

# ***Interactive comment on “A Procedure to Select Earthquake Time Histories for Deterministic Seismic Hazard Analysis: Case Studies of Major Cities in Taiwan” by Duruo Huang and Wenqi Du***

## **Anonymous Referee #2**

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The manuscript is presenting a procedure for selecting the acceleration time histories from the New Generation Attenuation database for six cities in Taiwan needed for either earthquake resistance design or assessing the seismic performance of existing structures. 1- In page 3 the second step for DSHA is to define the  $M_{max}$  and closest distance to each fault, how the author did assign the distance between source and sites of interest? I did not see any location for the maximum magnitude earthquakes assigned to each fault line or area. 2- There is no information about the fault style or fault type for each fault line or area which could be important in selection criteria. 3- Lines 66-67, simple method does not mean accurate estimate and with new updates of DSHA and PSHA it is easy to resolve the transparency issue. 4- Why did the author

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not use PSHA or Neo-DSHA (Magrin et al. 2016 and references therein) in the estimation of the target response spectra, since they are incorporating sets of earthquakes scenarios and the resulted RSs will cover a wide range of possible scenarios than only on worst-case scenario used by this study? The long period part of the RSs might be dominated by far field sources which can be easily tackled by incorporating sets of scenarios. Keep in mind for PSHA weights in a logic tree were commonly determined by a large group of experts instead of "the author's experience and judgment". 5- Lin et al.(2011) attenuation model is not the only available local model for Taiwan, so why the authors employed only one model rather than carrying out a sensitivity analysis in order to better assess the epistemic uncertainty?. 6- Lin et al (2011) have developed different attenuation relations based on source characteristics and site effects, what is the basis for the selection of the attenuation relation being used i.e. the hanging-wall and soil sites relation, for estimating the RSs for the six cities, do all the sites are located on the hanging wall? "Chi-Chi earthquake records are used in developing the hanging-wall/footwall attenuation relation" see Lin et al (2011). Please explain this in the proper place in the manuscript. 6- The authors used Lin et al. (2011) attenuation relationship in order to predict the response spectra for periods ranging from 0.01s - 5s, but in table 2 and the response spectra figures, the author present periods only till 3 seconds. 7- How did the authors decide the scaling factor range? Please explain in the manuscript. 8- The authors described the duration of the ground motion and fault style as casual parameters whereas they are very important for the selection of proper time histories. 9- In Figure 4 the response spectra for the first 5 cities are almost the same, do the authors expect big differences in the selected time histories if yes, why?. Is it ok to use one RS for the 5 cities? 10- Lines 224-225 "First, the adopted local GMPE was developed with 42 earthquakes, 85% of which 225 are not associated with the Chi-Chi earthquake, its foreshocks and aftershocks (Lin et al., 2011)" this is not correct because in that study 44 local earthquakes and 8 earthquakes from outside Taiwan were used and about 81% of which are not associated with Chi-Chi event. I do not know if the authors recognised that about 52% of the records used to develop the attenuation

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relations of Lin et al. (2011) are coming from Chi-Chi 1999 earthquake and its aftershocks. 11- In the table4 there are two Chi-Chi earthquakes (i.e. 1989 and 1999), in the text, the authors used only Chi-Chi earthquake without any additional information about the year or magnitude, it is better to be more specific. 12- Line 221 “Why Chi-Chi earthquake’s motions are not selected?” this title does not consist with what is mentioned in Table 4, where Chi-Chi, 1999 earthquake has been selected for Taipei (with basin effect) and Pingtung cities. 13- Lines 229 and 230 “The second reason is that the employed searching process does not specify more weights or 230 preferences to local earthquakes” actually the selection of local earthquake records will be better since they intrinsically contain the correct path effects which can affect the experienced ground motion at the site of interest. 14- Lines 233-235 are unclear, please re-write.

References Magrin, A., Gusev, A. A., Romanelli, F., Vaccari, F., & Panza, G. F. (2016). Broadband NDSHA computations and earthquake ground motion observations for the Italian territory. *International Journal of Earthquake and Impact Engineering*, 1(1-2), 131-158. Lin, P. S., Lee, C. T., Cheng, C. T., and Sung, C. H.: Response spectral attenuation relations for shallow crustal earthquakes in Taiwan, *Eng. Geol.*, 121, 150-164, 2011.

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