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Hyperconcentrated flow and men velocity estimation: a study case

Donatella Termini
Italy (donatella.termini@unipa.it)

Due to the complexity of the debris-flow process, numerical models to simulate propagation phenomenon are still limited. Different approaches (either monophase or two-phase) have been proposed in literature to solve the set of governing equations. But, the difficulty is due to the fact that these equations require suitable closure relations that should be valid in a very wide range of slope and materials characteristics.
The point is that, in order to perform a hazard assessment and/or to design protective measures against debris flows, it is necessary to estimate important parameters such as mean flow velocity, peak discharge and runout distance. Experimental program has been recently conducted at the Hydraulic laboratory of the Department of Civil, Environmental, Aerospatial and of Materials (DICAM) – University of Palermo (Italy) in order to evaluate the influence of different geometrical parameters (such as the slope and the geometrical characteristics of the confluences to the main channel) on the propagation phenomenon of the debris flow and its deposition. The experimental apparatus includes a high-precision camera allowing the estimation of hyperconcentrated flow velocity by applying the VIA technique. In a previous work (Termini and Di Leonardo, 2014) the influence of geometrical parameters on the propagation phenomenon were analyzed. In the present work the attention is devoted to the mean velocity and its estimation for different concentrations of solid materials.

References

Termini D., Di Leonardo A. 2014. “Propagation of hyperconcentrated flows in protection channels around urban areas:experimental investigation” –Urban and urbanization. ST. KLIMENT OHRIDSKI. University Press. Sofia.