



Sedimentary facies and progradational style of a Pleistocene talus-slope succession, Northern Calcareous Alps, Austria.

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In mountain ranges, talus slopes are ubiquitous and typically represent the highest deposystem. The style of talus buildup from a low-dipping, immature slope to a high and steep, geomorphically mature slope, however, to date was not documented. Near Innsbruck city (Austria) a lithified talus-slope succession records progradation and downlap via talus-associated alluvial fans along its toe-of-slope.

The considered succession ('Hötting Breccia' Auct.) probably accumulated during the terminal Riss-Würm interglacial to early Würmian, and became lithified before the Last Glacial Maximum. The Hötting Breccia consists of alluvial-fan deposits which, in turn, are locally downlapped by a succession deposited from aggrading to prograding talus slopes. Up-hill, the fossil talus slopes pinch out in onlap onto former rock cliffs. In the eastern part of outcrop, talus buildup is well-exposed along the flanks of a canyon; there, facies and depositional geometries record: (a) a basal, low-dipping alluvial-fan interval that accumulated near the toe-of-cliff, overlain and downlapped by (b) a steeper-dipping talus-slope succession. In the steep-dipping (25-35°), proximal slope segment hundreds of meters in length, the talus succession consists mainly of: (i) clast-supported breccias of cohesive debris flows, intercalated with (ii) openwork breccias from grain flows and particle creep. Progradation of the steep-dipping segment of talus slopes took place via shingling of alluvial-fan depositional units along the toe-of-slope; the fan depounits linked the progradation of the steep-dipping, proximal talus-slope segment with the lower-dipping substrate ahead of the slopes.

The change from alluvial-fan deposition along the toe of initially high cliffs towards climbing onlap and progradation of talus slopes occurred when a slope segment dipping with the mean angle of residual shear of talus material had formed at the apex of the fan. Because the free cliff face supplying talus deposition diminishes with time, the progradation potential of talus slopes yet is inherently limited.