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

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- Title should be '... fragility curve development...' R: the title will be modified according to suggestions of both reviewers, for example: "Development and application of tsunami fragility curve of the 2015 tsunami in Coquimbo, Chile".

- 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 problems throughout the document. R: the new draft will be corrected by a native English speaker in order to avoid small mistakes.

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Discussion paper

- Pae 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. R: Since we will add new fragility curves using velocity and hydrodynamic force as well as maximum velocity field, it will help clarifying why areas with equal inundation depth could have more damage. It is expected that plain areas have lower velocities than ria coasts.

- Page 3 line 15. Tsunami height of 7 m. Does this mean the height offshore? The height a the coastline? Runup? Please be specific. R: according to the references, it was 7 m inundation height. We will be more specific in the manuscript.

- Page 4 line 13. "The most affected structures were adobe. " You mean structures most affected by the earthquake? Clarify this. R: yes, we will correct the sentence by “the most affected structures due to the earthquake were made of adobe...”

- Page 5 line 1. State DART buoy ID number. R: The DART buoy is the 32402. We will add the ID number.

- Page 5, lines 10-15. State the source and publication numbers of the nautical charts used for bathymetry. R: ok, we will add the detail of the publication numbers if the nautical charts.

- 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? R: We will add details on the DTM from LIDAR topography provided by the local authority. We will also add some comment of the subsidence due to the 2015 earthquake, which was in the order of 5 cm.

- Page 5 line 24. State the source (reference) of the JSCE guidelines. R: we will use the original reference (Aide 1978) as suggested by Referee 1.

- 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. R: We use n=0.06 based on Kotani et al (1998) given in Table 1. We did not try larger values, since the larger the manning coefficient, the smaller the inundation. In addition, the best results was for n=0.025.

- Page 6 line 31. What are the units of the mean and std dev values shown? R. The units are metres. It will be added to the paper.

- 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. R: Yes, more discussion will be added since fragility curve using velocity and maximum velocity field will be included in the new version of the paper. It will help to understand the tsunami behavior and impact in Coquimbo.

-Figure 8. "probability of occurrence" is not a good label for the y-axis, as it appears to show CDF's of inunation depth, which is not the case. The axis label should be"probability of damage" or similar. R: Yes, the y-label is not appropriate. It will be changed to Damage probability.

- In some places in the text, you need to make superscripts for units (i.e., km2). R: ok, it will be checked throughout the text.

- Section 4.2. What topography is used? Subsided or non-subsided? How much subsidence is expected for a quake of this size? R: According to Figure 10, the subsidence is <1m. It is indeed included in the numerical simulation. We will add a sentence with the subsidence of each tsunami scenario, which is already included in the inundation simulation.

- Figure 2. You should indicate what level of damage each photo corresponds to. R: yes, it will be added. In addition, as suggested by Referee 1, we will added photos of washed away, too.

- 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. R: We will add a description in the caption. Triangles and circles are runup and inundation heights measurements, respectively.

- Fg 7c caption. Plot (of what)? Needs better description. R: the plot of least-squares fit will be added as a description to the figure 7c.

- Fig 10. Left center right are columns, not rows. R: it will be corrected in the figure caption

Fig 11. I don't understand what the blue shading colorscale means. You need to state this, or show a colorbar R: the caption of the figure will be modified in order to explain better the inundation area due to the possible tsunami scenario as follows: Figure 11. a) Tsunami flow depth on structures. b) Damage probability of flooded structures. The light blue area represents the tsunami inundation area due to the possible future tsunami.

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