

## ***Interactive comment on “Seismic hazards of the Iberian Peninsula – evaluation with kernel functions” by M. J. Crespo et al.***

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Received and published: 1 October 2013

In my opinion, this manuscript is suitable for publication with changes, as outlined below.

Concerning title: - Write “Seismic hazard” instead of “Seismic hazards”.

Concerning “introduction” section: - page 3764, lines 24-25. Write “García-Mayordomo” instead of “Gacia-Mayordomo” - page 3765, lines 18-19. It is very debatable the fact that in recent times a design seismic input in maritime areas is required. Really, it is interesting to know the expected acceleration values in the middle of the Alborán Sea, the Valencia Through or the Gulf of Cádiz, hundred of meters below the sea level? If authors search through latest seismic hazard computations published in

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scientific journals, they can observe that authors do not draw seismic hazard values at sea, amongst other things because, taking into account reliability and completeness of the used seismic catalogs, seismic hazard values have large uncertainties. - page 3766, lines 5-6. The quoted work has been done and published. Authors must refer it.

Concerning “methodology” section:

- page 3768, lines 5-6. Write “Woo (1996a)” instead of “Woo (1996)”.

Concerning “seismic catalog” section:

- page 3771, lines 10-12. Really large events in NW Italy may influence the seismic hazard in NE Spain? There is some antecedent? If so, cite it. It can be inferred from final results? If so, refer it. - page 3771, line 13. Write “(USGS, 2011; ISC, 2010)” instead of “(USGS and ISC)”. - page 3772, lines 8-9. Martínez-Solares and López-Arroyo (2004) is not included in the references section. - page 3774, lines 16-15. García-Mayordomo (2005), quoted sometimes in the manuscript, is not included in the references section.

Concerning “attenuation model” section:

- The use of the Youngs et al. (1997) attenuation relationship, a relationship for subduction regions, is not well justified. “Deep” earthquakes ( $h > 35$  km) in the Iberian Peninsula are not related to a subduction process, and although there is a clear slow attenuation in the SW Spanish coast (López-Casado et al., 2000, among others) where the previous relationship can be used, a) this slow attenuation happens not only for “deep” earthquakes but also for “shallow” earthquakes, and b) this slow attenuation do not happens in the Málaga-Alboran Sea-Alhoceima region, do not quoted by the authors (page 3777, lines 4-6), or the Pyrenean region, where authors also use the Youngs et al. (1997) relationship. Authors quote the Buforn et al. (1988) work to justify the fact that there is a possible subduction of the African plate under the Iberian one. This is just the criterion of several authors to propose that earthquakes below 600 km

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are produced for this process, but not earthquakes in the range (30-50 km) under the Alborán Sea or Pyrenean regions. The only problem of the depth of the earthquakes cannot be resolved by using an attenuation relationship for subduction events. It can be solved, for example, using attenuation relationships for shallow events if hypocentral distance is used instead of the epicentral one. - Other important question is the fact of to consider as “shallow” earthquakes all events located above 35 km depth. To consider an earthquake happened at 20, 30 or 35 km depth at surface (this is that implies to use the epicentral distance in the attenuation relationships) clearly increases the seismic hazard close to these events. I propose to the authors to compute the different attenuation of a certain event at distances of 0 km and 35 km using, for example, the Ambraseys et al. (2005) relationship. Authors can observe a very large difference between these two computed values, independently of the magnitude or soil type. I propose again to use the hypocentral distance instead of the epicentral one. This criterion, followed by the authors, could be one of the reasons because authors obtain biggest seismic hazard values in certain areas that previous works.

Concerning “seismic activity rate” section:

- page 3778, lines 24-25. Write “Gutenberg-Richter (1944)” instead of “Gutenberg-Richter”.

Concerning “results” section:

- The computation of seismic hazard values for a return period of 2475 years appears as unreasonable in this work, more taking into account the characteristics of the Iberian seismic catalog. For this return period, with no excuse, geological data must be considered. The temporal extent of the Iberian catalog does not cover the seismic cycle of the Iberian active faults. Nonetheless, seismic hazard values for a return period of 975 years, using only seismicity data, appear more reasonable. It is not true that authors declare in page 3783 (lines 5-7). Given the characteristics of the seismic catalog and the obtained results on the “reference years” showed in table 2 (v.g., 1000 for earth-

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quakes in the range MW 6.6-7.1), the seismic hazard contribution of the geological data must be important for return periods above one thousand years. - It could be illustrative to cite the biggest earthquakes happened in the areas with biggest seismic hazard. Likely, they are the main reason of these hazard values. - page 3784, lines 3-4. Figures 14 and 15 are quoted before figures 11 to 13. - page 3785, line 28. Write “Ambraseys et al.” instead of “Ambraseys”. - When comparing, for example, Lisbon (0.20g for a return period of 475 years) and Granada (0.30g) results, seismic hazard values do not agree with “expectable” values when using a non zonified approach, or that is one and the same, with historical seismicity. For example, Lisbon has felt intensities equal or above intensity VIII-IX during the 1309, 1356, 1531 and 1755 earthquakes (LNEC, 1986). Granada never felt this intensity (there is no evidence from the Spanish historic catalog). Then, how are these seismic hazard values possible? Can author explain it from the new compiled catalog?

Concerning figures:

- Kilometer scale in figures 5, 6, 8, 9, 10, 11, 12 and 13 is not necessary, taking into account that plots show geographical coordinates. - Figures 6 and 8 must depict the same frame that figures 5, 9, 10, 11, 12 and 13, that is, all the studied region. - It is possible to compute the spectra in figures 14 and 15 with more resolution? Moreover, given the result, only the period interval 0.0-1.0 s is significant.

Quoted reference:

- LNEC - Laboratório Nacional de Engenharia Civil (1986). A sismicidade histórica e a revisão do catálogo sísmico. Lisboa.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 3763, 2013.

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