Assessment of fractal dimension and geometrical characteristics of the landslides identified in North of Tehran, Iran

ABSTRACT

The aim of the presented study is to assess the fractal dimension (D) and the geometrical characteristics (length and width) of the landslides identified in North of Tehran, Iran. At first, the landslide locations (528 landslides) were identified by interpretation of aerial photographs, satellite images and field surveys, and then to calculate the fractal dimension (D), we used the computer programming named as FRACEK. In the next step, geometrical characteristics of each landslide such as length (L) and width (W) were calculated by ArcGIS software. The landslide polygons were digitized from the mentioned landslide inventory map and rotated based on movement direction. The fractal dimension for all landslides varied between 1.665 and 1.968. Subsequently, the relationship between the length/width ratios and theirs fractal D values for 528 landslides was calculated. The results showed that correlation coefficients (R), which are different regression models such as exponential, linear, logarithmic, polynomial, and power, between D and L/W ratio are relatively high, respectively (0.75, 0.75, 0.76, 0.78, and 0.75). It can be concluded that the fractal dimension values and geometry characteristics of landslides would be useful indices for the management of hazardous areas, susceptible slopes, land use planning, and landslide hazard mitigation.