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## Comparative analysis of statistical methods for landslide susceptibility mapping in the Bostanlik District, Uzbekistan

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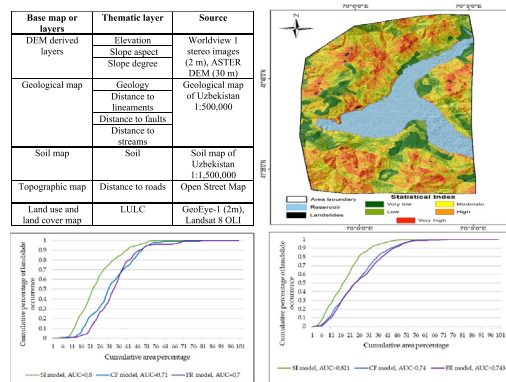
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### HIGHLIGHTS

- The present study is the first attempt of a statistical landslide susceptibility analysis for part of the territory of Uzbekistan.
- Statistical index (SI), frequency ratio (FR) and certainty factor (CF) are employed for the landslide susceptibility mapping.
- The statistical index method results in the best model performance.
- The landslide–predictor relationships confirm findings of previous studies.
- The results perform slightly better than those obtained in some previous studies, possibly due to the polygon-based inventory used.

### GRAPHICAL ABSTRACT



### ARTICLE INFO

#### Article history:

Received 2 August 2018

Received in revised form 31 October 2018

Accepted 31 October 2018

Available online 02 November 2018

Editor: Ouyang Wei

#### Keywords:

Landslide  
Inventory  
Statistical index  
Frequency ratio  
Certainty factor  
Evaluation

### ABSTRACT

The Bostanlik district, Uzbekistan, is characterized by mountainous terrain susceptible to landslides. The present study aims at creating a statistically derived landslide susceptibility map – the first of its type for Uzbekistan – for part of the area in order to inform risk management. Statistical index (SI), frequency ratio (FR) and certainty factor (CF) are employed and compared for this purpose. Ten predictor layers are used for the analysis, including geology, soil, land use and land cover, slope, aspect, elevation, distance to lineaments, distance to faults, distance to roads, and distance to streams. 170 landslide polygons are mapped based on GeoEye-1 and Google Earth imagery. 119 (70%) out of them are randomly selected and used for the training of the methods, whereas 51 (30%) are retained for the evaluation of the results. The three landslide susceptibility maps are split into five classes, i.e. very low, low, moderate, high, and very high. The evaluation of the results obtained builds on the area under the success rate and prediction rate curves (AUC). The training accuracies are 82.1%, 74.3% and 74%, while the prediction accuracies are 80%, 70% and 71%, for the SI, FR and CF methods, respectively. The spatial relationships between the landslides and the predictor layers confirmed the results of previous studies conducted in other areas, whereas model performance was slightly higher than in some earlier studies – possibly a benefit of the polygon-based landslide inventory.

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