



The loess-paleosol profile Datthausen, on the penultimate-glacial terrace of the upper Danube River: Sedimentological and paleopedological characteristics

Daniela Sauer (1), Annette Kadereit (2), Peter Kühn (3), Ludger Herrmann (4), Michael Kösel (5), Christopher Miller (6), Taeko Shinonaga (7), Sebastian Kreutzer (8), Britt Starkovich (6,9)

(1) University of Technology, Dresden, Institute of Geography, Dresden, Germany (daniela.sauer@uni-hohenheim.de), (2) University of Heidelberg, Institute of Geography, Heidelberg Luminescence Laboratory, (3) University of Tübingen, Institute of Geography, (4) University of Hohenheim, Institute of Soil Science and Land Evaluation, (5) Soil Survey of Baden-Württemberg, (6) University of Tübingen, Institute for Archaeological Sciences, (7) Helmholtz Center Munich, German Research Center of Health and Environment, Neuherberg., (8) IRAMAT-CRP2A, Université Bordeaux Montaigne, Maison de l'Archéologie, Pessac, France., (9) Senckenberg Center for Human Evolution and Paleoenvironment (HEP), Tübingen

Here we present a new loess profile, exposed in the gravel quarry Datthausen on the penultimate-glacial terrace of the upper Danube River, 40 km SW of Ulm, Germany. The loess in this region is by far not as thick and differentiated as in the Upper and Middle Rhine regions or in the Basin of Mainz; nevertheless, we found several similarities between those and the profile Datthausen. The profile is located in the East wall of the quarry, in a flat channel filled by reworked loess. It was sampled for grain size analysis, chemical standard analyses, analysis of the clay mineral assemblage (XRD of oriented clay specimen) and soil thin section analysis. Five luminescence dates provide a time frame (see Kadereit et al. in this session for further details).

The profile starts above the Eemian paleosol, which is developed in penultimate-glacial gravel of the Danube River. No early Würmian soils are preserved; the basal section of the profile comprises a succession of several middle Würmian (MIS3) brown soil horizons (9BCr to 6Bg5; Table 1). Two additional brown horizons (5Bg4 and 5Bg3) follow on top. They both have a slight olive tint, and the upper one shows clear features of redox processes and reworking. A thin gravel band on top of the olive-brown soil horizons can be traced over ca. 170 m along the wall (4Bg2). Above the gravel band two brown, only slightly de-carbonated soil horizons (3Bw1 and 2Bg1) and two hydromorphic horizons (Cg2 and Cg1) follow. The top of the profile is made up of a Luvisol comprising the horizon sequence Ap-Bt-BCtg1-BCtg2.

Table 1: Main soil-morphological characteristics of the loess-paleosol profile Datthausen

Depth; horizon (FAO); color (dry, moist); structure; major characteristics

- 30 cm: Ap
- 70 cm: Bt; 10YR5/6, 10YR4/6; angular blocky and prismatic; earthworm feces, channels, clay coatings
- 100 cm: BCtg1; 10YR7/4, 10YR5/4; massive, pinholes; mottled, fine Mn nodules, clay coatings in channels
- 125 cm: BCtg2; 10YR6/4, 10YR4/4; massive, pinholes; mottled, fine Mn nodules, clay coatings in channels
- 150 cm: Cg1; 2.5Y7/4, 2.5Y5/; massive (fine sandy layers); fine rusty spots and Mn nodules
- 190 cm: Cg2; 2.5Y7/3, 2.5Y5/4; massive (fine sandy layers); mottled, fine rusty spots (2 mm)
- 220 cm: 2Bg1; 10YR6/4, 10YR4/4; massive to fine platy, pinholes; intense brown, slightly mottled
- 260 cm: 3Bw1; 10YR6/4, 10YR5/4; massive to fine platy, pinholes; snail shell fragments
- 275 cm: 4Bg2; 10YR6/4, 10YR5/4; massive to fine platy, pinholes; slightly mottled
- 300 cm: 5Bg3; 10YR6/4, 10YR5/4; massive to fine platy, pinholes; very fine Fe+Mn mottles, slight olive tint
- 312 cm: 5Bg4; 10YR6/4, 10YR4/4; massive to fine platy; slight olive tint, fine Fe mottles and Mn nodules
- 355 cm: 6Bg5; 10YR6/4, 10YR4/6; massive to fine platy; more reddish than 5Bg4, fine Mn nodules
- 400 cm: 7Bg6; 10YR6/4, 10YR4/4; weakly fine platy and sub. blocky, pinholes; Mn mottles and coatings
- 435 cm: 8Bw2; 10YR6/4, 10YR4/4; weakly subangular blocky, pinholes
- 465 cm: 9BCr; 2.5Y7/4, 2.5Y5/4; weakly subangular blocky; grayish, bleached and rusty mottles