



Slope failure induced by post-glacial extensional fracturing in the Matter and Saas Valleys, Switzerland.

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Extensional fractures in competent rock masses within alpine valleys are commonly associated with deglaciation and the retreat of Last Glacial Maximum (LGM) ice. Such fractures have been identified in the Matter and Saas Valleys in Canton Valais, Switzerland. These valleys are subject to numerous natural hazards, which threaten traffic corridors, tourist resort areas, and mountain villages.

In order to address processes associated with rock slope instability in this region, we have undertaken field investigations and finite element modelling of the mountain slopes. The field investigations have highlighted a process of bottom-up erosion, in which the valley walls are undercut by progressive rockfalls that propagate from near the base of the slope. This process has lead to the creation of significant bedrock instabilities which commonly exploit fractures inferred to be extensional in origin. Such instabilities represent a significant hazard to people and property within the valleys. By applying a failure criterion recently developed to evaluate the potential for spalling in deep excavations, we have gained new insight into processes leading to the formation of such extensional fractures on natural rock slopes. This approach has provided good indication of the potential for ongoing development of extensional fractures in geomorphically active environments, as well as insight into the development, and controlling factors of associated slope instabilities.