

Slope stability assessment by artificial neural network in EnShi region, China

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Landslide is one of the most common and damaging natural hazard type in mountainous areas. However, due to the uncertain failure time and complex mechanisms of a landslide, it determines that the research trend for landslide susceptibility would be the prediction of possibility for unstable slopes which are prone to landslides in specific region and under certain conditions, as well as the analysis of spatial distribution law for these unstable slopes. In order to effectively avoid the interference due to differences in failure mechanisms of different landslide types, unstable slopes only in Silurian stratum in EnShi region were chosen as the research object. Based on the field investigation and slope failure mechanism analysis, slope angle, slope structure, road influence, stream and gully influence were taken into account as the factor of evaluation index system. Then an intelligent unstable slope prediction model was developed by artificial neural network, which was well trained and tested by investigated landslide data, so as to get good prediction ability. Finally, the research obtained a spatial distribution of unstable slope zones which are prone to landslides in the study area. The prediction result also supported by remote sensing data and field investigation. The research not only proves the feasibility and reliability of the spatial unstable slope prediction method which based on computational intelligence theory and GIS technology, but also provides useful guidance for both independent landslide susceptibility assessment and land planning processes.

Keywords: silurian stratum, slope stability, spatial prediction, artificial neural network, geographic information system