

RESPONSE TO THE COMMENTS

Dear Alexandra Carvalho PhD,

We thank for their constructive and valuable suggestions. We believe that the quality of this manuscript has improved considerably after your review. We have carried out an exhaustive revision of our manuscript following your suggestions. We have succeeded in synthesizing and improving the content of the manuscript. All changes made are included in the attached revised version.

Comments:

Beltré et al. present a seismic hazard analysis, for bedrock conditions, of the marine area comprised between west Gulf of Cádiz and east Alboran Sea, based on a deterministic approach (DSHA), considering areal seismogenic sources.

Reply (R): Thank you for this comment.

The article is classified as a review paper, even though presents as stated "...the first comprehensive deterministic seismic hazard assessment carried out in the Ibero-Maghrebian region", implying that the paper should be reviewed as a research paper.

R: We have removed the phrase "Review article" from the title of the paper.

The manuscript is very exhaustive and difficult to read because of so many detailed issues, some of them not deserving such a consideration as they are very technical and can be found elsewhere, and even so, some fundamental questions and debating are lacking. The state of the art is not truly addressed. If it might be considered a research paper, more than half of the manuscript is useless and should be deleted.

R: Thank you for your suggestion. The content of the manuscript was considerably synthesized and reduced.

The study uses a mid-resolution digital terrain model, which seems a positive innovation. Nonetheless, I want to express a deep concern about this Seismic hazard assessment:

R: Thank you for this comment.

DSHA lies on the selection of the controlling earthquake (the earthquake that is expected to produce the strongest level of shaking) or a maximum credible earthquake for a specific fault. It depends a lot on the quantity and quality of the data collected, detailed active fault data and estimation of the dimensions of the fault, so that both maximum magnitude potential and source to site distance calculations result in realistic values. In the study presented, the geometry and characterization of the geological structures do not seem to have been under consideration either in terms of defining the maximum credible

earthquake or in terms of the distance to the structure. In fact, considering arial seismogenic sources, a not very well understood distance (the distance to the area plus the depth of the area?) and the maximum magnitude, M_{max} , of zones, I wonder why the use of a DSHA approach.

R: The authors fully agree with the point of view expressed by the reviewer. The outcome of the seismic hazard assessment is strongly conditioned by the quality of the data used to describe, not only seismically, but also the geometry of the seismogenic sources. The authors are aware of the existence of a database of faults (identified as traces on the seafloor) called QUAFI which has recently been updated with the best data and has also been used in other works, with a different purpose than the one shown in this paper. However, as this database has not been used in the published official seismic hazard map of Spain, we have not incorporated it in the set of seismogenic sources either. We have only used the same areal sources (planar geometry and seismic characteristics) in order to compare our results with those obtained in this map since we have no other control information in the marine area. With the seismic information of the maximum credible earthquake in each source, and with the distances that each attenuation function incorporates in its mathematical expression (according to the catalogue published by Douglas (2020); some are planimetric distances and others are 3D distances) we have evaluated the seismic hazard according to a classical deterministic scheme as a first preliminary step in a study of this type, before using more sophisticated tools such as PSHA or NDSHA.

A few More comments:

line 36 ...a Mw 7.7 and a unique reference for the 1755 Lisbon earthquake. Then, in line 119, it is mentioned a magnitude 8.5, with no reference. The same for the 1969 earthquake.

R: The reviewer is right. We have corrected the magnitudes and added more references to the Lisbon and Cape St. Vincent earthquakes.

Line 43 “ ...and mitigate seismic hazard” ?. Risk is mitigated, not seismic hazard.

R: This sentence was deleted during the revision and synthesis of the manuscript.

Line 221: hazard IS NOT the probability that an earthquake occurs in a given geographic area.!!!

R: The reviewer is right. We have corrected the definition of seismic hazard. Thanks.

Line 285 : it is not true the statement “ ... obtaining higher Y because they are closer to seismogenic sources”, as, as an example, directivity changes profoundly results.

R: This sentence was deleted during the revision and synthesis of the manuscript.

And many mistakes easily corrected.

I would recommend a deep level of review, by the authors, before trying to submit it again.

R: Thank you for your recommendation. A exhaustive review and synthesis of the paper content was performed.