



Development and application of a modified wireless tracer for disaster prevention

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Typhoon-induced flooding causes water overflow in a river channel, which results in general and bridge scour and soil erosion, thus leading to bridge failure, debris flow and landslide collapse. Therefore, dynamic measurement technology should be developed to assess scour in channels and landslide as a disaster-prevention measure against bridge failure and debris flow. This paper presents a wireless tracer that enables monitoring general scour in river channels and soil erosion in hillsides. The wireless tracer comprises a wireless high-power radio modem, various electronic components, and a self-designed printed circuit board that are all combined with a 9-V battery pack and an auto switch. The entire device is sealed in a jar by silicon. After it was modified, the wireless tracer underwent the following tests for practical applications: power continuation and durability, water penetration, and signal transmission during floating. A regression correlation between the wireless tracer's transmission signal and distance was also established. This device can be embedded at any location where scouring is monitored, and, in contrast to its counterparts that detect scour depth by identifying and analyzing received signals, it enables real-time observation of the scouring process. In summary, the wireless tracer developed in this study provides a dynamic technology for real-time monitoring of scouring (or erosion) and forecasting of landslide hazards.

Keywords: wireless tracer; scour; real-time monitoring; landslide hazard.