Geophysical Research Abstracts
Vol. 18, EGU2016-10988, 2016
EGU General Assembly 2016

GIS based probabilistic analysis for shallow landslide susceptibility using Point Estimate Method

Hyuck-Jin Park and Jung-Hyun Lee
Sejong University, Korea, Republic Of (hjpark@sejong.ac.kr)

The mechanical properties of soil materials (such as cohesion and friction angle) used in physically based model for landslide susceptibility analyses have been identified as the major source of uncertainty caused by complex geological conditions and spatial variability. In addition, limited sampling is another source of the uncertainty since the input parameters were obtained from broad areas. Therefore, in order to properly account for the uncertainty in mechanical parameters, the parameters were considered as random variables and the probabilistic analysis method has been used. In many previous researches, the Monte Carlo simulation has been widely used as the probabilistic analysis. However, since the Monte Carlo method requires a large number of repeated calculations and a great deal of calculation time to evaluate the probability of failure, it is not easy to adopt this approach to extensive study area due to a huge amount of computation time for regional study area. Therefore, this study proposes the alternative probabilistic analysis approach using the Point Estimate method (PEM), which has the advantage overcoming the shortcomings of the Monte Carlo simulation. This is because PEM requires only the mean and standard deviation of random variables and can obtain the probability of failure with a simple calculation. This proposed approach was performed in GIS based environments and applied to the study are which was experienced a large amount of landslides. The spatial database for input parameters and landslide inventory map were constructed in a grid-based GIS environment. To evaluate the performance of the model, the results of the landslide susceptibility assessment were compared with the landslide inventories using ROC graph.