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Comment

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

### **Anonymous Referee #2**

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Despite the authors' claim, this paper seems to me the application of Boore's stochastic model to a study-area in northern Egypt. In practice, the authors did not develop any specific new model, but at most introduced some variants. The authors should better explain the variants and the reason why they liked to use them.

English is poor, and often the authors use different expressions in an equivalent way, though they have different meaning in the canonical literature. One example is the identification of seismic hazard with the calculation of the PGA, (or PGV, or PGD) or of the PSA (pseudo spectral acceleration).

The additivity of the amplification and attenuation functions in equation (3) is suspicious. As is stated in eq.(1) all functions (E, P, G and I) are multiplied as spectral factors. This implies that if some of these functions (like G) is formed by multiple com-

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ponents (i.e. A and D), then even these components should be combined together as factors.

From the analysis, it seems that the seismic zones contributing to the maximum PGA are the zones closest to the study area (see Table 2), i.e. zones 6, 14, 25 and 26. According to their method, the authors take the highest expected magnitude (given in Table 1, and repeated in Table 2) in each zone, then they assume that this maximum earthquake occurs in the point of the polygonal zone that is closest to the target city. This means that the way the boundary of the zone is drawn is crucial for the analysis. But looking at the seismicity plot of Figure 2, the boundaries of these zones are quite arbitrary. And this reflects on the computations, since it changes the distance  $R$  in the path term  $P$  of formula (1). The authors should discuss this and other factors introducing uncertainties in the evaluation of the resulting PGA.

Using a catalogue of independent earthquakes when adopting the method of the worst-case scenario is not necessary. Indeed in principle it may be wrong. Cancelling earthquakes from the catalogue can eliminate some largest earthquakes (this would happen only rarely when a large foreshock is mistakenly taken as the main shock), but more frequently it would reduce the geographic extension of the seismic zones. Often a fault is better described by the full set of foreshock and aftershocks rather than by the independent main earthquakes that break the fault.

My overall opinion on this paper is that it is an exercise, that can be published only after the above remarks are replied, and after the authors show the real novelty contained in this paper with respect the Boore's method and, importantly, with respect to the previous studies of seismic hazards conducted for the northern cities of Egypt.

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

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