Semi-Automated Landslide Mapping by Using an Expert Based Module Running on GIS Environment: Netcad Architect M-AHP Operator

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In the present study semi-automated landslide mapping of an area locating between the cities Afyon and Usak (west of Turkey) was evaluated by using an expert based modelling operator developed in Netcad Architect environment. The area considerably suffers from landslides. The main public concern of this region within this respect is due to the high speed train railway route which will connect Ankara and Izmir. The study was carried out in three main stages; (i) data production, (ii) modelling for semi-automated landslide mapping, and (iii) validation of the constructed models by using the actual landslides observed in the region. The altitude, slope gradient, slope aspect and the second derivative of topography in terms of topographical wetness index parameters, geology in terms of lithology type, and normalized difference vegetation index in terms of environmental factor were evaluated to be the main conditioning factor of active and old landslides observed in the area. Two expert based models for mapping active and old landslides were constructed by using the M-AHP operator of the Netcad Architect environment. The resultant maps represent both possible active and old landslide areas which could be encountered throughout the region. According to the results of the modelling stages, almost 7 % of the area is found to be active landslide area, and almost 13 % of the area constitutes possible old failures in the region. The validations of the constructed models were performed by using the ROC (Receiver Operating Characteristics) curve operator which was also developed in Netcad Architect environment. The area under ROC curves for the models were calculated to be 0.674 and 0.728 for active and old landslides respectively. Considering expert nature of the constructed models these results are promising, and could be evaluated in route selection assessments and suitable site selection for settlement.