



Madagascar Highland erosion: What can we learn from the archive precipitation data?

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In Madagascar, soil erosion is significant even when it is compared to world averages, resulting in special geomorphic forms known as lavakas appearing in the Highland regions of the island. The development of these features is due to rather unique multifactorial environmental conditions. Among many factors (geology, soil composition, human influence, etc.) the spatial and temporal distribution of precipitation is a key factor. The presence of the dry and wet season seems to be responsible for the enhanced generation of small cracks that might eventually lead to the development of a gully. However, the way of the development of such gully erosions are unknown. To what extent of the actual precipitation pattern to what extent the weather contributes to the aforementioned phenomenon has not yet been studied in great detail. The aim of our research is to study the climatic and weather conditions of lavaka-prone areas for the last decades.

The typical cyclonal pattern affects the Madagascar Highlands in various ways. The precipitation and the soil moisture data show that the spatial distribution can be correlated with the appearance of lavakas to a given extent, however the local distribution cannot be explained only based on the precipitation pattern. The severity of the wet season varies strongly in the various decades leading to different precipitation maxima in January–March period. In general the effectiveness of the gully erosion is thought to be highly enhanced if the run-off of the area show large temporal variations. According to our studies this variability is quite high in certain seasons, and, despite of the low spatial resolution, related to the lavaka-prone areas. However, neither the amount of the precipitation, nor the variability alone cannot explain the high variation found in the spatial density and length distribution. Further multidisciplinary studies are necessary to draw conclusions about lavaka formation and describe the process of lavaka development.

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