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The mobility of dry rock avalanches

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Rock flows form a serious hazard in mountainous context, the protection against which includes better understanding of their flow properties and maximum run-out length. One seemingly well-established feature is the increase of the run-out with the volume of the flow. The physical nature of this lubrication mechanism remains however unclear. In this paper, we analyze field data in the light of discrete numerical simulations of granular flows, and discuss the geometrical origin of the apparent mobility of both real and numerical flows. We evidence the intertwined role of volume and topography in the flow ability to travel away for the release point, and single out spreading and sliding as two distinct contributions to run-out.