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MASS WASTING PROCESSES ON THE ETHIOPIAN HIGHLANDS – HOW MULTISENSORAL REMOTE SENSING METHODS PROVIDE VALUABLE INPUT FOR SUSCEPTIBILITY MODELLING

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ABSTRACT:

The overall objective of the project is the assessment of the present day geomorphic processes and the analysis of the complex system of the Ethiopian highlands in terms of its erosion sensitivity and its landscape evolution. The test site at the contact zone of the Ethiopian Plateau with the African Rift Valley has various symptoms of land degradation due to rapid land cover changes connected to growing population pressure in the last decades but also due to high geomorphologic dynamics. The proposed paper provides a comprehensive method assessing erosion and mass wasting features by new multisensoral high resolution remote sensing systems applicable in remote and data sparse regions. The remote sensing based methods comprehend the following: mapping of geomorphological units (erosion features, cracks, mudflows, etc.) from aerial photography and field surveys, multitemporal optical change detection from IKONOS (2005) and Kompsat-2 (2008) data to derive displacement vectors, SAR amplitude tracking from ENVISAT ASAR (2004, 2005) to assess horizontal displacements and finally DEM subtractions of a Structure from Motion derived DEM from aerial photography of 1986 and a DEM from ALOS PRISM data of 2008. Moreover, advanced physically based modelling methods will be applied to analyze the systems dynamics by providing a landscape susceptibility map and to assess the landscape evolution. Finally the project will focus on the development of an integrated soil erosion and mass wasting assessment method with innovative physically based models in order to understand the systems sensitivities and the landscape evolution processes. The cooperation with local afforestation experts will foster several erosion prevention strategies.