MAPPING THE LANDSLIDE SUSCEPTIBILITY AND RISK OF HONG KONG BY REMOTELY-SENSED IMAGERY

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Abstract: Among the various natural hazards, landslides are one of the most widespread and damaging one. Different approaches have been developed to produce landslide susceptibility maps. Until now, traditional geospatial method is still severely affected by erroneous input layers, the ambiguous influence effects of datasets, inappropriate user-defined database queries, and the fuzziness of the dataset themselves. This study aims at presenting and evaluating the cloud-computing geospatial method in mapping the landslide susceptibility. The statically based frequency ratio model was used to evaluate the landslide hazard for the study area in Hong Kong. Landslide inventory, topographic map, geological map, soil map, drainage map, Landsat TM imagery, SPOT 5 image, Digital Elevation Model (DEM) and rainfall data are acquired. The spatial relationships between landslide location and each landslide-related factor were analyzed using the frequency ratio-based statistical model. The ratios of each factor parameter were summed to calculate the landslide hazard index (LHI). Through multiple fieldworks, image interpretation, environmental parameter analysis in cloud-computation system, a landslide susceptibility map is produced. The statically based frequency ratio model was used to evaluate the landslide hazard for the study area in Hong Kong. This study, supported by a cloud-computation platform, demonstrate a more efficient, systematic and widely-applicable approach to map the landslide susceptibility. In our study, we are also investigating the possibility of establishing an online monitoring system for landslide hazard. Based on the geo-computation platform developed by LIESMARS, Wuhan University, the model we derived is able to register to the cloud-server in order to make it commonly available to broader communities through Internet, and the real-time visualization of the landslide hazard can also be viewed.

Keywords: landslide susceptibility; remote sensing; Geographic Information System (GIS); cloud-computation; Hong Kong