



Application of scour monitoring instrument for river early warning system

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In Taiwan, most natural hazards come from severe riverbed scour because frail geology of catchment and steep channel slope. High speed flow with high sediment concentration eroded the levee toe and lead to the land loss and house failure during flood period. According to some empirical formulas, the possible maximum scour depths of riverbed could be calculated by flow discharge, water depth, grain size, etc. Nevertheless, the less field-collected scour data verified the accuracy of predicted data. In this research, the technology, wireless tracer real-time riverbed scour monitoring, was used in Zhuoshui River of Taiwan. It can record the riverbed scour elevation and water surface velocity in different time during the floods. From 2016, the several scour depths and hydro-graph of riverbed change have been monitored by using wireless tracker instruments. A maximum scour depth of 2.6m and surface velocity 3.9m/s was measured in a gravel bed of Zhuoshui River, which was caused by 0601 heavy rain in 2017. The riverbed was scoured severely at the flow rising period and maximum scour depth occurred near the time of peak flow, but the riverbed elevation after flood was close to or greater than initial bed elevation. Therefore, the riverbed scour depth was estimated correctly is an important issue for river hazard warning system in study area. Based on the collected field data, a general scour formula was developed and gave reasonable predictions. Also the flow chart, which used for estimating the flow and sediment data at each record time of wireless tracer, was proposed here. In conjunction with the real-time ultrasonic water level measurements, the flow chart can be used as a potential tool for the emergency evacuation purposes.