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Prediction of landslide crises: testing concepts for fluidization of sliding material.

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Predicting the occurrence of landslide crises (eg. acceleration of gradually or intermittently moving landslides) is of paramount importance for a reliable assessment of the hazard. The main problem is to identify the possibilities of landslide acceleration and its potential transformation in a catastrophic flow.

Different mechanisms has been identified which explain this dangerous transition. Iverson (2005) proposed a mathematical model describing dilation or contraction of the water saturated basal shear zone which is controlled by a parameter αs which, in turn, depends on a dilatancy angle of the material and excess pore pressure generation (positive or negative) and dissipation. These pore pressure generations control the displacement rate during failure and may in case of positive excess pore pressure cause fluidization of the sliding material.

Van Asch (2006) proposed another conceptual mechanism describing fluidization by undrained loading caused by kinematic deformation of sliding material.

The objective of this work is to present some experiences of retrogressively slumping in sandy material simulated in a laboratory flume. The slumps were triggered by creating a critical steady state groundwater table by means of supply of groundwater at the bottom head of the artificially slope and controlled drainage at the toe. Pore pressures before and during failure were measured and displacement rates could be determined through video monitoring. Geomechanical and hydrological laboratory tests on the material delivered important parameters like, friction angle, hydraulic conductivity and porosity. The laboratory simulations enable us to test whether the observed lique-

faction can be explained by contraction of a saturated shear band or (and) by internal deformation and undrained loading.

References:

Iverson, R.M., 2005. Regulation of landslide motion by dilatancy and pore pressure feedback.Journal of Geohysical Research: 110 F02015, doi.10.1029. 16 pp.

Van Asch, Th.W.J., Malet, J.-P.,Van Beek, L.P.H.,2006. Influence of landslide geometry and kinematic deformation to describe the liquefaction of landslides: Some theoretical considerations. Engineering Geology: 88, 59-69.