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Landslides in a Changing Tropical Environment: North Tanganyika - Kivu Rift Zones

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The North Tanganyika and Kivu Rift zones (Burundi, DR Congo, Rwanda) encompass a region where environmental factors such as heavy rainfall, tectonic activity, and steep topography favor the occurrence of landslides. These landslides have a negative impact on the livelihoods of the local population that suffers yearly from damage to infrastructure and losses of agricultural land. Moreover, the area is characterized by a high and continuously increasing population density resulting in (1) the expansion of urban areas and their associated road infrastructure and (2) deforestation caused by the creation of farmland. At present, however, it is not known whether landslides can be considered as a natural phenomenon or whether they are the consequence of human impact through e.g. the modification of the land cover.

Therefore the main objective of this research is to assess the long-term impact of LULC changes on the prevalence of landslides. In a first stage, a database of circa 4000 landslides was compiled on the basis of a visual inspection of Google Earth Imagery. This allowed making a distinction between recent landslides (<10y) and older landslides (>10y). For each of these landslides topographic setting, land use, and peak ground acceleration (PGA) were assessed. The first results of the analysis show that recent landslides are in many cases triggered by extreme rainfall events, often in combination with disturbances in land cover related to road construction and/or mining activities. The spatial pattern of the older landslides can be correlated with earthquake-triggered activities along major fault systems.

In order to better understand the role of human activities on the prevalence of landslides, historical photographs and archives will be used to characterize LULC changes over the past 60 years. The results of this historical analysis will enable the identification of interactions between environmental changes and landslides.