

The stratigraphic and sedimentologic framework of fine-scale faunal replacements in the Middle Miocene of the Vienna Basin (Austria)

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ABSTRACT

Fine-scale paleocommunity dynamics were studied in a short (~16 m) section in the Middle Miocene (Badenian Stage) of the Central Paratethys, which consists of siliciclastic, pelitic, and sandy-to-gravelly shallow-water deposits. Two basal, coarsening- and shallowing-upward parasequences of a late highstand systems tract are separated by a third-order sequence boundary from the deepening-upward basal part of a transgressive systems tract at the top of the section. Benthic faunas in this succession are primarily autochthonous and storm-influenced, level-bottom assemblages, but a distinct oyster-vermetid boundstone occurs near the base of the transgressive systems tract. Additionally, three tempestitic shell beds were included, which were found out of sequence in an associated basinal setting; their faunal content relates them closely to the fine-grained deepest parts of the transgressive systems tract. Ordination of species and samples using detrended correspondence analysis and analysis of similarity suggest that two basic benthic assemblages can be distinguished. The oyster-vermetid boundstone is tied to a unique set of environmental conditions and indicates a major environmental change at the sequence boundary. The faunal assemblage in the boundstone shows a weak gradient into the pelitic (deeper and quiet-water) level-bottom assemblage, which in turn is characterized by strong overlaps with the fauna of sandy (shallower and more agitated) habitats. Therefore it is concluded that the benthic assemblages in the studied section belong to the same basic metacommunity, which was not seriously affected by the strong facies changes at the sequence boundary and at the flooding surfaces. Moreover, the species in the studied benthic assemblages reacted to changes in the environment by habitat tracking.