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## Modeling the run-out behavior of the July 23rd, 2015 Cancia debris-flow event using two numerical models

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Numerical models have become a useful tool for predicting the potential risk caused by debris flows. Although a variety of numerical models have been proposed for the runout simulation of debris flows, the differences and performances of these models are unknown. To this end, in this paper, two typical depth-averaged models have been selected to analyze the debris-flow event that occurred in the Cancia basin on July 23rd, 2015. The simulations with and without entrainment are conducted to analyze the influence of entrainment on the runout behavior of the debris flow. The simulated results are compared and discussed in detail. In the scenario without entrainment, a part of the debris mass deviates from the main path during propagation, while the debris mass propagates along the channel if entrainment is considered. This conclusion illustrates that entrainment cannot be ignored in this case. Additionally, the comparison between measured and simulated results shows that both models perform generally well in the terms of simulating the erosion-deposition distribution, but the DAN3D model will present a greater lateral spreading and a thinner depositional thickness than Shen's model.