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Studies on landscape evolution and climate in Madagascar: Lavakization in the light of archive precipitation data

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In Madagascar, land degradation is significant, resulting in special gullies termed as lavakas. Lavakization (the generation and development of these features) is due to the combination of many environmental factors, such as geological, soil compositional, anthropogenic factors, etc. Among these the spatial and temporal distribution of precipitation seems to be a key factor influencing the lithology and the vegetation cover of the island. Alternation of the dry and wet seasons seems to be responsible for the formation of small cracks that might lead to lavakization. However, the way these geomorphic features develop is unknown. To what extent the precipitation intensity contributes to the above mentioned gully formation has not yet been studied in detail.

This contribution aims to analyze lavaka distribution with GIS methods and study the relation between their density and the climatic conditions. Study areas have been designated throughout the country and lavakas have been identified using satellite imagery. Archive precipitation data of the study areas have been used to understand the influence of the climate on gully density.

Preliminary results show that the precipitation intensity can be correlated with the occurrence of lavakas to a given extent and its effect is further strengthened by the tropical cyclones. However, the local distribution of these specific landforms cannot be explained only based on the precipitation pattern; additional multidisciplinary studies are necessary to understand the process of lavaka development.

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