

Evolution of the eastern Austrian Molasse Basin: The Lower Miocene (Burdigalian) as a key to the understanding of the Eastern Alps – Molasse Basin system

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The eastern Austrian Molasse Basin is situated between the Bohemian Massif, the Waschberg-Zone and the Alps. There, sands of the Lower Miocene (Upper Otnangian) Traisen Formation represent a clastic interval at the top of pelitic Schlier successions, which is correlated with the global sea level drop Bur3 (Burdigalian). North of the Danube River, the continuation of the Traisen-Formation is overlain by the Karpatian Laa-Formation.

Drill cores from OMV-wells predominantly from the continuation of the Traisen Formation in deep parts in the NE of the basin show hundreds of meters of pelites with intersections of sands. Contrary to the exposed, mainly brackish TF, a turbiditic and predominantly fully marine deep-water environment is inferred from the cores.

Profiles of carbonate content, XRD, XRF, whole rock chemistry, clay minerals, calcareous nannoplankton and dinoflagellate cysts of 7 wells were investigated representing a NE-SW transect through the LAMB. Based on these data, a new stratigraphy for the Burdigalian distal parts of the LAMB can be defined and correlated with the proximal units.

The Traisen Formation and its equivalents are characterized at their base by an increased clastic input in the south and by increasing mica content in the northern parts. The complete interval is characterized by the decreased carbonate content. The XRD data show strongly reduced calcite contents which go hand in hand with the absence of nannoplankton. Whether the signal is related to a crisis in primary production or to carbonate dissolution remains unclear. The absence of dinoflagellate cysts and the chemical data (reduced B/Al* ratios indicate reduced salinity) are considered as an argument for an environmental crisis. However, the absence of resedimented Cretaceous to Paleocene nannofossils, which usually occur together with the autochthonous NN4-nannofossils, indicates carbonate dissolution.

These results enable us to define a basinal interval as equivalent to the proximal Traisen Formation which may serve as a key section for the stratigraphy of the deep basinal part.

Sediments of this section were influenced by a low salinity crisis that was caused by the closure of the connection to the Upper Austrian Molasse Basin. This led to a partly or completely isolated basin in Lower Austria with a probably strongly reduced water circulation and strong freshwater influence. The closure is probably connected to the Miocene lateral extrusion of the Alps, the fast uplift of the Northern Calcareous Alps and accelerated sediment input from the south. This isolation may be terminated by the deepening of the Vienna Basin during Karpatian/Badenian times.