nhess-2024-138

1. The overall quality of the preprint (general comments)

The revised manuscript presents significant improvements over the initial submission. The authors have effectively addressed several key concerns raised during the review process, particularly in refining their methodology, providing additional validation, and clarifying the model's applications. The inclusion of Sections 4.3 and 4.4, along with new figures (Figures 13, and 14), has notably enhanced the manuscript's clarity and robustness. The study remains a valuable contribution to seismic loss estimation and exposure modeling, with its detailed grid-level fixed asset model providing a novel and practical dataset for China's disaster risk assessment community.

However, despite these improvements, some minor revisions are still recommended to further strengthen the manuscript before final acceptance. The remaining concerns primarily pertain to depreciation rate variability, early-year data reliability, and asset categorization, all of which could enhance the study's applicability and methodological robustness with additional refinements

2. Individual scientific questions/issues (specific comments)

Here are some areas for minor revision:

Depreciation Rate Variability

While the authors acknowledge the importance of variable depreciation rates, the model continues to use a fixed 5% rate across all provinces and time periods. This assumption may not fully capture regional differences in asset longevity, economic conditions, and maintenance practices.

Suggested Revision: Include a sensitivity analysis testing different depreciation rates (e.g., 5%, 7%, and 9%) and their impact on estimated asset values. This would provide a clearer understanding of the model's robustness and potential variations in loss estimation.

Even if the dataset constraints prevent full integration of variable rates, a quantitative discussion on the potential impact of using different rates would add credibility to the model.

Early-Year Data Reliability

The authors justify their approach of using population density data as a proxy in the absence of nighttime light or built-up area data before 1971. While reasonable, this introduces uncertainty in the fixed asset estimates for early years.

Suggested Revision: Provide a comparative analysis of early-year fixed asset estimations against alternative historical economic indicators (e.g., historical GDP, industrial output). If

direct comparisons are not possible, a brief discussion of potential error margins in early-year estimations would help.

Addressing possible inconsistencies in early-year estimates will strengthen confidence in the model's historical reliability, particularly for long-term economic trend analysis

Asset Type Categorization

The model does not differentiate between asset types (residential, commercial, industrial), limiting its utility for applications that require specific asset vulnerability assessments.

Suggested Revision: If differentiation is not feasible due to data limitations, clarify in the discussion how future studies could incorporate land-use data, building inventories, or economic sector data to refine the model.

Even if asset-type differentiation is beyond the scope of this study, acknowledging its importance and outlining potential future directions would improve the paper's practical relevance.

3. Technical corrections

The authors have made commendable efforts in refining the manuscript's clarity, addressing most grammatical and typographical errors. However, the following minor adjustments are recommended (disregard if this reviewer saw it wrongly):

- Equation Consistency: The symbol for delta (δ) is used with different meanings in Equations (3) and (4). Consider replacing one of them to avoid confusion.
- Units in Figures 5, 7-9: While the justification for using monetary units at the grid level is reasonable, adding a brief explanatory note in the figure captions would help readers understand why values differ from Tables 2-3.

4. Conclusion and Final Recommendation

The manuscript is in near-final form and has substantially improved through this revision process. The remaining concerns are minor and can be addressed through a final revision focusing on sensitivity analysis for depreciation rates, historical data validation, and an expanded discussion on asset categorization. These changes will further solidify the paper's contributions to seismic risk modeling and disaster economics.