# Is the triggering of Kainama landslide (Kyrgyzstan, 2004) related to seismic shaking, groundwater flow or a combination of both ?

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In the framework of a project evaluating landslide hazard in the Central Asian Republic of Kyrgyzstan, we focused our interest on slope failures initiation with a high potential of activation by seismic shaking and/or groundwater flow. The case study is the 2004 loess slide that occurred close to the village of Kainama (Fergana valley, Southern Provinces) after a combination of small-magnitude-earthquakes and heavy rain falls. This landslide killed 33 people. A field survey was carried out in 2005 by Swiss, Kyrgyz and Belgian teams on a possibly unstable slope close to the loess slide to derive an accurate representation of the slope in terms of topographic profile, geological structure, local ground-motion amplifications and ground resistivities. We came up with the definition of three hypotheses regarding the triggering of the 2004 failure: static origin because of a high water level, seismic origin because of site effects, seismic and hydrological origin because of pore pressure generation during the seismic shaking. To discriminate between these processes, we conducted a numerical analysis with a finite difference code named FLAC (Itasca 2005). This allowed us to analyse separately each factor and therefore achieve a better understanding of the physical mechanisms that led to the triggering of the landslide.

In this work, we will discuss the location of the water table inside the slope and its implication for slope stability, compare the simulated and the measured elastic seismic ground response and give its impact on slope stability, establish connections between seismically induced pore pressures, site effects and the slope failure potential.