



Slope Stability Assessment Based on GIS Analysis – Case Study of Lanzhou Region, China

J Ma (1), X Meng (1), and X Dou (2)

(1) Key Laboratory of Ministry of Education for Environmental Systems of Western China, Lanzhou University, China, (2) Gansu Academy of Sciences, Lanzhou, China

Lanzhou, the capital of Gansu Province, is located in the conjunctive zone between Tibetan, Loess and Mongolian Plateau. Due to the special geological, geomorphological and climatic conditions, together with an increased urbanisation in the last 50 years, the Great Lanzhou has become one of the severely mass movement affected areas in the world. The study of landslides and slope instability, however, still remains primarily on a level of descriptive approach and individual landslide investigation. As to the spatial distribution of landslides, slope instabilities and their influential factors for a large area, effective systematic quantitative analysis has not yet been carried out.

Based on 15 indices, including field survey data, DEM, precipitation, lithology, landuse, vegetation, river system etc., this paper employs GIS technique and CF statistic model (Shortlife and Buchanan, 1975) to obtain and, to compare the CF value of each index. The analytic result shows that landslides are closely correlated with indices of slope angle, horizontal and profile curvature and slope length, whereas other indices fall into a minimal level of influence. Taken account of this result, a number of randomly selected samples are analysed by using Binary Logistic Regression Model, from which the landsliding probability can be then obtained. Having compared with actual landslide occurrences, it is found that the accuracy of such analysis is in an order of 75.4%. Therefore, by using this technique, a landslide risk probability map of this region can be effectively produced.