氣候變遷下大甲溪集水區崩塌衝擊趨勢初探

Landslide Impact Evaluation in Dajia River Watershed under Climate Change

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摘　要

大甲溪集水區過去曾受2001年桃芝颱風、2004年敏督利颱風等極端降雨事件影響，誘發集水區內多處崩塌及土石流，造成道路毀損、水庫淤積，並危害居民生命安全。未來氣候變遷下，極端降雨事件發生機率提升，將可能使崩塌衝擊加劇。因此，本研究選用 HiRAM-WRF 動力降尺度資料內的颱風事件，搭配 TRIGRS 淺層崩塌模式，以及衝擊指標－崩塌率，來瞭解氣候變遷情境下大甲溪集水區的崩塌衝擊變化。結果顯示，大甲溪集水區基期的崩塌率範圍介於 0.26 至 4.95%，世紀中則介於 0.35 至 3.53%。以平均值來看，平均崩塌率由 1.48%提升至 1.57%，代表氣候變遷情境下整體崩塌衝擊略為增加，後續需多注意對水庫及聚落安全可能帶來的威脅。

關鍵詞：氣候變遷，衝擊，崩塌率，TRIGRS

Abstract

In the past, Dajia River watershed experienced many extreme rainfall events such as the 2001 TORAJI typhoon and the 2004 MINDULLE typhoon, which led to many landslides and debris flows in the watershed, causing road damage, reservoir sedimentation, and endangering the safety of residents. Due to climate change, the occurrence probability of the extreme rainfall events will be increased, which may exacerbate landslide impact. Therefore, this study used HiRAM-WRF dynamical downscaling climate change projection data, combined with TRIGRS, and the impact index – landslide area ratio, to evaluate the landslide impact of the Dajia River watershed under climate change scenario. The results show that the landslide area ratio ranged from 0.26 to 4.95% in the end of the 20th century, and between 0.35 and 3.53% in the middle of the 21st century. In terms of the average value, the average landslide area ratio has increased from 1.48 to 1.57%, which means that the overall landslide impact has slightly increased under climate change scenario, and more attention should be paid to the possible threats to reservoir and the safety of hillside communities.

Keywords：climate change, impact, landslide area ratio, TRIGRS