

Earthquake Hazard Assessment for Central Greece Considering Local Geological Media

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Earthquakes are serious threat to human communities with their complex structure systems and relating infrastructures. The principal way in which seismologists are able to mitigate their dangerous vibration effects is highly sophisticated approach of the earthquake hazard assessment that is handed over to advising engineers, politicians, designers and urban planners. To evaluate earthquake hazard it is important to know how the vibration shaking decreases with distance from the epicenter. Macro-seismic intensity values are able to give a direct measure of earthquake effects in human terms. However, a routine macroseismic data gathering and evaluating have to reflect societal changes. Kriging method is delivered to draw automatically isoseismal maps. Its smoothing and numerical parameters were tested on macroseismic data of Greek earthquakes and the optimum values were defined. Shapes of isoseismals depend on source properties, lithosphere structures, tectonic line orientations, site geology and topography. The isoseismals of higher intensities are often shaped in accordance with local rupture zones and their seismotectonic characteristics and the isoseismals of lower intensities reflect generally broad regional structural features of the shaken area. Even if less consolidated geological formations (soils, sands, etc.) in large epicenter distances, they can influence intensities significantly too. The kriging allows local intensity differences between original and smoothed values to be evaluated and relations of the differences to physical properties of site rock formations (e.g. seismic wave velocity, bulk density, etc.) to be defined. The intensity increments correlate mostly to less consolidate rocks and, on the other hand, the intensity reductions to igneous or metamorphic rocks, as well as to firm sediments (limestone, dolomite, etc). Finally, standard probabilistic earthquake hazard calculations will be discussed from a viewpoint of a consideration of the intensity rates estimated for geological media in Central Greece to get a reliable assessment of earthquake hazard.