



Discussions on Debris Flow Induced Factors of Shenmu Watershed in Taiwan

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Debris flow first happened in the Shenmu area during Typhoon Herb. Large casualties, mass debris, and aggressive media coverage made the area the home of landslides. Affected by global warming and extreme weather, debris flows almost always take place in the Shenmu area during the flood season, especially in the catchment areas around Tsushui River and Aiyuzih River. Both man-made and natural, debris flow factors are complex and numerous. The precise start conditions are difficult to clarify. Therefore, this study will begin with the three major debris flow factors by using the data from the catchment areas. At the same time, the study will combine the remote sensing images from before and after debris flows with field investigation to establish a connection among the three major factors that triggered debris flows in Shenmu watershed: sufficient water, rich material, and suitable terrain.

During the flood season, Shenmu area often has large-scale debris flows. This threatens the safety downstream and disrupts traffic arteries. It is one of the key disaster areas in Taiwan. Through simplifying the assessment process, this study used actual data to assess the characteristics of and correlations among the three key debris flow factors by combining site surveys and telemetry with catchment area data to obtain the debris flow occurring conditions. The results show Tsushui River and Aiyuzih River catchment areas are very young. Riverbed movement is violent, and huge amounts of sediment are deposited in the rivers and at mid-slopes. The main sediment supply comes from 2,300m (or more) from the downstream junction. Rainfall analysis suggests when the effective accumulated rainfall in a single rainfall reaches 200mm, and when the rainfall intensity reaches 20mm/hr, the likelihood for debris flow is quite high. Because of the recent extreme climate, the average rainfall in Shenmu area for the past five years is approximately 5,000mm. The above causes are very conducive to trigger debris flows.

As a result, debris flows are rampant in the Shenmu area. Therefore, we recommend maintaining monitoring and conducting comprehensive geotechnical surveys in this area. Furthermore, hydrological and geological surveys from upstream, midstream, and downstream should be consolidated to compile relevant information for future debris flow analysis and provide a reference for disaster prevention and evacuation by the government. This will improve the early warning, prevention, and management, etc. and strengthen monitoring and prevention mechanisms.

Keyword: Shenmu Watershed, Debris Flow, Emergency Action, Disaster Preparation