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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Approach for combining faults and area sources in seismic hazard assessment: Application in southeastern Spain" *by* Alicia Rivas-Medina et al.

Anonymous Referee #3

Received and published: 10 April 2018

The paper it is a valuable and original contribution in the subject of fault source modelling in PSHA. The proposed approach has been used in a SH calculation in Spain with satisfactory results. It would be interesting to check the viability of the model in other parts of the world with faster moving faults.

Nevertheless, there are few issues that, if tackled appropriately, will greatly improve the paper, and I think they should be addressed obligatory before publication in NHESS (please see list below).

Additionally, I attached the manuscript with many comments, suggestions, and corrections, all of them highlighted in yellow and commented using Adobe reader tools.

- Improve the English. Please, for a new submission make sure that the entire article is revised by an English native speaker. The style could also be greatly improved. Avoid the excessive use of "extra comments" in brackets (e.g., page 1, line 9; p.2 lines 17, 30, 31; p.3 line 4, 12;. . . and so many more. . .). I attached the manuscript pdf highlighting that, typos, few mistakes and so.

- Citations. In the introduction there is not a single cite about other previous approaches about incorporating faults as sources in PSHA neither globally nor locally. The authors must cite other previous work in the subject (e.g., Youngs and Coppersmith, 1985; Wesnousky, 1986; Anderson and Luco, 1983; Bungum, 2007; . . .... and much more recently the different UCERF versions (e.g., Field et al., 2009, 2014), the SHARE project (Woessner et al., 2015),. . . among others. If there are, cite also other previous work done in your study area.

- Seismic Moment Equation. It is necessary to cite and write the equation used for calculating the seismic moment from magnitude (Mo as function of (Mw), Hanks y Kanamori, 1979, IASPEI, 2005) for a completely comprehension of equation (2) and, later, equation (4). Additionally, you should state before that with the variable "m" you always refer to magnitude in the moment magnitude (Mw) scale.

- Equation 4. I assume this equation is an original contribution from this work? Please, you need to show how do you get to equation 4 from Anderson (1979) integral. Need to explain what is parameter d (in relation to Mo f (Mw).

- Equation 10. Further explanations should be given on how you get to equation 10.

- Figure captions. They are very short. More explanations in the captions are needed to fully understand the figures. Particularly figure 2 (see attached pdf).

- Figure 5. This figure can be greatly improved from what it is now (a dumped screen). A inset locating geographically the studied area is necessary.

- Fault sources. The paper will improve greatly if you further explain how did you select

the faults and what are there characteristics in terms of slip rate, Mmax, kinematics, etc. . .

- Ground Motion Prediction Equation. The GMPE you chose for your calculations was produced to address near fault-source effects. I understand that the point of the paper is to use your methodology for sharing the seismic potential between zones and faults, but because you have chosen this particular GMPE for your calculations you should explore the impact of using it in your hazard results compare to the use of a general GMPE one. I mean, this is important because in your results it is clearly shown that the hazard increases a lot near the faults, as you state p.10 l.3: "The results show an increment of expected accelerations near fault traces (in a factor of 2)." And later: "This increment is achieved at the expense of decreasing expected accelerations in areas located farther away from faults." This statement should be properly discussed in the Discussion section.

- Results. This section should be rewritten. It contains many statements that are better placed in a "Discussion" section. See attached pdf.

- Discussion and Conclusion should be separated sections. The paper will improve greatly if you discuss your results in terms of earthquake rates contribution from faults vs zones, instead of accelerations. This way it would be showed the real (pure) impact of your approach in the hazard, without consideration of the GMPE. Subsequently, you can explore the impact of using a different GMPE in the calculations.

- References list. There are a couple of references listed but missing in the manuscript.

- Table 2. Mmax relates to the Max event from the fault. When there is more than one fault in the region, which value do you state on this table? In the range Mmin-Mmax you show the accumulated moment rate from all the faults in the region? How can be regions with MaxC blank? . . . More information is needed to understand this table properly.

- Table 3. More information is needed in the caption to understand it properly. Information on some regions is missed. The MmaxC values are strikingly low. . . What happened to the larger values (big historical events)?

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2018-28/nhess-2018-28-RC3-supplement.pdf

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