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# Comparison of debris flow simulation models for lateral runout prediction on the fan

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The destructive impact of debris flows presents a threat to human life and infrastructure on torrential fans on a regular basis. In order to allow local decision makers, infrastructure providers and professionals in the field of hazard management the development of successful hazard mitigation and risk handling strategies, the potentially endangered areas on the fan have to be identified. Here simulation models can serve as supporting tools for the prediction of runout and depositional behaviour of the transported water sediment mixture. Over recent years a number of 2-dimensional models for debris flow simulation have been developed, no single accepted reliable and easy to use standard model for the delineation of potentially endangered areas seems to have been agreed on yet. Therefore the objective of the presented contribution is to give a comparative overview of a defined set of available lateral runout prediction simulation models.
The considered models include FLO-2D (O'Brien et al., 1993), TopRunDF, TopFlowDF (Scheidl and Rickenmann, 2010) and RAMMS (WSL). While FLO-2D and RAMMS are dynamical models based on physical model approaches, TopRunDF is based on a semi-empirical approach combined with stochastic elements. TopFlowDF combines a simple physical approach with the flow algorithm implemented in TopRunDF.
In a first step the models are compared by a backcalculation of well documented debris flow events based on topographical information obtained from digital terrain models (DTM) of the respective catchments with a raster cell width of 2.5m. The depositional patterns, obtained from the best-fit simulations for each model, are evaluated against the observed deposition areas using a method proposed by Carranza and Castro (2006) - also applied by Scheidl and Rickenmann (2010) and Hochschwarzer (2009).
In addition to the presented quantitative comparison also a qualitative comparison of the presented models is conducted, taking into account the quantity and quality of required input data as well as the overall usability and stability of the examined models, thus trying to give a comprehensive overview of potential and limitations of the respective models.

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