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The Heidelberg Basin Drilling Project – Sedimentology and Stratigraphy of the Quaternary succession

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Within the context of the Heidelberg Basin Drilling Project (Gabriel et al. 2008), a detailed sediment succession is presented here based upon deep drillings taken at Heidelberg UniNord and Mannheim Käfertal. Sediment structures, and micromorphological and pollen analyses were conducted and used to reconsider some of the climate transitions within the lower Pleistocene. A new and novel scenario is postulated regarding the preservation of Quaternary sediment packages within the Cenozoic Graben environment of the Heidelberg basin.

The palynological evidence comprises the periods of warm climate of the Holsteinian (mainly *Abies* (fir), some *Fagus* (beech), *Pterocarya* & *Azolla*); the Cromerian (*Pinus-Picea-QM* (pine-spruce-QM)); the Bavelian (*Abies*, *Tsuga* (hemlock fir), QM & phases of increased NAP including *Pinus*); the Waalian (*Abies*, *Tsuga*, QM); and the Tiglian (*Fagus* & early Pleistocene taxa especially *Sciadopytis*, downward increasing Tertiary taxa).

The sediment package was studied both macroscopically and microscopically. Both techniques provide evidence of fluvial, lacustrine and mass movement sedimentary processes. Some include evidence of periglacial processes (silt droplets within fine grained sands indicative of frozen ground conditions). The periglacial structures are often, not always, accompanied by pollen spectra dominated by pine and NAP.

E.g. the Tiglian part of the succession shows periglacial sediment structures at its base and top but not in its middle sections. I.e. it appears not as a series of warm and cold phases but rather as a constant warm period with warm-cold-alternations at its bottom and top.

All results illustrate sediment preservation in the Heidelberg basin almost throughout the Quaternary. This may be due to tectonic subsidence, but also to compaction by sediment loading of underlying fine sediments (Oligocene to Quaternary) leading to incomplete but virtually continuous sediment preservation (Tanner et al. 2009).

References

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