



Calibration of back-analysed model parameters for landslides using classification statistics

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Back-analyses are useful for characterizing the geomorphological and mechanical processes and parameters involved in the initiation and propagation of landslides. These processes and parameters can in turn be used for improving forecasts of scenarios and hazard assessments in areas or sites which have similar settings to the back-analysed cases.

The selection of the modeled landslide that produces the best agreement with the actual observations requires running a number of simulations by varying the type of model and the sets of input parameters. The comparison of the simulated and observed parameters is normally performed by visual comparison of geomorphological or dynamic variables (e.g., geometry of scarp and final deposit, maximum velocities and depths).

Over the past six years, a method developed by NGI has been used by some researchers for a more objective selection of back-analysed input model parameters. That method includes an adaptation of the equations for calculation of classifiers, and a comparative evaluation of classifiers of the selected parameter sets in the Receiver Operating Characteristic (ROC) space.

This contribution presents an updating of the methodology. The proposed procedure allows comparisons between two or more "clouds" of classifiers. Each cloud represents the performance of a model over a range of input parameters (e.g., samples of probability distributions). Considering the fact that each cloud does not necessarily produce a full ROC curve, two new normalised ROC-space parameters are introduced for characterizing the performance of each cloud. The first parameter is representative of the cloud position relative to the point of perfect classification. The second parameter characterizes the position of the cloud relative to the theoretically perfect ROC curve and the no-discrimination line.

The methodology is illustrated with back-analyses of slope stability and landslide runout of selected case studies.

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