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Reconstruction of multistage massive rock slope failure: Polymethodical approach in Lake Oeschinen (CH)

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Lateglacial and Holocene rock-slope failures occur often as multistage failures where paraglacial adjustment and stress adaptation are hypothesised to control stages of detachment. However, we have only limited datasets to reconstruct detailed stages of large multistage rock-slope failures, and still aim at improving our models in terms of geohazard assessment. Here we use lake sediments, well-established for paleoclimate and paleoseismological reconstruction, with a focus on the reconstruction of rock-slope failures. We present a unique inventory from Lake Oeschinen (Bernese Alps, Switzerland) covering about 2.4 kyrs of rock-slope failure history. The lake sediments have been analysed using sediment-core analysis, radiocarbon dating and seismic-to-core and core-to-core correlations, and these were linked to historical and meteorological records. The results imply that the lake is significantly younger than the ∼9 kyrs old Kandersteg rock avalanche (Tinner et al., 2005) and shows multiple rock-slope failures, two of which could be C14-dated. Several events detached from the same area potentially initiated by prehistoric earthquakes (Monecke et al., 2006) and later from stress relaxation processes. The data imply unexpected short recurrence rates that can be related to certain detachment scarps and also help to understand the generation of a historical lake-outburst flood. Here we show how polymethodical analysis of lake sediments can help to decipher massive multistage rock-slope failure.

References

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