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Parameterization experiments performed via synthetic mass movements prototypes generated by 3D slope stability simulator

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The central purpose of this work is to perform a reverse procedure in the mass movement conventional parameterization approach. The idea is to generate a number of synthetic mass movements by means of the "slope stability simulator" (Colangelo, 2007), and compeer their morphological and physical properties with "real" conditions of effective mass movements. This device is an integrated part of "relief unity emulator" (rue), that permits generate synthetic mass movements in a synthetic slope environment. The "rue" was build upon fundamental geomorphological concepts. These devices operate with an integrated set of mechanical, geomorphic and hydrological models. The "slope stability simulator" device (sss) permits to perform a detailed slope stability analysis in a theoretical three dimensional space, by means of evaluation the spatial behavior of critical depths, gradients and saturation levels in the "potential rupture surfaces" inferred along a set of slope profiles, that compounds a synthetic slope unity. It's a meta-stable 4-dimensional object generated by means of "rue", that represents a sequence evolution of a generator profile applied here, was adapted the infinite slope model for slope. Any slope profiles were sliced by means of finite element solution like in Bishop method. For the synthetic slope systems generated, we assume that the potential rupture surface occurs at soil-regolith or soil-rock boundary in slope material. Sixteen variables were included in the "rue-sss" device that operates in an integrated manner. For each cell, the factor of safety was calculated considering the value of shear strength (cohesion and friction) of material, soil-regolith boundary depth, soil moisture level content, potential rupture surface gradient, slope surface gradient, top of subsurface flow gradient, apparent soil bulk density and vegetation surcharge. The slope soil was considered as cohesive material. The 16 variables incorporated in the models were analyzed for each cell in synthetic slope systems performed by relief unity emulator. The central methodological strategy is to locate the potential rupture surfaces (prs), main material discontinuities, like soil-regolith or regolith-rock transitions. Inner these "prs", we would to outline the effective potential rupture surfaces (eprs). This surface is a sub-set of the "prs" that presents safety factor less than unity ($f<1$), the sub-region in the "prs" equal or deeper than critical depths. When the effective potential rupture surface acquires significant extension with respect the thickness of critical depth and retaining walls, the "slope stability simulator" generates a synthetic mass movement. The overlay material will slide until that a new equilibrium be attained at residual shear strength. These devices generate graphic 3D cinematic sequences of experiments in synthetic slope systems and numerical results about physical and morphological data about scars and deposits. Thus, we have a detailed geotechnical, morphological, topographic and morphometric description of these mass movements prototypes, for deal with effective mass movements found in the real environments.