



The rock avalanche in Obernberg valley (Tyrol, Austria): Characteristics and age.

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In Obernberg valley, Eastern Alps, Austria, an array of landforms previously interpreted as terminal moraines (by other authors) is re-interpreted by us as a rock avalanche. In their distal 2 km, the rock avalanche mass is characterized by an ensemble of 40 hillocks and transversal ridges up to 17 m in vertical relief. The internal fabric of the ridges is incompatible with a glacial origin, but consistent with dynamic disintegration as diagnostic of rock avalanches.

Catastrophic slope failure involved a rock volume of $4.5e7 \text{ m}^3$, and a runout of 7.2 km over a vertical distance of 1330 m (fahrböschung 10°); the deposits cover an area of $\sim 3 \text{ km}^2$. Ground electrical tomography with six multielectrode profiles provided information on the depth to substrate, and on the internal structure, of the rock avalanche. The volume of accumulated rock debris is estimated at $5.3e7 \text{ m}^3$.

A radiocarbon age of $7785 \pm 190 \text{ cal yr BP}$ of organic remnants in an alluvial fan that downlaps the rock avalanche provides a minimum-age constraint ('older-than' age) on mass-wasting. A mean ^{36}Cl surface-exposure age of $8.6 \pm 0.6 \text{ ka BP}$ of boulders of the avalanche mass indicates that the event took place during the early Holocene. Palaeoclimatic records indicate that, neither, the detachment scar, nor the runout track of the rock avalanche were glaciated at the time of mass-wasting. A lake basin in the proximal part of the rock-avalanche mass thus did not form as a result of dead ice melting. Marked seasonal fluctuations of lake level, combined with strong changes in shedding of springs downslope of the lake, suggest that the basin had formed by combined eluviation and dissolution of cataclastic rock-avalanche matrix and, perhaps, by karstification of underlying carbonate rocks.