



Studies on slope failure processes in a laboratory flume

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In January 2006 the interdisciplinary research project "Coupled Modelling of Flow and Deformation Processes at Creeping Hillslopes", funded by the German Research Foundation (DFG), was established. Rapid infiltration processes were observed at an hill slope located in the proximity of the town of Ebnet, Vorarlberg, Austria. The rapid infiltration at upper slope positions generates a fast increase of soil water saturation in sections of the subsurface several hundred meters down gradient. It is postulated that the seeping soil water leads to a rapid increase in head and hence to buoyancy forces in the lower regions of the slope resulting in slope deformations, observable in the form of slow slope creeping.

In order to systematically investigate and quantify the development of slope failure processes, a laboratory experiment was designed and built at the Research Facility for Subsurface Remediation (VEGAS) at the Universität Stuttgart. It consists of a 100 cm high, 200 cm long and 80 cm wide steel container. One long side of this flume is constructed by a glass pane. At the both short sides it is possible to install constant boundary head conditions in order to control the flow of groundwater and to adjust the steady state groundwater table. The soil material in the flume is shaped to a slope. On the upper side of the slope a hydraulic cylinder is installed to simulate a load on the slope. Varying either the load on the slope or the location of the groundwater table will provide important information on the factors affecting the stability of the slope and their interdependence. In the presentation the experimental concept as well as first results will be discussed.