



Local Effects Induced by Crustal Seismogenic Zone of Banat, Romania

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The aim of this study is to evaluate the seismic effects induced by the crustal earthquakes in the local structure of the Banat area. The investigated area belongs to the Eastern part of the Pannonia Depression, with geographical limits between 45°N-46°N latitude and 20°E-22°E longitude, and its geological, tectonic and geophysical particularities are presented. The area contains a complex system of faults crossing each other perpendicularly. The seismicity of the region is studied, along with a history of the seismic activity starting with the strong earthquakes of 1879 up to 2012. About 300 events were reported in the area, four of them with $M_w \geq 5.0$. Macroseismic intensities observed during this period are about VII MSK for 24 events and VII-VIII for 9 other events. Time distribution indicates a higher activity in the last two decades, possible because of the much accurate seismic network.

The parametric catalogue of Banat shows superficial depths (10-15 km) for hypocenters and a great variety of focal mechanism solutions. These local and crustal events influence seismic hazard of the region, being the only earthquakes that affect the Timisoara city area, the most important town situated in the studied zone.

Several seismic scenarios are defined in order to study the seismic hazard for the city of Timisoara. The chosen scenario in this paper is based on the seismic sequence of July-December 1991. Local seismic effects in Timisoara area are discussed in terms of accelerations and response spectra at the surface, seismic response of the local structure is computed on the basis of synthetic processing for available records (the 2.12.1991 earthquake, $M_w=5.5$). Nonlinear effects induced by significant deformations need a certain method – linear equivalent - for a multi-stratified zone as we considered for the Banat superficial area. Therefore important nonlinear variations of shear modulus and damping function with state of strain, as a seismic event occurs, are expected in superficial soil deposits during the transfer of the seismic signal to the surface. This goal will be accomplished using the specialized computational programs. All these give us a very complete image of the crustal seismic hazard of the Banat zone. Therefore, these results could be considered in the design of large structures (civil and industrial) in the studied area.

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