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An Assessment of Conditioning Parameter Selection Efficiency on Medium Scale Erosion Susceptibility Mapping by GIS and Remote Sensing methodologies : An Example from Northwest Turkey

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To make a medium scale erosion susceptibility map, several conditioning parameters can be considered to be input parameter in the model constructed. However, to select appropriate conditioning parameters is an important task in order to provide a comprehensive erosion susceptibility map. In this context, this study examines the efficiency of conditioning parameter selection in a case study.
For this purpose, Ayvalık district (Northwest Turkey) was selected where a serious surface erosion problem is available. To make an erosion susceptibility map of the area, two methodologies were considered, namely logistic regression (LR) and analytical hierarchy process (AHP). Weathering of rock units, slope gradient, stream power index (SPI), structural lineament density, drainage density and land cover were considered to be conditioning parameters. Initally, an erosion susceptibility map considering by all the conditioning parameters were produced by LR and AHP methodologies. Then, six different parameter combinations were created, and six different erosion susceptibility maps were also produced for two modelling methods. After obtaining twelve different erosion susceptibility maps, performance analyses were carried out for all produced maps by area under curvature (AUC) procedure. The maps produced were also compared with each other. For this purpose, cross correlation were done, and both similarities and dissimilarities were determined between the maps by Kappa Index (KIA) assessment. After all these process, the obtained erosion susceptibility maps were also compared with the landslide occurrence locations which are another natural hazard problem in the area to investigate the relationship between erosion susceptibility and landslide occurrence. At the end of the performance analysis, the most successful estimations by LR and AHP were obtained, and the results were also discussed in frame of cause-result relationship.

Keywords: Erosion, AHP, Logistic regression, Turkey