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High resolution characterisation of a recent landslide in a tropical environment

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The accurate characterisation of landslide processes remains a challenge in many regions. A fundamental tool to reach this goal is the availability of high-resolution digital representation of the surface topography, which greatly facilitates the study of landslide morphology, structures and mechanisms. In the present work, we use UAV acquisitions to reconstruct the topography of a recent deep-seated landslide located near the city of Bukavu, in Eastern DR Congo. The location of the landslide in a tropical environment and within the seismically active Kivu rift, as well as the presence of recent and highly apparent surface features make it a perfect natural laboratory to study landslide processes in such a data-scarce environment.

The study of the high-resolution topography is complemented with high-resolution satellite imagery and field surveys, which allows us to better discriminate its spatial and temporal evolution. The spatial mapping of the internal deformation features and the reconstruction of the local stress field allow, among others, the zoning of differential movements within the mobile mass. These different sectors highlighting interactions within the landslide body and the occurrence of multiple deformation episodes. The satellite image time-series analysis shows that deformational features were already present more than a decade ago. However, the main phase of instability occurred between March 2013 and April 2014. Over the following two years, displacements ranging up to a few dozen of meters per year were recorded over the landslide. Altogether, these elements provide insights into the mechanisms and behaviour of this landslide, which does not seem to have been triggered by a specific event. The information gathered in this study also helping to better evaluate the landslide hazard in this region.