

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
<https://doi.org/10.5194/nhess-2021-26-RC1>, 2021
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Comment on “Residential building stock modeling for mainland China targeted for seismic risk assessment” by Xin et al.

Anonymous Referee #1

Referee comment on "Residential building stock modelling for mainland China targeted for seismic risk assessment" by Danhua Xin et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-26-RC1>, 2021

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The authors present an interesting approach to achieve a nation-wide model for the building stock to be used in seismic risk assessment. Based on various statistical data and information derived from secondary sources and remotely-sensed data, they present a method to derive at a geo-coded 1km×1km resolution residential building exposure model for 31 provinces of mainland China. Moreover, based on a sensitivity analysis for one case study, the authors present possible sources of uncertainty in the results, and show how these may be decreased during future research efforts.

Overall, the paper is timely, and well-structured. The overall point of criticism is that the sole use of statistical data to derive at a “real world” building stock model neglects region-specific and very local impacts on the distribution and quality of assets, which may lead to systematic over- and underestimation in certain areas of the country.

Nevertheless, I strongly believe that the method is worth being published so that the international research community can further refine the method and decrease inherent uncertainties.

Some minor comments:

- Line 152/153: something is missing here. Should be re-formulated.
- Line 193/194: could be better formulated.
- Line 270/271: please elaborate a bit more why the spatial coverage is limited.
- Line 469: in times of almost unlimited computing capacity, this should not be an issue. In contrast, applying the same unit price over the entire area of (mainland) China is a major source of uncertainty of the method, which should be addressed in more detail in the respective section 4.
- Section 3.1.2: Here it is not clear to me what the key message is; obviously, higher buildings will have a higher density of floor area and, thus, a higher population density. My suggestion is to elaborate this a bit more, or to delete this particular section.
- Figure 1: technically, the classes are not clearly distinguishable (what if a grid has exactly 4936 or 2750 inhabitants?), please adjust.
- Figure 4 (and related section in the main text body): from my understanding it would be more explanatory how well your method is suitable for application if you would compute the differences between the modelled floor area per km² and the 3d view provided in inlet (c), also in terms of uncertainty quantification. Please also consider the similar issue of classes given already for Figure 1 (and check all the other Figures, also in Figure 9 this is wrong).

Given these constraints I recommend revisions before the manuscript may become acceptable for publication.