

عنوان مقاله:

Efficiency of the maximum entropy algorithm and GIS in assessing landslide susceptibility

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خلاصه مقاله:

Background and Objectives: A review of the damages caused by landslides proves the need to investigate the factors affecting the occurrence of this phenomenon and the need to predict its occurrence. Landslides are one of the most dangerous natural disasters that cause excessive human and financial losses in the mountains worldwide. Due to their dangerous nature, landslides suddenly disrupt the morphology and cause major damage to residential areas, roads, agricultural lands, etc., in mountainous areas. Fortunately, there are appropriate methodologies for assessing risk and determining the effective risk factors associated with them. **Materials and Methods:** In this study, the maximum entropy of three replications was applied to Maxent software to investigate landslide susceptibility in the southern areas of the Fars Province, Iran. Thirteen factors were used to prepare the landslide susceptibility map: lithological units (Lu), land use/land cover (LULC), slope percentage (SP), slope aspect (SA), altitude, plan curvature (Plan-C), topographic wetness index (TWI), distance to river (DTR), distance to roads (DTRS), distance to fault (DTF), drainage density (DD), normalized difference vegetation index (NDVI), and annual mean rainfall (AMR). In this study, the lack of multicollinearity among the effective factors was proven using tolerance (TOL) and variance inflation factor (VIF) indicators. In addition, the weights of these 13 factors were determined using the analytic hierarchy process (AHP) model. **Results:** The results of the AHP method show that, in descending order, lithological units, land use-cover, and slope percentage are the most important factors influencing the occurrence of landslides in the study area. Thirty percent of the landslide points were randomly selected, removed from the modeling data, and used for the evaluation using the ROC/AUC indicator. In addition, the final map of the landslide susceptibility was presented in three scenarios using data replication. The preparation of three different outputs had good accuracy, but the third iteration, with an AUC value of 0.778 (ROC= 77.8%), had the highest accuracy in preparing the landslide susceptibility map. The evaluation of landslide susceptibility maps using the second and third iterations, with AUC values of 0.77 (ROC= 77 %) and 0.640 (ROC= 64%), respectively, had good and moderate accuracy with the highest efficiency in predicting landslide sensitivity. Finally, the highest percentage of landslide susceptibility area according to the first, second, and ... ,third repetitions were, respectively

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