

Landslide susceptibility evaluation and factor effect analysis using Probabilistic-Frequency Ratio model

ABSTRACT

In the North parts of Iran (Alborz Mountain belt), landslides occur frequently due to climatologic and geologic conditions with high tectonic activities. That results, annually, millions of dollars financial defects excluding casualties and unrecoverable resources. In this paper, the landslide susceptibility and the effect of landslide-related factors at Marzan Abad in Iran, using the Probabilistic-Frequency Ratio (PFR) model, geographic information system (GIS) and remote sensing data have been evaluated. Landslide location map has been generated on the basis of image elements interpretation from aerial photos, satellite data and field observations. Display, manipulate and analysis have been carried out to evaluate layers such as geology, geomorphology, slope, soil, land use, distance from roads and drainages. The area under the prediction rate curve, evaluates how well the method predicts landslides. The results showed satisfactory agreement between prepared susceptibility map and existing data on landslide locations (92.59%). To assess the factor effects, each factor was excluded from the analysis and its effect was verified using the landslide location data. It is revealed that all factors have relatively positive effects, on the landslide susceptibility maps in the study. The most effective factor is the lithology and outcrop of the bedrocks (13.7% positive influence) in this area.

Keyword: Central Alborz; Factor effect analysis; GIS and remote sensing; Landslide susceptibility; Probabilistic-Frequency Ratio