



Landslide susceptibility mapping for a part of North Anatolian Fault Zone (Northeast Turkey) using logistic regression model

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The North Anatolian Fault is known as one of the most active and destructive fault zones 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 injuries and lives lost. Therefore, a detailed landslide susceptibility assessment for this area is indispensable. In this context, a landslide susceptibility assessment for the 1445 km² area in the Kelkit River valley, a part of the 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, landslide inventory maps were prepared by using landslide data determined by field surveys and landslide data taken from the General Directorate of Mineral Research and Exploration. The landslide conditioning factors are considered to be lithology, slope gradient, slope aspect, topographical elevation, distance to streams, distance to roads and distance to faults, drainage density and fault density. ArcGIS package was used to manipulate and analyze all the collected data. Logistic regression method was applied to create a landslide susceptibility map. Landslide susceptibility maps were 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 Curve (AUC) approach was applied, and an AUC value was obtained. Based on this AUC value, the obtained landslide susceptibility map was concluded as satisfactory.

Keywords: North Anatolian Fault Zone, Landslide susceptibility map, Geographical Information Systems, Logistic Regression Analysis.