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Discussions

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Interactive comment on "Assessing the tsunami building vulnerability PTVA-3 and PTVA-4 models after the 16S 2015 event in the cities of Coquimbo – La Serena (Chile)" *by* Eduardo Fritis et al.
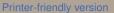
Anonymous Referee #2

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Comments on the paper "Assessing the tsunami building vulnerability PTVA-3 and PTVA-4 models after the 16S 2015 event in the cities of Coquimbo – La Serena (Chile)" by Fritis and co-authors.

General Comments:

The paper by Fritis et al. addresses the vulnerability of coastal buildings to tsunami impact from events occurring along the Chilean coast. To this end, the authors use an existing qualitative model (the 2 latest versions of PTVA) together with the post-tsunami damage data from the 2015 Illapel event to analyse the use and validate the PTVA models in two coastal cities of Chile, Coquimbo and La Serena. The authors conclude

that the PTVA3 model performs better than the PTVA4 model when comparing the obtained RVI scores with the damage data. While, the manuscript presents some interest as it contributes to a better understanding of the building damage in one of the most tsunami vulnerable coasts of the world, I find that this work seems (as mentioned by the authors in l20 of the introduction) to an exercise more than a research article. Moreover, the present version of the MS is immature and was not ready for submission. Therefore, in my opinion, the paper must undergo major revision before been accepted in NHESS journal. Overall, the manuscript needs substantial improvement and re-writing.

Major Comments:

1. The tittle seems too long, unclear and not reflecting the content of the MS:

. There is no need to mention both PTVA-3 and PTVA-4, in fact they are 2 versions of the same model (PTVA); . The authors apply a tsunami vulnerability model and attempt to validate it using filed data, which is not clear in their MS tittle. . What is the meaning of "16S"? the September 16th ?

Therefore, I propose to change the title and consider the following suggestion: "Analysis and Validation of the building tsunami vulnerability model, PTVA, using the 2015 Chile post-tsunami damage data".

2. The abstract needs substantial re-writing:

. As example, the first sentence of the abstract (l7-8, p1) is too long and confusing, I suggest splitting it in 2, something like "Chile is highly exposed to tsunami hazard from large earthquakes often occurring along the Peru-Chile trench. However, only recently the tsunami hazard has been considered in the land-use policies of the Chilean coasts." . The same applies for the other sentences in the rest of the abstract: l9-11, p1; l13-15, p1. . Also, introduce the complete expression of the acronyms like "PTVA" and "RVI", the reader must understand what it is about from the beginning. . Some numerical

values are necessary to quantify the "low", "high" and "very-high" levels of RVI.

3. The Introduction is poor and requires improvement:

. For instance, the statement "the Nazca plate subducts beneath the S America plate at a rate of 74 mm/yr" needs revision as it is only valid for the Central Chile because the Nazca plate is subducting beneath the S America plate with a convergence speed that varies from north to south. It moves approximately at 80 mm/year in the south and at about 65 mm/year in the north, relative to a fixed South America plate (DEMETZ et al. 2010). . Recent references on the Maule 2010, Mw=8.8; Iquique 2014, Mw=8.2; 20 and Illapel 2015 Mw= 8.4 earthquakes and tsunamis must be added (lines 18,19,20, page 1) (i.e Satake and Heidarzadeh 2017; Omira et al., 2016; Fuentes et al., 2016) . lines 26 to 28 (p1): the authors mentioned that the March 11 Tohoku-oki earthquake arrived at the Chilean coast after 21h with a max. amplitude of 2.23m. I suppose that the authors meant the tsunami instead of the earthquake. . A paragraph shortly describing other tsunami vulnerability methods, such as the Fragility Curves methods (Koshimura et al., 2009; Supasri et al., 2012) and other PTVA-similar methods (Omira et al. 2010), must be included. . My main concern is on the aim of the paper. The authors are invited to clearly state in the introduction that their work aims to apply the PTVA model on two coastal cities of the Chilean coast and validate it using post-tsunami damage data.

4. Study area:

Since the work aims to study the vulnerability of coastal buildings to tsunami impact, the authors, when describing their study areas, must focus on the built environment within the tsunami prone coastal zones. I suggest to add a paragraph that carefully describes the type, structure, number of stories ….etc of the buildings present within the study areas. Also, a map with these typologies will be welcome.

5. Methodology:

I suggest to re-organize the methodology section by joining everything in two main sub-sections: "Field Survey", in which the authors are invited to mention all the post-tsunami information leading to reconstruct the inundation maps and to derive the vulnerability index. Then a section on the "Vulnerability Model" and the way they applied it to the study areas.

6. Results:

. All the maps must have coordinates. . Provide more quantitative description of the results. . Describe your results in each city (Coquimbo and La Serena) rather than sectors . There is an excess in the number of figures. A unique vulnerability map per site is sufficient in my opinion.

7. Discussion of the results:

A section discussing the main results and their usefulness is missing in the paper. This must include the validation section and also a comparison of the PTVA methodology with other ones. Also, if available, a comparison with other similar studies in the region is welcome.

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