Geophysical Research Abstracts
Vol. 20, EGU2018-2157-1, 2018
EGU General Assembly 2018
© Author(s) 2018. CC Attribution 4.0 license.

Engineering – seismogeological structure of Georgia, the influence of geological and geophysical parameters on seismic hazard

Nato Jorjiashvili, Malkhaz Gigiberia, Ia Shengelia, and Maia Otinashvili
Ilia State University, Institute of Earth Sciences, Tbilisi, Georgia (nato_jorjiashvili@iliauni.edu.ge)

Georgia is situated in the Caucasus region, which is one of the most seismically active regions in the Alpine-Himalayan collision belt. Analysis of the historical and instrumental seismology of this region shows that it is still of moderate seismicity. The seismicity of the area reflects the general tectonics of the region. The main seismo-tectonic feature is the junction between the Arabian and Eurasian plates. The northern movement and counterclockwise rotation of the Arabian plate causes westward movement of the Turkish block, eastward movement of the Iranian block along the strike-slip faults and the creation of thrust faulting systems in the Caucasus region.

The main goal of the study was to find out lithofacies structure of basic and contemporary sediments (about 25-30 meter depth) for Georgia using geophysical survey and taking into consideration existing geological and geophysical data to find out the influence of the estimated parameters on seismic hazard assessment.
The study areas were selected where geophisical and local geological survey are done. Using geophysical survey direct and shear wave velocities were obtained, using which the following parameters are calculated: μd – viscosity (Poisson coefficient), Ed – elasticity dynamic (Young's) modulus, Gd – shear modulus, Kd – bulk modulus, D – modulus of common deformation and τ – ultimate compression strength, according to known theoretical and experimental relationships.

Maps of the values of these parameters up to 30 meter depth are obtained. Distributions of physical-mechanical parameters are analyzed for local zones. Then data were divided by rock type and 2D and 3D statistical analysis were done for each rock type.

As a result, finally, site-specific seismic hazards were assessed for PGA (Peak Ground Acceleration) for different probabilities and 50 years exposure time period. For the assessment new ground motion prediction models were used specially done for Caucasus region. Also, local soil conditions were included for the study and results were compared with ordinary results obtained without taking into account local soil conditions.
Finally, results were visualized as maps in GIS (geo-information systems).