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Assessment on the classification of landslide risk level using Genetic Algorithm of Operation Tree in central Taiwan

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This study assessed the classification of landslide areas by Genetic Algorithm of Operation Tree (GAOT) of Chen-Yu-Lan River upstream watershed of National Taiwan University Experimental Forest (NTUEF) after the Typhoon Morakot in 2009 using remotely and geological data. Landslides of 624.5 ha which accounting for 1.9% of total area were delineated with the threshold of slope (22°) and area size (1 hectare), 48 landslide sites were located in the upstream Chen-Yu-Lan watershed using FORMOSAT-II satellite imagery, the aerial photo and GIS related coverage. The five risk levels of these landslide areas was classified by the area, elevation, slope order, aspect, erosion order and geological factor order using the Simplicity Method suggested in the Technical Regulations for Soil and Water Conservation of Taiwan. If all the landslide sites were considered, the accuracy of classification using GAOT is 97.9%, superior than the K-means, Ward method, Shared Nearest Neighbor method, Maximum Likelihood Classifier and Bayesian Classifier; if 36 sites were used as training samples and the rest 12 sites were tested, the accuracy still can reach 81.3%. More geological data, anthropogenic influence and hydrological factors may be necessary for clarifying the landside area and the results benefit the assessment for future correction and management of the authorities.