



## **THE DRAINAGE EFFICIENCY INDEX (DEI) AS AN MORPHOLOGICAL INDICATOR OF LANDSLIDE SPATIAL OCCURRENCE IN MOUNTAINOUS CATCHMENTS. A case of study applied in the mountainous region of Brazilian Southeastern.**

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Morphometric parameters, acquired notoriety mainly after the Drainage Density proposition (Horton 1932, 1945) and after they were applied by geomorphologists on the perspective to understand landscape functionalities, quantifying their characteristics through parameters and indexes. After the drainage density, many other parameters which describe the basin characteristics, behavior and dynamics have been proposed. Among them, for example, the DEI was proposed by Coelho Netto and contributors during the 80's, while they were seek to understand the hydrological and erosive dynamics on Bananal river basin (Brazilian Southeastern). Through this investigations the DEI was created, revealing the importance of parameters as hollow and drainage density, conjugated to the topographic gradient (Meis et al. 1982) who prosecute controls on the water flow efficiency along the hollows in order to activate the regressive erosion of the main channel. Later on this index was applied on the basin scale in several works developed in mountainous regions, showing a remarkable correlation with the occurrence of landslides such as showed by Coelho Netto et al. (2007); that posteriorly use this index as one of the components of the landslide susceptibility map for the Tijuca Massif, located in Rio de Janeiro Municipality. This work aims to establish patterns of the DEI index values (applied to mountainous low order basins) and the relationship on the occurrence of Debrisflows or shallow translational slides. For this, the DEI index was applied on 4 different study areas located on the Southeastern mountainous region of Brazil to address deeply the connection between the index and the occurrence of landslides of different types applied for first and second order basins. The major study area is the Córrego Dantas Basin, situated in Nova Friburgo municipality (RJ), which is a 53 km<sup>2</sup> basin was affected by 327 landslides caused by a heavy rainfall on January 2011; Coelho Netto et al. (in press). The other selected areas were also affected by landslides and were selected to enrich the sampling and turn the analysis more reliable and complete. Briefly regarding the results, it was found a heavy relationship between the Debris flows occurrence and basin with high values of DEI and also a good relationship between shallow landslides and low values of DEI index, as expected. This relation can be briefly explained through one of the initial believes that expect on basin with a high drainage potential, consequently high values of DEI, are more prone to happen landslides as Debrisflows enhancing regressive erosion of the main channel and their development on the headward direction. While basin with low drainage potential, consequently lower values of DEI are more prone to happen landslides as shallow translational that are movements more related to the particular slope properties. Finally we believe that the proposed index can be a good predictor of landslide occurrence (on their different types) when applied to lower order basin. Supplementary analysis are intend to be showed during the presentation during the European Geosciences Union General Assembly 2016.