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# 1 Dynamic numerical modeling of debris flows in the pyroclastic deposits of Campania region, Italy

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Rapid long runout landslides are a difficult challenge in hazard studies because they endanger areas situated far from the source. Prediction of runout distance, flow velocity and depth (dynamic parameters in the following) are necessary for the design of protective measures and are a key requirement for delineation of the hazard zone. The best existing prediction methods rely on empirical relationships between volume, travel distance, angle of reach and so on (e.g. Scheidegger, 1972, Corominas, 1996, Scotto di Santolo, 2000; Fannin & Wise 2001) but they don't' allow to predict the dynamic parameters.

About 70 well documented case histories suitable for back-analysis were selected. Each of the case histories was analyzed in 2D dimensions using DAN-W (Dynamic Analysis of Landslides, Hungr, 2003) with different rheological models: frictional and Voellmy. The results of each analysis were assessed by matching the following parameters to the values as determined from maps and in situ survey: total horizontal runout distance and flow velocities. The Voellmy model produces the most consistent results in terms of total runout, debris spreading and distribution as well as velocity data.

The results show that it can model past events with reasonable accuracy with the Voellmy model; however it is still difficult to produce predictions of the most likely

runout beforehand.