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The palaeoecologic and biostratigraphic evaluation of Middle Miocene freshwater sediments and microfossils near Denkendorf (Bavaria)

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Isolated freshwater sediments that partially cover the Jurassic limestones of the Swabian and Franconian Alb represent the northernmost expansion of the Molasse sediments. These sediments represent the analogue to the Brackish Molasse and part of the Upper Freshwater Molasse (Ottnangian to Badenian).
Samples of six drillcores from the vicinity of Denkendorf (Franconian Alb, Bavaria) yielded ostracods of the superfamily Cypridoidea, frequent oogonia of charophytes, otoliths of the family Gobiidae, teeth of several taxa of micromammals as well as abundant material of amphibians, reptiles and gastropods.
The sediments show a general trend from basal, more clastic influenced deposits to uniformly developed marly sediments with freshwater carbonate intercalations. The acme of microfossil occurrences is associated with the latter section.
The palaeoecologic analysis characterises the environment as structured littoral zone (e.g. Pseudocandona steinheimensis, Gyraulus sp., Planorbarius sp., Rana ridibunda, Triturus sp.) of a larger oligo- to mesotrophic (Chara spp., Nitellopsis spp.) low-energy freshwater system under a warm subtropical to tropical climate (Diplocynodon cf. D. styriacus, Channa sp.). The cooccurrence of suboxia- and oligotrophy-tolerant species like Palaeocarassius sp. and Channa sp. may indicate short intervals of regional depletion of oxygene and raise of nutrient content. Mediocypris candonaeformis and Gobius latiformis represent relict species of the preceding Brackwassermolasse. Terrestrial elements include Proboscidea (phalanx), Cervidae (astragalus), land turtles (Testudo sp.) and gastropods (Clausiliidae, Pupillidae, Cepaea sp.). The occurrence of Jurassic xenoclasts and bean iron ore indicate the presence of a tributary system.
The faunal and floral assemblages show close affinities to other localities of the Molasse Basin (e.g., Sandelzhausen). In accordance with the depositional history this indicates a palaeogeographic connection with the foreland basin. Furthermore the ostracod assemblage is related to taxa recorded from the Miocene infill of the (isolated) Steinheim meteorite crater (e.g., Pseudocandona steinheimensis).
According to the evaluation of the micromammal molars (Megacricetodon cf. M. minor and M. cf. M. bavaricus) the sediments of Denkendorf are attributed to the lower MN5 mammal zone (latest Karpatian to early Badenian) and are thus considered to be younger than the associations found near Hitzhofen and Heitensheim.