



EGUsphere, author comment AC2  
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## Reply on RC2

Fatemeh Jalayer et al.

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Author comment on "Empirical tsunami fragility modelling for hierarchical damage levels" by Fatemeh Jalayer et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-206-AC2>, 2022

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We thank Prof. Galasso (R2, <https://doi.org/10.5194/egusphere-2022-206-RC2>) for the constructive and insightful comments that contribute to enriching our paper. Please find below a point-by-point response to the comments.

**R2: I sincerely apologize for the lengthy review period for your manuscript due to the summer break and several other deadlines over the past few months.**

**This paper proposes a simulation-based Bayesian method for parameter estimation and fragility model selection for mutually exclusive and collectively exhaustive damage states. The proposed approach is comprehensively illustrated through a case-study dataset related to the central South Pacific tsunami on September 29, 2009.**

**The manuscript is rigorous, very well written, and well organized. The figures are of excellent quality.**

**This is one of the very few cases where I am pleased to recommend accepting an original manuscript in its current form without any revisions.**

**A few very minor suggestions are as follows:**

- **Since the proposed statistical approach is general, I would consider removing the 'An application to damage data of the 2009 South Pacific tsunami' part from the title and stress more the fact this is a methodological study;**

We totally agree. In fact, after adding the Sulawesi-Palu application, the second part of the title becomes less relevant. In the revised manuscript, we are going to change the title to "**Bayesian empirical tsunami fragility modelling for hierarchical damage levels**". Moreover, we are going to stress more the fact that this is methodological study in the introduction section.

- **The authors refer to the concept of the "simplest model" in the abstract and a few other occurrences. I would clarify how "simple" is assessed from the very beginning;**

We are going to specify in the introduction (by adding few lines around line 78) that by

“simplest model” we mean the model that has the maximum relative entropy (measured using the Kullback-Leibler distance) with respect to the data. This usually means the model has a small number of parameters.

- **Again, since the methodology is general – and the case-study tsunami event is just used for illustrative purposes – I would briefly discuss the applicability of the method to fragility derivation for other natural-hazard loading conditions.**

Very good point. We are going to add comments to both the introduction and the conclusions stressing the applicability of this procedure to fragility derivation based on other natural hazards such as earthquake, flooding, and landslide. More specifically, we are going to state that the methodology is applicable to any damage scale defined based on mutually exclusive and collectively exhaustive (MECE) damage states and any hazard for which a suitable intensity measure (IM) can be identified.