共享社會經濟路徑情境下氣候變遷坡地災害風險圖

Risk Assessment of Landslides under SSP Scenarios

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摘　要

氣候變遷造成的極端降雨不斷攀升，增加了坡地災害發生的機率，需針對易致災的區位建議優先採取減災與調適措施，本研究根據聯合國政府間氣候變化專門委員會(IPCC, 2012)之風險架構概念，以及最新第六代耦合模(Coupled Model Intercomparison Project Phase 6, CMIP6)的氣候情境資料，IPCC AR6 採用的情境結合「共享社會經濟路徑（Shared Socioeconomic Pathways, SSPs）與代表濃度路徑（Representative Concentration Pathways, RCPs）」，藉由 SSP 的導入，CMIP6 將社會經濟與溫室氣體輻射強迫力彼此搭配，其模擬情境包含 SSP5-8.5(高強迫路徑)、SSP3-7.0(中高強迫路徑)、SSP2-4.5(中間路徑)、SSP1-2.6(低強迫路徑)，於不同暖化情境下，統計降尺度日雨量資料，評估極端降雨發生之機率，做為危害度指標。再將危害度、脆弱度和暴露度等三個指標進行量化，並採用 Quantile 方法進行分級，利用空間單元鄉鎮市區呈現坡地災害相對高風險等級之分布。

關鍵詞：CMIP6 增溫情境、共享社會經濟路徑、坡地災害風險

Abstract

The increase in extreme rainfall due to climate change has heightened the likelihood of landslide. Prioritizing adaptation measures in high vulnerability areas to such disasters is essential. This study is based on the risk framework concept of the Intergovernmental Panel on Climate Change (IPCC, 2012) and utilizes climate scenario data from the Coupled Model Intercomparing Project Phase 6 (CMIP6). The simulated Shared Socioeconomic Pathways (SSPs) scenarios include SSP5-8.5 (high forcing pathway), SSP3-7.0 (medium-high forcing pathway), SSP2-4.5 (intermediate pathway), and SSP1-2.6 (low forcing pathway). This study evaluates the probability of extreme rainfall events under different global warming scenarios by analyzing statistically downscaled daily rainfall data, which serves as a hazard index. Additionally, the hazard, vulnerability, and exposure indicators are quantified and classified using the Quantile method. This classification is then utilized to create a slope disaster risk map,

illustrating the distribution of relatively high-risk areas for slope disasters within spatial units such as townships.

Keyword: CMIP6 Warming Scenarios, Shared Socioeconomic Pathway, landslide risk