Landslide susceptibility mapping for a part of North Anatolian Fault Zone (Northeast Turkey) using likelihood-frequency ratio model

Gökhan Demir (1), Mustafa Aytekin (2), Aykut Akgün (3), and Sabriye Banu İkizler (4)

(1) Department of Civil Engineering, KTU, Trabzon, Turkey (gokhandemir61@hotmail.com/+904623772606), (2) Department of Civil Eng. & Arch, University of Bahrain, Isa Town, Kingdom of Bahrain(maytekin1@gmail.com), (3) Department of Geological Engineering, KTU, Trabzon, Turkey(aykutakgun@gmail.com), (4) Department of Civil Engineering, KTU, Trabzon, Turkey(banuh73@gmail.com/+904623772606)

The North Anatolian Fault is know as one of the most active and destructive fault zone which produced many earthquakes with high magnitudes. Along this fault zone, the morphology and the lithological features are prone to landsliding. However, many earthquake induced landslides were recorded by several studies along this fault zone, and these landslides caused both injuiries and live losts. Therefore, a detailed landslide susceptibility assessment for this area is indispancable. In this context, a landslide susceptibility assessment for a part of North Anatolian Fault zone (Eastern Black Sea region of Turkey) was intended with this study, and the results of this study are summarized here. For this purpose, geographical information system (GIS) and a bivariate statistical model were used. Initially, the landslide inventory of the area was prepared by detailed field surveys and the analyses of the topographical maps Lithology, slope gradient, slope aspect, topographical elevation, distance to stream, distance to roads, distance to faults, drainage density and fault density were considered to be the landslide conditioning factors. Likelihood-frequency ratio (LRM) model was used to create landslide susceptibility map. At the end of the susceptibility assessment, the area was divided into five susceptibility regions such as very low, low, moderate, high, and very high. The result of the analysis was verified using the inventoried landslide locations and compared with the produced probability model. For this purpose, Area Under Curvature (AUC) approach was applied, and a AUC value was obtained. Based on this AUC value, the obtained landslide susceptibility map was concluded as satisfactory.