



An early Holocene rock avalanche at Obernberg (Brenner Pass Area, Tyrol)

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In Obernberg valley, Eastern Alps, Austria, the character of a rock avalanche deposit led to diverse interpretations for more than a hundred years. Recently, this landform was interpreted as moraines, but we could verify its origin from a rock avalanche. The most controversial parts of the landform are the distal two kilometers of the rock-avalanche deposit which are characterized by a highly regular array of transverse ridges. These ridges and hills previously were interpreted as terminal moraines of late-Glacial glaciers. 'Jigsaw-puzzle structure' of gravel to boulder-size clasts in the ridges combined with a matrix of cataclastic gouge indicate that they originated from a rock avalanche.

Additionally the transversal ridges are arranged into two highly regular, 'higher-order waves' each composed of waxing and shrinking ridges. We suggest that the arrayed ridges reflect an aspect of the mechanics of movement, perhaps propagation of waves towards the snout of the rock avalanche deposit.

The catastrophic slope failure involved an initial rock volume of about 45 mio m³, with a runout of 7.2 km over a total vertical distance of 1330 m (fahrböschung 10°). A minimum-age constraint of the mass-wasting event was obtained by radiocarbon dating of organic remnants found in an alluvial fan on top of the rock avalanche deposits. The radiocarbon age is consistent with a ³⁶Cl surface-exposure age of 8.6 ± 0.6 ka BP of boulders of the avalanche mass.

To get more detailed information on the depth extent of the rock avalanche body, the internal structure of the mass movement, and the depth to rock basement, six geoelectrical multielectrode profiles were measured. The interpretations of the results have been used to estimate the volume of accumulated rock debris.