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Calibration of landslide runout models

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A review of the existing procedures for selection of runout model parameters from back analyses shows that these procedures do not allow integrating different types of runout criteria and generally lack a systematic approach. A new method based on Receiver Operating Characteristic (ROC) analyses and aimed to overcoming these limitations is herein proposed. The method consists of estimating discrete classifiers for every runout simulation associated with a set of model parameters. The set of parameters that yields the best prediction is selected using ROC metrics and space. The procedure is illustrated with the back analyses of a rainfall-triggered debris flow that killed 300-500 people in the Metropolitan Area of San Salvador (AMSS), El Salvador. The selected model parameters are used to estimate forward predictions for scenarios that correspond to different return periods. The proposed procedure may be useful in assessment of areas potentially affected by landslides. In turn, this information can be used in production or updating of land use plans and zonations, similar to that currently being carried out by the Office for Urban Planning of the Metropolitan Area of San Salvador (OPAMSS), El Salvador. Finally, practical aspects of the application of the method are discussed in the context of calibration at regional scales and considering uncertainty in the input variables.