

Bringing light into the underworld - optically stimulated luminescence dating of the loess section and wine-cellars of the Loisium wine-world, Lower Austria

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The study presents investigations of a 12 meters thick sedimentary sequence, newly exposed during construction work at the wine-world Loisium in Langenlois, Lower Austria. Additionally, loess from the wine-cellars of Loisium, situated ~20 meters south and stratigraphically below the main sequence (i.e. 12-14 m depth), was analysed too. The main section is composed of two fluvial gravel and two loess layers containing several horizons of pedogenesis. Numerous normal faults indicate neotectonic activity. To provide a chronostratigraphy, 9 samples for optically stimulated luminescence (OSL) dating were taken. The Single-Aliquot Regenerative-Dose (SAR) protocol was applied for measuring the coarse grain quartz fraction. A temperature of 180°C for both, preheat and cutheat, was chosen for all samples, following the result of dose recovery tests during which preheats were systematically varied. An early-background subtraction approach was used to maximise the proportion of the fast component in the dating signal and to prevent the malign effects of unstable medium and slow components. The resulting equivalent dose (D_e) distributions show acceptable over-dispersion (< 35 %) and were used for age calculation. The optical ages from the 12 m long main section are in correct stratigraphic order and are not older than marine isotope stage (MIS) 5. The uppermost loess layer from the main section suggests intensive aeolian deposition during the last glacial maximum (LGM) ~21 ka ago. The base of the main section appears to be > 100 ka and further methodological tests to constrain the basal age of this sediment sequence are currently underway. OSL ages of ~34-29 ka were obtained for the loess samples from the wine-cellars (i.e. > 12 m depth). Despite their deeper position, these loess samples are substantially younger than the base of the adjacent main section. This is presumed to be the result of the tectonic displacement along normal faults observed in this area, which in turn suggests substantial neotectonic activity for this part of Lower Austria.