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Submitted Abstract

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1 of 2

Abstract

The Ludoialm is located in the municipality of Münster in Tyrol, Austria. The landslide is situated in the Northern Calcareous Alps which forms the regional geological framing. Quaternary fluvial-glacial sediments form the uppermost layer of the landslide which were deposited on marly sediments. The remarkable acceleration/reactivations of the Ludoialm landslide occurred probably due to the intensive snow melting in early April 1967 and also in February 1999. The material loss during this reactivation phase is approximately 486,000 m3 in the landslide area, obtained by GIS analysis. Until today, it is assumed that the landslide still moves at a low rate of activity. Although a temporal relationship between meteorological events and slope displacement has been obtained, the hydro-mechanical coupled processes responsible for the initial landslide formation and the ongoing movement characteristics have yet to be identified.

This research work provides a comprehensive analysis of the triggering factors of this landslide from the geological and geotechnical perspectives. The geotechnical strength parameters are determined on the basis of laboratory analyses. A representative cross-section of the landslide area is selected for the 2D numerical investigation. We use the simplified pre-failure geometry of the cross-section as the calculation model, aiming to simulate the initial slope failure process by finite element limit analysis (FELA) and strength reduction finite element method (SRFEM). The location of the sliding zone obtained by the calculation is compared with the geological model based on field observations.

In this case study, the high groundwater table due to the extreme snow melting event provided a very unfavorable factor for the slope stability. This triggering factor is well confirmed by the computation.

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