

Interactive comment on “Probabilistic Tsunami Hazard Analysis For Tuzla Test Site Using Monte Carlo Simulations” by H. Basak Bayraktar and Ceren Ozer Sozdinler

Anonymous Referee #1

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Dear Editor, Please find below the comments on the paper “Probabilistic Tsunami Hazard Analysis For Tuzla Test Site Using Monte Carlo Simulations” by H. Basak Bayraktar and Ceren Ozer Sozdinler.

General Comments The paper is interesting for the Tuzla test site and it deserves publication with some revisions. Major revisions should be focused on the discussion of the uncertainties: the length of the synthetic earthquake catalogue and the choices of the parameters. Are 100 earthquakes enough to cover a wide range of scenarios necessary for such a detailed probabilistic analysis for the Tuzla test site? What are we missing? A part from the definitions of the aleatoric and epistemic uncertainties, section

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4.4 should present a deeper discussion. Also see the paper “Quantification of source uncertainties in Seismic Probabilistic Tsunami Hazard Analysis (SPTHA), by J. Selva, R. Tonini, I. Molinari, M.M. Tiberti, F. Romano, A. Grezio, D. Melini, A. Piatanesi, R. Basili and S. Lorito, *Geophys. J. Int.* (2016) 205, 1780–1803, doi: 10.1093/gji/ggw107”. Figures 5-6 and Figures 7,8,9,10 present unreadable legends and labels, the authors should use a bigger font. Figure 11 (second panel) has undistinguishable colours for the bars, they should be changed.

Detailed Comments - At line 12 please insert “(PIF)” after “Prince Island Fault”. - At line 13 please write “moment magnitudes” instead “magnitudes”. - Please re-write the sentence from line 30 to line 34 because it is too long and it is not clear the meaning. - Please remove “in 2004” at line 34. - At line 39 it is wrong the use of the word “attractive” in this context, please change or explain. - At line 40 remove “of” before large. - At line 79 is it “ $M_w > 7$ ” instead of “ $M > 7$ ”? - At line 87 not clear how the small faults generate the tsunamis. It is understandable for the submarine failures. Please explain. - At line 125 please remove “In tsunami research, this method” and write “It has been applied. . .”. - At line 125 “Grezio et al. 2017” is not in the references. - At line 126 please write “the method is generally adapted” inserting the verb “is”. - At line 157 maybe it is “was defined”, is it missing the verb “was”? - Please keep the acronyms in the text MC (Monte Carlo) and PIF (Prince Island Fault). - Please remove the title of the subsection “2.1 Probability Calculations” as well as the lines 213-214 of the first sentence. - Line 226: the sentence “Time dependent probabilistic model is followed for the probability calculations; because , instead of using multi – segment rupture scenarios, only one fault is considered. “ is not clear, please explain it. - It is better to write parameters and variable using the subscribed mode, for example T_r , M_w , M_o , and so on, because in formula (3) the “ $2T_r \alpha 2t$ ” seems to have 4 variables and not 3. - At line 258 please remove “in the next”. - At line 307 the following sentence should be re-written: “First, graphics are prepared to show general distribution of probability of occurrence with respect to considered tsunami hydrodynamic parameters, which are minimum and maximum water surface elevation and inundation depth”. A possible suggestion is the following:

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“First, distribution of probability of occurrence of the tsunami hydrodynamic parameters, which are minimum and maximum water surface elevation and inundation depth, are shown”. - At line 312 please change the title of the subsection simply by removing the words “Graphs of”. - Lines 320-322 in Figure 5, graphics of probabilities of occurrences according to maximum and minimum water surface elevation (maximum water withdraw) and inundation depth for next 50 years are represented, respectively. According to these graphs, tsunami wave heights up to 1 m and withdrawal of the waves around 1 m have approximately 65% probability of occurrence. - At line 338 please remove “from the graphics”. - Please re-write lines 347-349, they are not clear them. If I understand well your simulation of the worst earthquake case scenario produced the maximum water surface elevation equal to 1.85 m, the minimum water surface elevation (maximum withdraw) equal to 2.16 m and the inundation depth of 4.48 m and the probability of this worst earthquake case scenario is 35% for next 50 years and 60% for next 100 years. In the main text of the paper the residual are not mentioned, please write an explanation there (not only in the captions). - It is better to indicate the section 4.3 simply writing “Synthetic Gauges” and write in the text the approximate average distance between the points. - At line 436 the “;” should be “:”. - At line 454 “from” should be changed in “by”. - Lines 460-464 should be re-written, not clear what the authors intend by “results of the numerical modelling was demonstrated”, “demonstration of results” and “finale outcomes”.

Figures - Figure 1 is small and the legend is difficult to read. I suggest to use landscape for Figure 1 and to enlarge the legend. Please provide indication for the orange colour dots. - Figure 5 and 6 are difficult to understand, the font of the legend is too small and the red writing cannot be read. - Figure 11 (second panel) can improve the reading using the colour blue or violet for the bar instead of the red.

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