We deeply appreciate the detailed check of our work by the anonymous reviewer (hereafter referred as "RC2") and the helpful advices proposed. Detailed responses to RC2 comments are elaborated as follows. *The comments are in purple with italic font* and our responses are in blue.

(i) General comments from RC2:

"This is a very interesting paper tying the fragility curves to vulnerability and through this get a better correlation into conversion of Intensities to PGA. The authors reviewed a large number of data published on Chinese earthquakes since 1975 for two main typologies: RC and Masonry: 69 in terms of Chinese Intensity Scale and 18 on PGA. They used fragility curves obtained from experimental (in function of INT) and from numerical developments (in function of PGA) to obtain a conversion between INT vs PGA. To expand the results obtained to other places around the World, and not only to the Chinese construction, in a tentative to propose a world-wide conversion, they compare the results with other proposals in Europe and US (PERPETUATE; SHARE; GEM; etc.). But before I get convinced with the results presented and consequently to accept the paper I need a response to a few important issues."

(ii) Response: Thank you for this accurate summarization.

(i) RC2 comment 1:

"Construction in China is very different from other regions. So the comparison with other regions is very difficult to accept. "

(ii) Response: This concern is shared by RC1 as well. This part was added to respond the comments of one reviewer in the previous reviewing process. And we do notice the difficulty to conduct such comparisons, given the difference in building types across countries and variation in fragility analyses methods. Such a grand topic actually deserves individual deep-going study work in the future, and it is not enough to attach it as one section of our current work. Therefore, to narrow down the focus of this work, we decide to remove the comparisons in Section 4.2 and delete the related descriptions in the main context and the figures in the Appendix part.

(i) RC2 comment 2:

"Only two Types RC and Masonry (sub-divided into two sub classes) are considered. EMS-98 has many more! "

(ii) Response: As explained in Page 6, Line 11-18, compared with other building types, masonry and RC are more widely distributed and have relatively more fragility data. In the initial fragility data collection work, we actually collected empirical fragility data for more building types, including soil-wood, brick-wood, brick-concrete, RC, industrial frame, stone-wood, chuandou-timber, wood, stone and soil (these data are also available from the online supplement). Since another focus of our work is trying to develop intensity-PGA relationship by using fragility as the bridge, but for analytical fragility data, they are only available for masonry and RC building types. That's why finally only masonry and RC are considered.

(i) RC2 comment 3:

"The final proposal (TableB2) for each Intensity gets an interval 1:2 and no results for I>X. Other studies show similar intervals but with centre value slightly deviated."

(ii) Response: Thank you for your careful check. The values in Table B2 are the same as that in Chinese Official Seismic Intensity Scale (GB/T 17742-2008, in Chinese), which was issued in 2008 and was modified based on the old version GB/T 17742-1999 that issued in 1999. Maybe other studies you refer to were using the old values in GB/T 17742-1999?

(i) RC2 comment 4:

"Errors on establishing the D1 to D4 or D5 are full of uncertainties and so I do not know if bringing the fragilities into place is reducing the error."

(ii) Response: The categorization of damage of buildings into different classes is helpful for later-on risk analysis (i.e. from D1 to D5). On way to reduce the uncertainty in establishing the damage states is to increase the damage state/class used, but this will also increase the difficulty in applicating them during post-earthquake field investigation. Thus, trade-off needs to be made and currently many countries have five damage classes used.

When using fragility to represent the building damage, it provides a practical way to numerically compare fragilities derived from different methods. And the fragility curve can be attached with uncertainty of different damage states as well.

(i) RC2 comment 5:

"The Indicator with people and bicycles is very interesting especially for China as there is much traffic with bikes. For other countries unfortunately, the situation is still too far!"

(ii) Response: Exactly. That's why the comparison of Chinese building fragility with other countries are difficult to perform and should be separated from this work as an individual research.

(i) RC2 comment 6:

"There should be a Figure representing graphically the results in Table B2."

(ii) Response: Accepted. The following figure derived from Table B2 will be added to the Appendix part after Table B2.

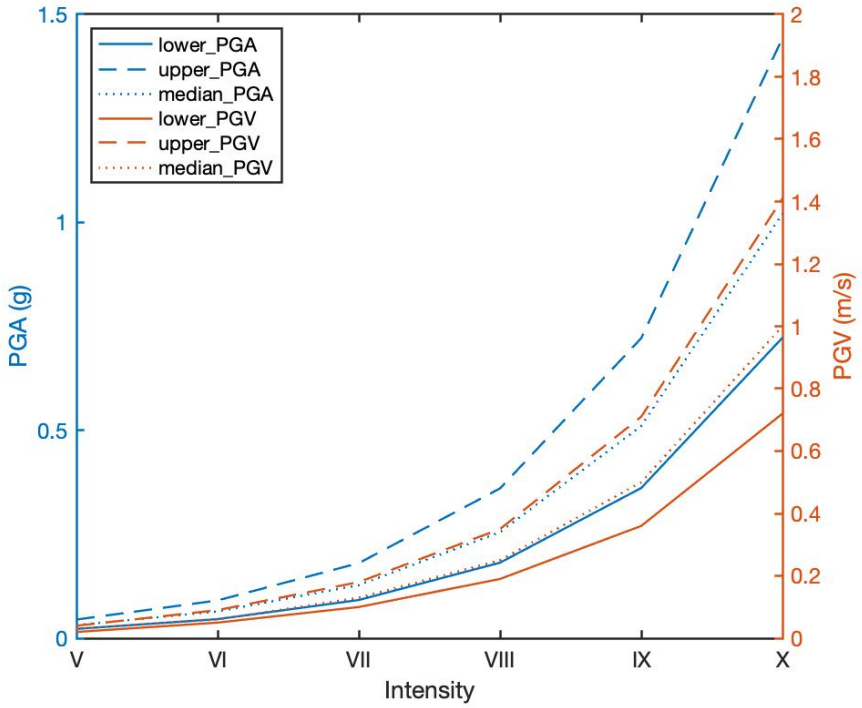

Figure R2: The suggested correspondence relation between intensity and PGA/PGV range by Chinese Official Seismic Intensity Scale (GB/T 17742-2008, as explained in Table B2).

(i) RC2 comment 7:

"Formula (5) is very old in California".

(ii) Response: We're aware that currently the bilinear function is used to regress the relation between PGA and intensity, based on a rich bunch of PGA/PGV and intensity data (e.g. Worden et al., 2012). However, in our work, to develop the relation between intensity and PGA by using fragility as the bridge, the regression relation between ln(PGA) and intensity should be linear, not bilinear, as explained in Page 11 Line 35-Line 8 (Page 12) of the manuscript.

(i) RC2 comment 8:

"Fig 3 and 4 should have line to be more understandable."

(ii) Response: For empirical fragility data in Fig. 3, they are digitalized from post-earthquake surveys and the original data are also discrete without a line. For analytical fragility data in Fig. 4, they are also digitalized from individual papers or theses for PGA levels like 0.1g, 0.2g, 0.3g…, which are also discrete. Although the original analytical fragility curves are continuous, but not all the literature we scrutinized provide the formula of their fragility curves. Therefore, all the fragility data in Fig. 3 and 4 are discretely digitalized from each literature, thus it is difficult to add lines to these data when putting them together. That's why the following box-plot method will be applied to remove the outliers and find the median fragility value for each intensity/PGA level, and then to derive the most representative fragility curve for each damage state of each building type.

(i) RC2 comment 9:

"Fig 5 and 6 should have line and same color."

(ii) Response: For typical box-plot method, there is actually no line attached (regretfully it is also not common to do so). And the change of the building fragility with intensity/PGA level can be estimated from the median fragility value (as indicated by the red line and the blue dot within each box of Fig. 5 and Fig. 6, respectively). And later on, the median fragility curve will be further plotted in Fig. 7 and Fig. 8.

(i) RC2 comment 10:

"Fig A1 could be merged with Fig 7 and Fig A2 with Fig 8."

(ii) Response: Thank you for this good idea. The merged Fig. 7 (with Fig. A1) and Fig. 8 (Fig. A2) are as follows and will replace the old Fig. 7 and Fig. 8 in the revised manuscript.

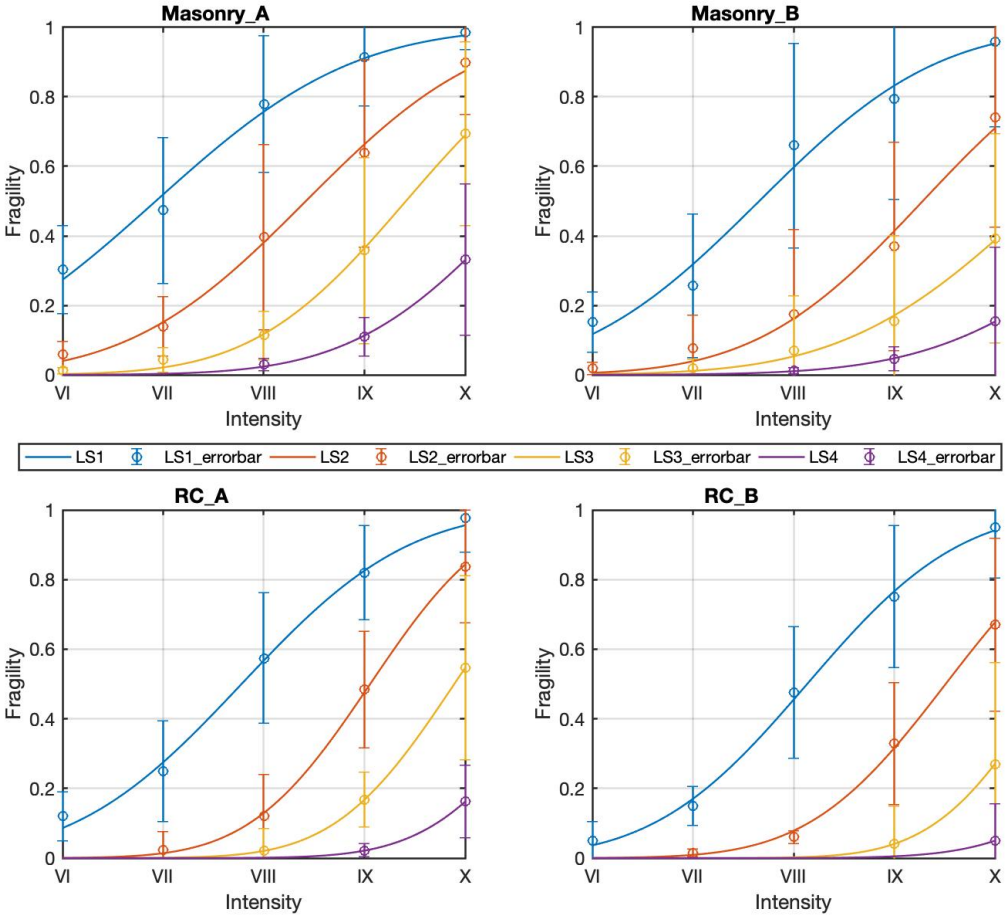

Figure R3: Modified Fig. 7, merged with Fig. A1 in the Appendix.

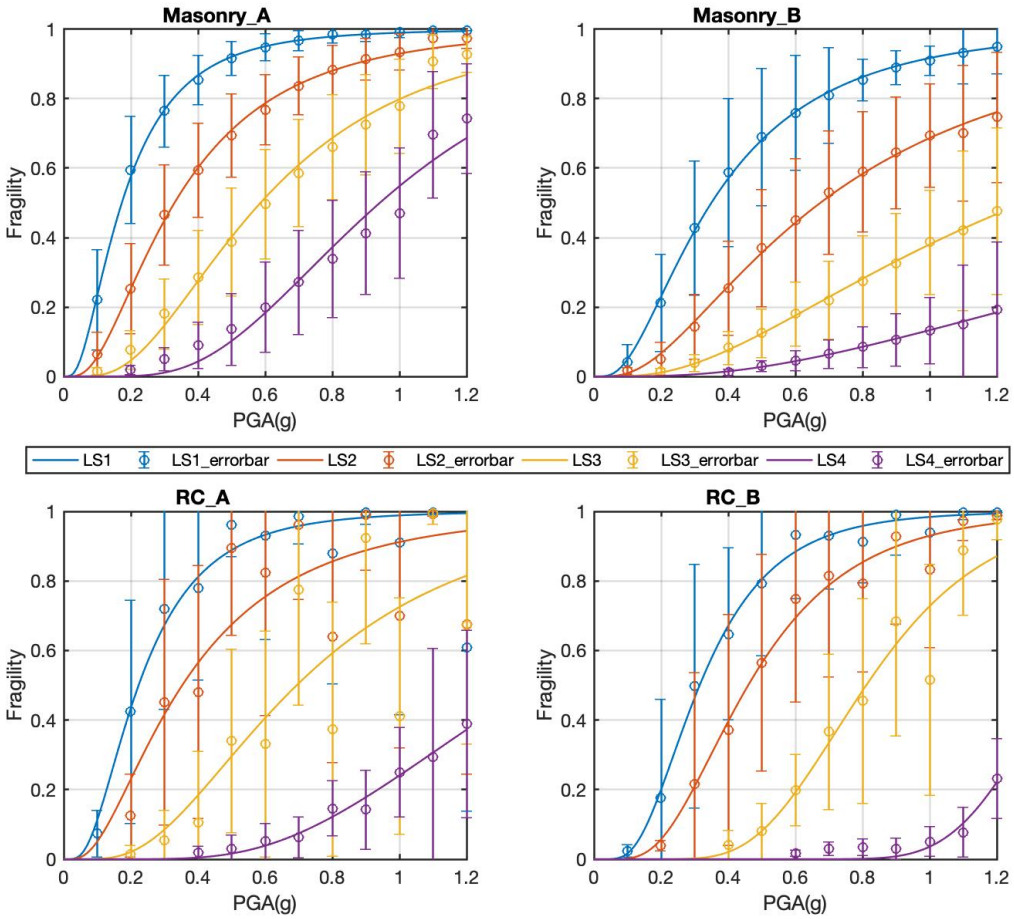

Figure R4: Modified Figure 8, merged with Fig. A2 in the Appendix.

(i) RC2 comment 11:

"Figs A6 and A7 are impossible to read!"

(ii) Response: Sorry for this inconvenience when printing it out. Since the comparison of Chinese building fragility with that in other countries is a quite complex issue and deserves to be studied individually (as explained in above response), we decide to remove this part from this current manuscript. Thus, Fig. A5, A6, A7 will also be removed.

(i) RC2 comment 12:

"Title could be slighted changed, inverting the order of ideas."

(ii) Response: Thank you for this proposal. However, first of all, the review of building fragility has been considered as a challenging task, since different approaches and methodologies are spread across scientific journals, conference proceedings, technical reports and software manuals, hindering the creation of an integrated framework that could allow the visualization, acquisition and comparison between all the existing curves. Therefore, the first focus of our work is to conduct such a review. Secondly, the derivation of intensity-PGA relation by using fragility as the bridge remains to be a tentative approach and uncertainties in between are difficult to fully handle, although we've tried hard to develop the uncertainty transmission

methodology in Appendix C. Thus, we prefer to mention this part as an implication from the review of building fragility. As such, we consider it's more appropriate to keep the current title as it is.

(i) RC2 comment 13:
"I found several inconsistencies in the Reference List Attached Doc (References Corrections)."
(ii) Response: Thank you very much for your careful check! We'll modify them in the revised version.

Reference:

Worden, C. B., Gerstenberger, M. C., Rhoades, D. A. and Wald, D. J.: Probabilistic Relationships between Ground-Motion Parameters and Modified Mercalli Intensity in California, Bulletin of the Seismological Society of America, 102(1), 204–221, doi:10.1785/0120110156, 2012.