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The late-glacial fluvial terrace t7 at Raunheim (lower River Main), Germany. Constraining the chronological placement by optical stimulated luminescence dating.

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The lower River Main valley exhibits up to seven fluvial terrace levels (t1 – t7, according to the stratigraphy of Semmel 1969). The lowermost terrace (t7) represents the most recently formed level which due to stratigraphical considerations is assumed to be of Late Pleistocene age (Semmel 1969). However, the chronological placement of the terrace has not been determined by numerical dating so far. The area was apparently roamed by Late Palaeolithic people as evidenced by artefacts which were discovered on a former sandy river bank between 87 m and 91 m above sea level on top of the t7 east of the town of Raunheim. We took this opportunity to open four trenches in order to localize additional in situ Palaeolithic artefacts and to investigate the stratigraphy of the sediments and soils and, for the first time, to provide numerical ages in order to narrow down the period of the t7 activity. Eight samples from three profiles in three of the trenches were collected for optical stimulated (OSL) dating. OSL dating occurred applying a blue light stimulated luminescence (BLSL) single aliquot regeneration (SAR) protocol (Murray & Wintle 2000) to small aliquots (few 102 grains) of quartz coarse grain separates (125 – 212 μm).
The trenches showed that the t7 sediments consist of fluvial sand over gravel. They are overlain by calcareous loamy and sandy overbank deposits. At the investigated site the Holocene Cambisol at the surface passes into a Gleysol that has developed in a palaeochannel which is incised into the t7. The trenches revealed further that only parts of the Late Palaeolithic site are in situ and therefore contemporaneous with the fluvial sediments beneath the Cambisol. The upper part of the sections consists of colluvial deposits lying on truncated Cambisols.
The OSL dating places the section into the period spanning the last glacial maximum (LGM) / late glacial to the late Holocene. The oldest investigated fluvial t7 sediments date around 24.7 ka. Slightly younger ages, around ca. 17 ka and ca. 14 ka, indicate that fluvial activity continued into late glacial times and that the deposits were last partly reworked. The colluvial deposits date from approximately 5000 BP until today reflecting the long lasting agricultural use of the old settled river terraces on the lower River Main. A peat layer indicates that the channel in the t7 was still active in Holocene times and finally filled only in the Middle Ages, according to palynological investigations.

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