



A precise age for catastrophic mass-wasting obtained by Th-U isochron dating of early post-depositional carbonate cement: the Fern Pass rockslide (Tyrol, Austria).

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In the Fern Pass rockslide (Tyrol, Austria), projecting boulders redirected pore-water flow into small-scale, short-lived, phreatic to vadose diagenetic systems recorded by carbonate cements. Th-U age-dating of a cement sample indicates that the rockslide occurred at or closely before 4190 ± 60 years bp.

The rockslide detached from a west-facing slope of Triassic dolostones and branched, after run-up onto the opposite valley flank, into a northern and southern arm. Today the deposit is forested but shows transversal ridges and tomas hills that may largely represent the original surface after rockslide freezing. In the upper part of the tomas, along the south-facing flank of projecting boulders more than about 4 meters in exposed diameter, layers up to about 20 cm thick of breccia lithified by calcium carbonate cements are present. The diagenetic successions of breccias are highly variable and record fluctuating, phreatic and vadose small-scale settings. Phreatic conditions are recorded by fringes of aragonite cement and/or scalenohedral calcite, and by blocky calcite spar. Vadose cementation is indicated by crusts of micrite to lithic wackestone, and by micrite with alveolar structure. From the surface of boulders outwards, diagenetic successions become more incomplete and cements disappear.

At one location, a botryoidal aragonite cement along a boulder surface was dated by the Th-U disequilibrium isochron method to 4190 ± 100 years bp. This is in ac-

cord with absolute ages derived by other authors from ^{36}Cl -exposition dating of the rockslide detachment scar, and from ^{14}C -dating of organic material in deposits of rockslide-dammed lakes. The precipitation age of the aragonite to date is the most precise of all proxies of depositional age. Because the diagenetic conditions within the Fern Pass rockslide are not exceptional, similar breccias may well be expected in other rockslides, too. Age-dating of cemented portions of rockslides by the Th-U method may thus represent a new, hitherto unexploited approach to absolute age determination of catastrophic mass failures.