

Statistical-based shallow landslide susceptibility assessment for a tropical environment: a case study in the southeastern Brazilian coast

Helen Cristina Dias, Marcelo Fischer Gramani, Carlos Henrique Grohmann, Carlos Bateira & Bianca Carvalho Vieira

**Natural Hazards** , v.08, n.1, p.205–223, aug. 2021. <https://doi.org/10.1007/s11069-021-04676-y>

#### ABSTRACT

Statistical susceptibility assessment is a common approach applied worldwide for shallow landslide studies. Identification of morphological and geological conditions is essential and still incipient to evaluate the susceptibility of landslide events in the Brazilian territory. This study aimed to develop and compare shallow landslide susceptibility scenarios based on a bivariate statistical evaluation of geological (lithology and structures) and morphological (curvature, elevation, slope, and aspect) factors in Caraguatatuba, northern coast of São Paulo State in Brazil. A compilation of geological factors from published maps was made, and morphological maps were created based on Shuttle Radar Topography Mission (30 m). A bivariate statistical application by the informative value method was used to create four susceptibility scenarios, and the validation was achieved using the area under the curve (AUC). The results indicated that lithology was the more relevant conditioning factor, followed by elevation and slope. The methodology used to determine the susceptibility was efficient (AUC values between 0.809 and 0.841). The susceptibility scenario comparison identified that conditioning factors with the highest informational value generated the most accurate mapping. This indicates that using several conditioning factors does not necessarily generate a better map. This study contributes to shallow landslides research from a methodological perspective, as it is the first analysis of its kind in Serra do Mar Paulista, which are continuously affected by mass movements. Open-source data were chosen to be used, focusing on methodological applicability in other regions of the country, since resources for landslide studies in Brazil are low.