

Stojakowits, Philipp¹; Gegg, Lukas²; Jacob, Laura²; Moine, Olivier³; Nelson, Elli⁴; Penkman, Kirsty⁴; Schwahn, Fiona²; White, Dustin⁴; Wielandt-Schuster, Ulrike⁵; Preusser, Frank²

Environments during the Late Middle Pleistocene in the Heidelberg Basin, Upper Rhine Graben (Germany)

¹Landesamt für Bergbau, Energie und Geologie, Deutschland;

²Institute of Earth and Environmental Sciences, University of Freiburg, Deutschland;

³Laboratoire de Géographie Physique, UMR 8591 CNRS-Université Paris 1-UPEC, Frankreich;

⁴Department of Chemistry, University of York, England;

⁵Landesamt für Geologie, Rohstoffe und Bergbau, Deutschland;

Philipp.Stojakowits@lbg.niedersachsen.de

A drill core, 136 m long, from the southern Heidelberg Basin was investigated by two dating methods as well as by pollen and mollusc analyses to reconstruct the environmental conditions. The chronological framework is based on post-infrared infrared-stimulated luminescence dating supported by additional amino acid geochronology. The sediment sequence comprises fluvial, colluvial, and palustrine deposits representing more or less continuously at least the last ~500 ka. The lower part of the drill core is composed of fluvial gravel and colluvial diamicts of a lateral alluvial fan into the Upper Rhine Graben. The central part of the succession comprises a large-scale fining upward cycle belonging to the Ludwigshafen Formation. The fining upward cycle terminates with palustrine fines with rich mollusc and pollen assemblages.

The pollen record encompassing these palustrine fines shows a succession from open vegetation conditions in the lower part of the profile to a dense forest vegetation indicating interglacial conditions in the upper part. During the uppermost local pollen zone 7, *Alnus* (20-50 %) is accompanied by *Abies* (15-25 %) and a low presence of thermophilous trees, such as *Quercus*, *Ulmus*, *Carpinus*, and *Fagus*. Noteworthy is also the occurrence of *Buxus*. Furthermore, there is a high presence of *Azolla filiculoides* (121 % of the reference sum). These frequent findings of *Azolla* are indicative of warm and sub-oceanic conditions.

Unfortunately, the palustrine succession in Eppelheim ends with a sharp erosive boundary, so that the interglacial succession is incomplete. From a palynostratigraphical point of view, the investigated archive is very similar to the (presumed Cromerian) Mannheim Interglacial (Knipping 2008) as defined close by, whereas a correlation with the Holsteinian Interglacial appears unlikely. A tentative correlation with Mannheim Interglacial is supported by the amino acid geochronology. In contrast, the pIRIR ages are younger and correspond to MIS 11. However, these dating results are roughly in agreement with previous luminescence studies on correlative deposits in other drill cores (Lauer et al. 2011, Li et al. 2018).

Knipping, M. (2008): Early and Middle Pleistocene pollen assemblages of deep core drillings in the northern Upper Rhine Graben, Germany. – *Netherlands Journal of Geosciences* 87, 51–65.

Lauer, T., Frechen, M., Hoselmann, C., Tsukamoto, S., 2010. Fluvial aggradation phases in the Upper Rhine Graben – New insights by quartz OSL dating. – *Proceedings of the Geologists' Association* 121, 154–161.

Li, Y., Tsukamoto, S., Frechen, M., Gabriel, G., 2018. Timing of fluvial sedimentation in the Upper Rhine Graben since the Middle Pleistocene: constraints from quartz and feldspar luminescence dating. – *Boreas* 47, 256–270.

Session: DEUQUA Session: Terrestrial records of paleoenvironments and – climates

Keywords: Amino Acid Geochronology, Luminescence Dating, Molluscs, Pollen