



Multiple debris flow surges monitored directly by DFLP system at Kamikamihori Creek

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The monitoring method for direct debris flow measurements using loadcells and so on, that were preliminary developed by WSL in Switzerland (McArdell et al., 2007), was firstly installed in Sakurajima Island in Japan, where volcanic activity was severe, and many debris flows took place due to deposition of falling ash after eruptions. Debris Flow measurements with Loadcells and Pressure sensors (DFLP) system was installed referring to the method by WSL, and debris flow characteristics such as specific weight and volumetric sediment concentration have been obtained (e.g., Osaka et al., 2014).

In Japan, as well as in Sakurajima island, attempts for debris flow monitoring were also carried out at KamiKamihori Creek since 1970s (e.g., Okuda et al., 1980), and there were a lot of debris flow events due to heavy rainfall. KamiKamihori Creek is at western side of Mt. Yake, where volcanic activity was severe at those time. The DFLP system was modified and installed there in November in 2014, because there were a lot of sediment deposition and debris flows took place though volcanic activity has been inactive. Present research could report the following results.

(1) Multiple debris flow over five surges were monitored using DFLP system installed in 2014 during 15 minutes in debris flow events on August 29th, 2019. Rainfall intensity for 10 minutes was 12 mm and accumulated depth was 56 mm just before those events. Antecedent time before those events was 4.5 hours.

(2) The DFLP system measured multiple debris flow surges in events on August 29th, 2019, and sediment concentration was calculated temporary and continuously. Time-averaged sediment concentration and relative mass density are calculated as 0.470 and 1.73, respectively, under flow discharge obtained by images analysis of CCTV video camera. Equilibrium sediment concentration of coarse sediment particles is estimated 0.160 for bed slope of 0.141 (8 degrees) and calculated value using the DFLP system is over than the equilibrium value because of mud phase due to fine sediment particles.

References

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