

## ***Interactive comment on “Tsunami fragility curve using field data and numerical simulation of the 2015 tsunami in Coquimbo, Chile” by Rafael Aránguiz et al.***

### **Anonymous Referee #2**

Received and published: 9 December 2017

This paper provides tsunami fragility curves for residential buildings in a town in Chile. The authors use a standard procedure, using model results to hindcast flow depth, then correlating with observations. Though no new methods are developed in this paper, the results are useful to engineers and planners in Chile and other tsunami-prone coasts. Therefore, it will be ready for publication after the authors address the following comments.

Title should be ‘... fragility curve development...’

Please have a native English speaker correct the manuscript, as there are many small mistakes. For example, on line 17, “low damage” should be “light damage”, and similar

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problems throughout the document.

Page 2. Lines 17-18. You say that buildings in Sanriku experienced greater damage than those on the Sendai Plain. Is this just because the inundation was deeper in Sanriku? Or do you mean that for equal inundation depths, buildings in Sanriku experience more damage? Clarify this.

Page 3 line 15. Tsunami height of 7 m. Does this mean the height offshore? The height at the coastline? Runup? Please be specific.

Page 4 line 13. “The most affected structures were adobe.” You mean structures most affected by the earthquake? Clarify this.

Page 5 line 1. State DART buoy ID number.

Page 5, lines 10-15. State the source and publication numbers of the nautical charts used for bathymetry.

Page 5 line 16. What is the DTM resolution? What is its source (LIDAR or land surveys)? Does the DTM show pre-earthquake or post-earthquake (subsided) topography? How much tectonic subsidence occurred here?

Page 5 line 24. State the source (reference) of the JSCE guidelines.

Page 6 line 6.  $n=0.06$  seems small for medium density urban areas. Looking at Table 1 in Bricker et al (which you already reference), the recommended values for medium density urban areas range from 0.09 (based on Koshimura et al) to 0.12 (based on Bunya et al). Therefore, you need to justify the value 0.06 you choose for medium density urban areas.

Page 6 line 31. What are the units of the mean and std dev values shown?

Page 7 lines 15-16. In addition to different building materials, could the difference in fragility curves have been due to the tsunami behavior? Bore vs. no bore? Flow speed? Impact of debris from the harbor? This section needs a little more discussion.

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Figure 8. "probability of occurrence" is not a good label for the y-axis, as it appears to show CDF's of inundation depth, which is not the case. The axis label should be "probability of damage" or similar.

In some places in the text, you need to make superscripts for units (i.e., km<sup>2</sup>).

Section 4.2. What topography is used? Subsided or non-subsided? How much subsidence is expected for a quake of this size?

Figure 2. You should indicate what level of damage each photo corresponds to.

Fig 3. I don't understand what the red circles and yellow triangles in the figure on the right mean. You need a legend or a description in the caption.

Fig 7c caption. Plot (of what)? Needs better description.

Fig 10. Left center right are columns, not rows.

Fig 11. I don't understand what the blue shading colorscale means. You need to state this, or show a colorbar.

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