Possibilities for an Early Warning System for Georgias largest landslide

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In June 2015 a flash flood caused by a failure of a natural dam originated by a hazardous large landslide in the Vere valley hit Tbilisi. 23 persons lost their lives and property damages were above $ 24 M. The catchment area is a region of high landslide susceptibility with a range of active and expectable processes with differing intensities/volumes. The event of 2015 must be seen as mega-event with recurrence periods of several 1000s of years or more. However, the landslide has created even more unstable conditions and weakened an already semi-stable system. As conclusion, the likelihood for medium to large subsequent events has risen significantly.

Along with the planning of the reconstruction of the Tskneti-Samadlo-road and the Tskneti-Akhaldaba road some detailed geological investigations, e.g. large-scale engineering geological mapping, laser scanning, monitoring of groundwater level, deformation measurements etc. were carried out or are still in progress. Along with the reconstruction of the road an early warning system will be developed, tested and implemented.

These first results brought some evidence of geological, hydrogeological and geotechnical setting in the Tskneti region and the types of processes (weathering, changes of water level) and landslides (rock slides, rockfalls, creeping etc.) that provided debris for the catastrophic event in 2015.

Deformation measurements show ongoing movements on the surface as well as in large depths. Correlation with piezometric pressures might indicate movement acceleration in the future. UAV mapping and laser scanning are being used to identify areas of erosion and movements as well as failure volumes and deformations of retaining structures.

Long term observations will have to be carried out and help for a better understanding of the slope. By analysing all measured data over a long period of time thresholds for an early warning will be defined, evaluated and updated.