

Bringing dust to good use: Quartz OSL ante-quam dating of the Strassberg rock avalanche (Northern Calcareous Alps, Austria) and implications for chronostratigraphic resolution of post-glacial deposits

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The Mieming massif in the western part of the Northern Calcareous Alps (NCA, Austria) records a complex history of rapid landscape change during the deglacial to paraglacial phase (c. 19.5–17 ka) after the Last Glacial Maximum (LGM). In this succession of changes, a major event that shaped the entire catchment till today was the descend of a rock avalanche of a GIS-estimated volume of 11 Mm³. This rock avalanche: (a) clogged a pre-existing valley, (b) dammed up an intramontane basin (Strassberg basin), and (c) triggered the incision of an epigenetic bedrock gorge some 1.5 km in length (Sanders et al., 2016). Geomorphological and sedimentological indicators all suggest that the rock avalanche descended very soon after local deglaciation, but an age estimate of mass-wasting was difficult to provide. Bulk radiocarbon ages of the acid-washed, humic fraction of soil horizons intercalated into colluvium above the rock avalanche deposit indicated an oldest age of 11180–11170 a cal BP; a large scatter of radiocarbon ages (youngest: 7960 a cal BP; oldest: 11180 a cal BP; total of three ages) indicated that these well-drained soils were subject to input of younger humic substance, thus can provide only a crude proxy ante-quam date for the event.

Over the past two years, in the NCA, a landscape-wide drape of polymictic siliciclastic aeolian silt was discovered that – as suggested by its geomorphic and sedimentary context – most probably was deposited during the late-glacial chron. The drape is verified over a vertical relief amplitude of more than 2000 meters, from valley floors up to LGM nunataks (Gild et al., 2016). A level of polymictic siliciclastic silt was found also directly on top of the Strassberg rock avalanche deposit. This provided an opportunity to deduce a more precise ante-quam quartz OSL age of 18.77 ± 1.55 ka for mass-wasting. The high post-glacial event age is consistent with evidence that the clearing of the older trunk valley from LGM sediments was just on the verge to start when it was brusquely quenched by the descend of the rock avalanche. Because of its large extent and accessibility to OSL dating, the mentioned silt drape provides the first-ever regional chronostratigraphic marker in post-glacial deposits of the Alps.

Gild et al., 2016, Geophysical Research Abstracts, vol. 18, EGU2016-4474.

Sanders et al., 2016, Geo.Alp, 13, 183-202.