

複合型土砂災害模擬 - 以日本京都府宇治市志津川為例

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摘要 儘管颱風豪雨期間，山區的自然災害大多係與水及土砂的移動過程有關，但大多數現行的土砂災害警戒系統通常僅考量單一類型的災害。本研究整合降雨—入滲模式、坡面穩定性分析模式、坡面崩塌土體運移模式、洪水及土砂流出模式，以及河床高程變化模式等，模擬流域尺度內之複合型土砂災害。此外，本研究採用一個全新的崩塌預測方法，它能快速地預測流域尺度內各個斜坡單元的崩塌發生時間、地點及規模；同時，此法亦用能來估算降雨時各斜坡單元上之坡面逕流，以取代缺乏明確物理意義的動力波法。此模擬結果不僅可協助地方政府驗證地區災害防救計畫，亦可作為發展複合型土砂災害警戒系統之基礎。

關鍵詞：複合型土砂災害、崩塌預測、土砂流出。

Simulation of Multi-Modal Sediment Disaster - A Case Study of Shizugawa Basin, Uji, Kyoto, Japan

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ABSTRACT While the nature disaster in mountain area during rainfall usually resulted from the moving of sediment and flooding, most of the existing warning system only considered the single hazard. This study integrates rainfall-infiltration, slope stability, water discharge, sediment runoff, and riverbed deformation model to simulate the multi-modal sediment disaster on a basin scale. In addition, this study adopts a new method to predict landslides. It can swiftly predict the occurring time, location, and scale of landslides on a basin scale. Moreover, it also can simulate the runoff of slopes to replace the kinematic wave method. The results can not only offer the verification of the disaster prevention plan but also provide the foundation of developing the multi-modal disaster warning system.

Key Words : multi-modal sediment disaster, landslide prediction, sediment runoff.

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