



Probabilistic Seismic Hazard Maps in PGA for Bulgaria

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The territory of Bulgaria represents a typical example of high seismic risk area in the eastern part of the Balkan Peninsula. Bulgaria contains important industrial areas that face considerable earthquake risk. Moreover, the seismicity of the neighboring countries, like Greece, Turkey, Serbia, FYROM and Romania (especially Vrancea-Romania intermediate earthquakes involving the non-crustal lithosphere), influences the seismic hazard in Bulgaria.

The basic approach used for the creation of ground motion maps combines via GIS, source geometry, earthquake occurrence model, maximum earthquake magnitude, and the appropriate attenuation relations for shallow and intermediate earthquakes. In the study seismic hazard maps for Bulgaria are presented in terms of Peak Ground Acceleration (PGA) in agreement with EC8. As recommended in EC8, the maps are calculated for a 475 years return period (probability of exceedance of 10% in 50 years) for the design earthquake and for a 95 years return period (probability of exceedance of 10% in 10 years) for weaker earthquakes with higher frequency of occurrence. Additionally a 1000 years return period hazard map is presented.

Procedure called disaggregation has been applied to examine the spatial and magnitude dependence of PSHA results. The aim is to determine the magnitudes and distances that contribute to the calculated exceedance frequencies at a given return period and at a structural period of engineering interest. The seismic hazard for some of the cities in Bulgaria for a 475 years return period and at PGA is partitioned into selected magnitude and distance bins. The results are displayed at a histogram giving the percent contribution to the calculated hazard of earthquakes capable to cause ground motion equal to or greater than the corresponding to the hazard as a function of distance and magnitude.