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Interactive comment on “An extended stochastic method for seismic hazard estimation” by A. K. Abd el-aal et al.

Anonymous Referee #1

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General comment: It is not clear from the text in what consists the novelty of the proposed ground-motion simulation method. The paper appears to consist of a simple application to few Egypt sites of the Boore (2003) method. The authors did not develop the method in any way (as themselves also admit, writing at pg. 12 that they simulated the ground motion simply using the SMSIM code by Boore (2009)). Moreover the text is a collection of inaccuracies and mistakes. So I suggest to reject the paper.

Major points:

Page 2,

Line 25. I never heard the definition of seismic hazard given by the authors: “the probable level of ground shaking associated to the recurrence of earthquakes”. The

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standard definition of seismic hazard in current literature is instead: “the exceedance probability of given levels of ground motion (or the levels of ground motion having a given exceedance probability) in a future time interval”. The authors should change the definition or give references for their own definition. Moreover, the assessment of seismic hazard does not reduce, by itself, “the effects of the earthquakes” but rather it is a tool to establish regulations that, in case they were applied, might reduce the earthquake effects. Even the subsequent discussion about PSHA and DSHA is not correct as these two approaches provide essentially different estimates. As well the, “stochastic simulation methods” are not another category of SHA but rather a kind of DSHA.

Page 3.

Line 6. The justification given for not using PSHA (“a complete earthquake catalogue is unavailable for the study area”) is risible as it also applies to DSHA.

Page 5.

Lines 4-6. Declustering is usually applied to the catalog in PSHA but it is not necessary for DSHA. Moreover it is not clear from the wording if the authors apply it or not (and eventually how).

Page 7.

Line 17. Eq. (3) substantially differ from the corresponding equation (10) of Boore (2003). An explanation is needed for such difference.

Page 13,

Line 15-20. The 80% probability of non exceedance in 50 years corresponds to a “return period” of 224 years (not 75). The “return period” of 75 years about corresponds to the 50% probability of non exceedance ($T = -50 / \ln(\text{Non Exc. Prob.})$). Moreover the ground motion predicted by stochastic simulation has implicitly an associated probability of exceedance of 100% (0% of non exceedance) and a virtually null return period

so IT IS NOT COMPARABLE with PSHA estimates with 90% probability of non exceedance.

Minor points

Abstract.

Line 4. In current literature it is usually not appropriate to report title and publication details of a cited paper (Boore, 2003) in the text of the article.

Lines 13-14. I do not understand the difference between “predicting the ground motion” and “estimating the maximum peak ground acceleration”.

Page 3.

Line 28. The self-citations of Abd El-Aal, 2008, and 2010a are not necessary to support the previous sentence (which is obvious).

Page4.

Line 1. Earthquakes are only one among others natural hazard phenomena (not the “most typical”).

Line 28. The method of Boore (2003) predicts ground motion not “seismic hazard”.

Page 5.

Line1. Figure 1 is not particularly informative and necessary.

Line 2. Check “is consists”.

Line 7. P (R, f) is the path TERM.

Line 22. Trifunac not Trifunace

Page 6.

Lines 16-22. References for all the methods listed for determining maximum magnitude



or a description of strengths and weaknesses of each of them should be provided.

Page7.

Lines 8-9. References or a detailed description for both method of ground motion computation should be provided.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 7555, 2015.

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