

蘭陽溪上游之地形地質如何影響河床土砂

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摘要 本研究以土砂平衡關係推导出土砂生產指標(I_P)及土砂堆積搬運指標(I_R),以蘭陽溪流域為對象,選用凡那比颱風(2010)及梅姬颱風(2010)兩事件,針對集水區之土砂搬運、堆積及平衡進行探討,了解極端事件對蘭陽溪流域土砂生產之變化及蘭陽溪流域易發生土砂堆積之河段範圍。本研究於兩項指標分別選用不同因子圖層,包括地形因子(坡度、坡型、河道寬度及坡度、河岸坡度、摩擦角)、雨量因子(累積雨量、最大降雨強度)與崩塌比,再利用 GIS 軟體之分析功能配合多變量分析方法進行上述之影響分析。由土砂堆積運移趨勢結果可以發現,隨著凡那比颱風至梅姬颱風的時間演變,蘭陽溪上游集水區土砂堆積有移往下游減緩堆積量之趨勢,而中下游地區集水區之土砂堆積趨勢則是有增無減,土砂運移情形並不明顯。顯示土砂運移堆積情形因短時間內無法即時搬運至下游地區,伴隨新的颱風事件增加之土砂生產量,造成土砂材料大多還堆積至集水區上游處,若無法運移至下游處達到平衡,未來再發生大規模之暴雨事件,可能誘發大規模土石流、山崩及土砂運移現象,下游可能造成二次災害。

關鍵詞: 地理資訊系統、土砂生產、土砂堆積運移、影響因子分析。

On The Influence Of Topography And Geology On The Sedimentation In The Upstream Area Of Lan-Yang Catchment

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ABSTRACT The change of river morphology is closely related to the discharge, transport capacity, and the sediment supply. In this study, the equilibrium equation of sediment was derived, in which we can define two indexes, the sediments generation index I_P and the sediments transportation index I_R . Focusing on the impact of the typhoons Fanapi and Megi on the Lan-Yang River watershed, this study investigated the control factors to those two indexes, including topography, geology, rainfall, river morphology, landslide, etc. The results suggest that the sediments generated by Fanapi were transported to the middle segments of Lan-Yang River. However, there are still areas with severe sediment accumulation, where treatments including dredging or earth working are necessary. Those areas need to be carefully handled since they are highly prone to secondary hazard due to typhoon or heavy rain.

Key Words: GIS, sediments generation, sedimentation transportation, control factors.

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