Natural Hazards
and Earth System
Sciences

Discussions

Interactive comment on "A detailed seismic zonation model for shallow earthquakes in the broader Aegean area" *by* D. A. Vamvakaris et al.

Anonymous Referee #1

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General comments:

This is a useful paper which improves previous ones published in the past by some of the co-authors. Yet, this paper may be considered as a new contribution given that it is based on significantly more data sets with respect to the previous ones.

Specific comments:

In l. 22-23, p. 6730, it is reported "Of course, more recent, instrumentally recorded data are of higher accuracy, hence they participate with a diïňÃerent weighting in the zonation procedure". However, the weighting in the zonation procedure is not reported later in the paper.

The magnitude completeness, Mc, of earthquake catalogue data is of crucial importance in the analysis performed in this paper, since the calculation of the G-R a, b parameters are directly dependent on the Mc. The authors selected to decide on the Mc for the several time segments of the catalog by "visual inspection" on the G-R graphs (l. 12-14, p. 6739). However, this may lead to erroneous decisions. The question is why they didn't use the widely applicable z-map software (e.g. Wiemer, 2001) which calculates, with a variety of techniques, parameters such as Mc, a, b.

From section "6. Seismicity parameter assessment for the new zonation model" one may conclude that the authors used the least-squares and the least-absolute values techniques for the determination of the b parameter for data set of magnitude range exceeding 1.9. In fact, shorter magnitude range may lead to unstable results. The question is why they did not applied the maximum likelihood method (MLM) instead of the least-squares and the least-absolute values ones, given that the superiority of MLM has been shown from many years in the seismological literature and is available for application by the z-map software.

Another important issue is that the size of some of the seismotectonic zones selected is too small, e.g. S12, S15 and many others. This is important since at least one dimension of those zone, is less than the error involved in the epicentral determinations of several historical earthquakes, being on the order of 30 km or more, particularly for earthquakes occurring in the sea. It would be more realistic and less risky to reduce the number of zones with the aim to reduce such uncertainties.

The authors use a long number of papers but neglected to include others which are directly related to the several sections they divided their paper. Some examples may refer to the papers

1. A study of the deep seismotectonics in the Hellenic arc. Boll. Geof. Teor. Applic., 27, 197-207, 1985 (D. KondoÂňpoulou, G.A. PapaÂňdopoulos & S. Pavlides).

2. Seismotectonics of the Aegean region. Tectonophysics, 124, 67-84, 1986 (G.A.

Papadopoulos, D. Kondopoulou, G.- A. Leventakis & S. Pavlides).

3. Maximum likelihood estimation of earthquake hazard parameters in the Aegean area from mixed data. Tectonophysics, 185, 277-294, 1991 (G.A. Papadopoulos & A. Kijko).

4. Time independent seismic hazard analysis of Greece deduced from Bayesian statistics. Natural Hazards & Earth System Science, 3, 129-134, 2003 (T. M. Tsapanos, G.A. Papadopoulos & O. Ch. Galanis).

5. Preliminary seismic hazard assessments for the area of Pylos and surrounding region (SW Peloponnese). Boll. Geof. Teor. Applic., 51 (2-3): 163-186, 2010 (D. Slejko, M. Santulin, J. Garcia, J. Papoulia, E. Daskalaki, C. Fasulaka, A. Fokaefs, D. Ilinski, J. Mascle, J. Makris, R. Nicolich, G.A. Papadopoulos, A. Tsambas, N. Wardell).

Number 1 and 2 contain many fault plane solutions, n. 3 and 4 calculates a,b, Mc and maximum magnitude for several seismotectonic zones of the Aegean region, n. 5 proposes a new seismotectonic zonation for the western Hellenic arc.

Technical corrections:

In l. 25, p. 6738 it is written "...$M \geq 5.0$ since 195,...". The authors should correct the year, is it 1950?

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