

## NEOTECTONIC DEFORMATION IN QUATERNARY DEPOSITS NEAR INNSBRUCK (EASTERN ALPS)

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Because of tectonic indentation, the Eastern Alps are dismembered along seismically active faults. Rockslides associated with these faults in some cases were directly triggered by earthquakes. Macroseismicity mostly is of  $M < 5-5.5$  (minimum for coseismic structures at surface), and deformation seems to be mainly accommodated by 'secondary' structures less clearly tied to tectonism. During glacials, most of the Eastern Alps was covered by ice streams, so glacio-seismicity might produce structures hardly distinguishable from 'non-glacial' deformation. In consequence, in Quaternary deposits, only very few structures remain that may be of genuine tectonic origin.

The Hötting Breccia (HB) – a succession mainly of lithified alluvial fans and talus along the mountain flank north of Innsbruck – largely accumulated and lithified before ~167 ka (Spötl et al., 2014). The HB commonly shows gravitational downthrow of joint-bounded blocks up to hundreds of meters in size along steep slopes. At three locations, brittle fault planes were found that record lateral displacement. In karstic cavities up to a few decimeters wide, geopetally-laminated internal deposits became multiply deformed (folds, breccias). In a post-glacial, partly lithified alluvial fan to talus succession near Innsbruck, numerous deformation structures were identified; these include lithoclasts fractured/crushed in situ, meter-scale monoclines, decameter-scale kink folds, and crushed geopetally-laminated pore fillings.

In the HB, the brittle fault planes and the multi-phase deformed cave deposits record tectonic deformation. All of the other deformation structures, however, might result from gravitational instability only. In the mentioned post-glacial succession, the lateral persistence and the scale of structures suggest gravitational instability event(s) triggered by seismicity, if not by coseismic throw deeper within at site. This is suggested by a similar inventory of deformation structures in talus successions of the Apennines that are clearly associated with active faults, and that were not covered by glaciers. Deformation structures – mainly in-situ fracture of clasts up to boulder size and soft-sediment deformation – were observed in lithified Quaternary deposits also at other locations in the Eastern Alps; in those cases, however, a separation of gravity-induced deformation, glacial loading, tectonism and glacio-tectonism is more ambiguous.

Reference: Spötl, C. et al. (2014): Zeitschrift Gletscherkd. Glazialgeologie, 47/48: 135-146.