



## The Effects of Vegetation Changes in the Spatial Distribution of Landslides in Southern Brazil

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Land use and/or land cover changes have direct and indirect effects on slope stability and frequently represent a major factor controlling the occurrence of man-induced mass movements. In Brazil, especially in the southern and southeastern regions, areas of original natural rain forest have been continuously replaced by agriculture during the last decades, leading to important modifications in soil mechanical properties, especially in terms of cohesion, and to major changes in hillslope hydrology. In these regions, such effects are amplified due to the steep hilly topography, intense summer rainfall events and dense urbanization. Recently, a major landslide event took place in a rural area with intensive agriculture in the state of Santa Catarina (Morro do Baú), where many catastrophic debris flows were triggered after a long rainy period. In this area, the natural forest has been replaced by huge banana and pine plantations. In this study, based on field mapping and modeling, we characterize the role played by geomorphological and geological factors, as well as land use and/or land cover in controlling the spatial distribution of landslides in the Morro do Baú area. In order to attain such objective, a digital elevation model of the basin was generated with a 2,5m grid in which the topographic parameters were obtained. In parallel, a recent satellite image, prior to the event, was used to generate the land use and/or cover map. The spatial distribution of the scars from this major event was mapped from another image, obtained immediately after the landslide event. Numerical simulations with the SHALSTAB model were carried out in the basin and the results compared to the original location of the scars in the field. The results, although preliminary, suggest that the replacement of the natural rain forest by huge banana plantations in this environment, associated with its steep slopes and the patterns of intense rainstorms, played a major role in defining the spatial distribution of landslide scars and the magnitude of the debris flows generated. The combination of field mapping with the numerical simulation of future land use and/or land cover scenarios may contribute to the definition of better land management practices in such environment.