



Numerical analysis of mudstone slope stability in Greater Sochi, Russia

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The mountainous area of Greater Sochi, located in northern Caucasus, is always subjected to landslide hazard. For the safety of transportation facilities and human beings, stability assessment of the slopes along the roadways was conducted, applying numerical modeling. The main geological subject of the slope is the Jurassic deposit, represented by low strength argillite – one sort of mudstones. Earthquake is considered to be the important triggering factor causing slope instabilities in this area. The influence of topography, physical-mechanical properties, seismic parameter on slope safety factor was analyzed. A slope map from the digital elevation model (DEM) is produced using ArcGIS. According to the map, the variation of the slope angles was achieved, aiming to classify slope angle of slope models. The stress-strain conditions of the different slopes with various slope angles were then compared using MIDAS GTS. A sensitivity analysis was carried out using GeoStudio, then determined that the stability of the slope is more sensitive to cohesion of mudstone and seismic coefficient, other than material density and internal friction angle. The safety factor (Fs) is summarized under different slope angles, cohesion, and seismic coefficients. The safety factor contour maps were drawn to compare. Finally, a chemical grouting method was recommended to mitigate landslide.