

## 摘要

近年受到極端氣候之影響，臺灣山區災害頻傳，崩塌事件屢見不鮮，大規模崩塌事件更是備受關注。集水區崩塌發生後，崩落堆積於坡面之土砂容易造成二次災害，因此集水區崩塌地堆積區位之劃定極為重要。崩塌地堆積區位之劃定，傳統上常以崩塌事件前、後之數值高程模型加以運算，但礙於數值高程模型製作曠日費時且成本高取得不易。利用衛星影像雖可經濟且快速地繪製崩塌區位，但卻無法有效萃取堆積區位，故以植生復育率判釋集水區崩塌地之堆積區位為本研究重點。以小林村與九份二山等大規模崩塌地為研究樣區，在「演替初期之植生復育率，堆積區與滑落區應有顯著差異」之假說下，以災後數期之衛星影像計算崩塌地之植生復育率，配合 K-means 群集分析劃分植生復育之良窳。結果顯示災後約一年時間即可藉由植生復育率有效地劃分滑落及堆積區，經與數值高程模型驗證，小林村樣區之整體精確度達 61.5%，九份二山則達 69.8%。本研究所研發之崩塌土砂二次災害潛勢區位劃定模式，可結合保全對象之位相關係，優選崩塌地治理分區，供相關單位集水區保育治理工作之參考。

(關鍵詞：崩塌地萃取、植生復育率、二次災害)

## Abstract

Recently, the disaster events of landslide occurred frequently at mountainous watersheds due to extreme weather in Taiwan. Especially, the collapses with large scale volume which caused lots of depositions could become the potential source of secondary disaster and affect the protected targets in the watersheds. Areas of collapse and deposition were traditionally extracted from the digital elevation model (DEM) of pre- and post- disaster. However, it is hard to create the post-disaster DEM because of expenditure consideration. Therefore, watershed landsides were instead extracted from satellite images. The method of landslide delineation using vegetation index is still disable to distinguish the deposition areas from the landslides. This study introduced vegetation recovery rate as index to effectively delineate the areas of collapse and/or deposition for watershed landslides. The large-scale landslide in Siaolin Village and Chiufengershan, were selected as study areas. Based on the hypothesis of “at the initial phase of plant succession in a landslide area, the vegetation recovery rates should show significant difference at the sites of collapse and deposition”, the vegetation recovery rate derived from several phases of post- disaster satellite images coupled with K-means cluster analysis are employed to delineate the deposition areas of the slope failures. Results show that the collapse and deposition areas can be effectively delineated for about one year after the slope failure. The delineation is verified using DEM, and the overall accuracy is 61.5%, 69.8% at Siaolin Village and Chiufengershan respectively. The model developed in this study coupled with information of protection targets could be used to determine the priority of watershed landslide treatment for the references of related authorities.

(Keywords: Landslide extraction, Vegetation recovery rate, Secondary disaster).