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The Heidelberg Basin Drilling Project — basin analysis

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Within the context of the Heidelberg Basin Project (Gabriel *et al.* 2008), we present the first results of three-dimensional structural modelling of the basin, based on interpretation of reflection seismics and decompaction using porosity data measured from core material. Firstly, we interpreted six horizons (Base Quaternary, Internal and Base Pliocene, Base Upper Miocene, Internal and Base Mid Miocene Hydrobien beds) from all available industrial (ca. 100 km) and our own reflection seismic sections (ca. 15 km), which lie within a 8 km radius around the Heidelberg UniNord 1/2 boreholes. This data was used to construct a three-dimensional geometrical model of the Heidelberg Basin. Using 300 core samples, we determined the porosity of the Quaternary sediments and constructed an exponential porosity/depth relationship for these rocks, which were then attributed to the model. Lower strata were given values from the literature. The model shows that the Heidelberg basin has a N–S and E–W areal extent of only 10×6 km, directly abutting the eastern fault boundary of the Upper Rhine Graben. The strongest synsedimentary tectonic subsidence occurred during the Upper Miocene, Upper Pliocene, and Quarternary. Faults are not seen within the basin at this level, but a NW-SE striking strike-slip structure is recorded to the west of the basin. Furthermore, the sedimentary depocentre shifted 2 km northwards over time to the present location, directly below the city of Heidelberg. We determined that Quaternary sediments have porosities of over 60% at the surface, but at the Base Quaternary porosity is less than 35%. This strong decrease means that 740 m of sediments were compacted to produce the present ca. 500 m thickness of Quaternary strata.

Gabriel, G., Ellwanger, D., Hoselmann, C. & Weidenfeller, M. (2008): The Heidelberg Basin Drilling Project. — Quaternary Science Journal, 57, 3–4, 253–260.