微地形判釋應用於土石流災害之三維數值模擬

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摘 要 颱風豪雨所誘發山區大規模崩塌或土石流災害，其所挾帶之巨大衝擊力與土砂，經常造成下游保全對象生命財產威脅。為瞭解集水區尺度之潛在崩塌地土砂運移特性，本研究以光達掃瞄產製之高精度數值地形進行崩塌地擴大之山崩微地形判釋。整合前期遙測影像比對與地質調查成果，採用 Voellmy-Salm model 為理論基礎之三維土砂運移數值模擬程式(RAMMS)，以圈繪後之潛在不穩定重力變形區進行崩塌模擬。本文進一步考慮集水區水文歷線特性，探討邊坡崩積土體轉化為土石流之動態特徵，如河流彎道超高、沖積扇堆積等，最後導入危害矩陣(hazard matrix)概念進行危險度分級，以預測邊坡潛在土砂災害之影響範圍。

關鍵詞：崩塌、土石流、光達、微地形判釋、RAMMS。

The Study of Numerical Simulation of Debris Flow Hazard Combined with Micro-Photography Interpretation

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ABSTRACT The sediment volume of deep-seated landslide and debris flows which are triggered by torrential rains often causes the loss of live and property in the mountainous areas. For the purpose of understanding the characteristics of rapid mass movement on a watershed scale, the micro-photography interpretation based on the LiDAR scanning technique was utilized to determine the unstable landslide zonation. In addition to the multi-temporal satellite image interpretation and field investigation, the rapid mass movement process in the gravity deformation area was simulated by adopting the Voellmy-Salm model (RAMMS). The hydrograph variation in a catchment basin is introduced to investigate the detailed dynamic transportation behavior of debris flow such as super-elevation in a curve channel and alluvial fan formation in a valley. Finally, a hazard matrix concept is also proposed to classify the Debris flow hazard. The corresponding results may contribute to identify the potential influence area of sediment-disasters in the future..

Key Words : Landslide, debris flow, LiDAR, micro-photography interpretation, RAMMS.

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