



Application of the approach of susceptibility analysis in rock slopes considering geological data resolution from regional to site scales

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In Taiwan, Landslide hazards often come with large consequences because they regularly occurred within populated regions. To mitigate damage and prevent casualties, susceptibility analysis has been widely adopted as a fundamental task, facilitating the understanding of why and where slope failures might occur. In this study, a multiscale susceptibility analysis of rock slopes was conducted in a metamorphic area in northern Taiwan. The slope units, producing from high-resolution terrain elevation data by using object-based image analysis (OBIA), was employed as mapping units. For the same study area, susceptibility maps with different purposes can be achieved depending on the size of mapping units, input data resolution, and mapping scales [1]. The optimal selection of subdivision parameters for producing SUS at different mapping scales was determined by considering the SU internal homogeneity, SU external heterogeneity, and purposes of susceptibility maps. On the other hand, because the presence of geological discontinuities in rocks plays a critical role on the stability of rock slopes, this study increased the resolution of geological data to implement more detail susceptibility information of rock slopes when the map scale increased. The results show that the application of the susceptibility approach can provide rock slope susceptibility analyses from the landslide activity and the rock slope characterization on the regional scale and the failure mechanisms on the local scale. In addition, the UAV photogrammetry, which produced a high-resolution digital surface model (DSM) and reliable attitudes of geological discontinuities, can improve the result of the susceptibility analysis into site scale. Performances of the susceptibility maps were validated through field investigations and data of the geologically sensitive area, which was released by the Central Geological Survey of Taiwan.

Reference:

[1] Lin, C. H., Lin, M. L., Peng, H. R., & Lin, H. H. (2018). Framework for susceptibility analysis of layered rock slopes considering the dimensions of the mapping units and geological data resolution at various map scales. *Engineering Geology*, 246, 310-325.