



Laboratory container experiments to observe slope failures under dynamic groundwater situations

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Infiltration processes are observed at a hill slope located in the vicinity of the mountain village of Ebnit, Vorarlberg, Austria. These infiltrations observed at upper slope positions generate a fast increase of soil water saturation in sections of the subsurface several hundred meters down gradient. It is postulated that the rapidly seeping soil water leads to an increase in head and hence to buoyancy forces in the lower regions of the slope. These buoyancy forces then cause slope deformations, observable in the form of slow slope creeping.

In order to systematically investigate and quantify the development of slope deformation and slope failure processes, laboratory flume experiments were performed at the Research Facility for Subsurface Remediation (VEGAS), University of Stuttgart. The research focused on the dynamics of saturation and pore water pressure on slope stability. It could be shown that the position of the groundwater table and especially a fast increase of pore water pressure greatly affect the slope stability under mechanical strained conditions. Furthermore, the results showed that slope failures are preceded by an abrupt decrease in pore water pressure.

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