



Application of Physically based landslide susceptibility models in Brazil

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Shallow landslides and floods are the processes responsible for most material and environmental damages in Brazil. In the last decades, some landslides events induce a high number of deaths (e.g. Over 1000 deaths in one event) and incalculable social and economic losses. Therefore, the prediction of those processes is considered an important tool for land use planning tools. Among different methods the physically based landslide susceptibility models having been widely used in many countries, but in Brazil it is still incipient when compared to other ones, like statistical tools and frequency analyses. Thus, the main objective of this research was to assess the application of some Physically based landslide susceptibility models in Brazil, identifying their main results, the efficiency of susceptibility mapping, parameters used and limitations of the tropical humid environment. In order to achieve that, it was evaluated SHALSTAB, SINMAP and TRIGRS models in some studies in Brazil along with the Geotechnical values, scales, DEM grid resolution and the results based on the analysis of the agreement between predicted susceptibility and the landslide scar's map. Most of the studies in Brazil applied SHALSTAB, SINMAP and to a lesser extent the TRIGRS model. The majority researches are concentrated in the Serra do Mar mountain range, that is a system of escarpments and rugged mountains that extends more than 1,500 km along the southern and southeastern Brazilian coast, and regularly affected by heavy rainfall that generates widespread mass movements. Most part of these studies used conventional topographic maps with scales ranging from 1:2000 to 1:50000 and DEM-grid resolution between 2 and 20m. Regarding the Geotechnical and hydrological values, a few studies use field collected data which could produce more efficient results, as indicated by international literature. Therefore, even though they have enormous potential in the susceptibility mapping, even for comparison purposes between different areas, the studies in Brazil require more detailed consideration on the input of topographic and Geotechnical parameters.