

Early Miocene (Ottangian) coastal upwelling conditions along the southeastern scarp of the Bohemian Massif (Parisdorf, Lower Austria, Central Paratethys)

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In the Alpine-Carpathian Foredeep, Lower Miocene clays of the Zellerndorf Formation and intercalated diatomites of the Limberg Member occur between the villages Parisdorf, Oberdürnbach, Limberg and Niederschleinz, E to NE of Maissau (Lower Austria). These sediments show distinct features for coastal upwelling conditions along the steep southeastern scarp of the Bohemian Massif during the Ottangian. They were deposited in a deep marine sublittoral environment. The communities of diatoms, calcareous nannoplankton and planktonic foraminifera clearly point to the influence of cold and nutrient-rich deep-water currents, typical for upwelling zones. The very high content of smectitic clay minerals in both the sediments and volcanoclastics of time-equivalent strata in this area indicate prominent acidic volcanic input. Thus, besides the nutrient-rich deep-water currents, the induced high silica content in the sea also boosted biogenic productivity, especially for diatoms. The diatomites show rhythmic bedding laminations which are probably cyclic. The finer and light layers with rich accumulations of well-preserved, mostly planktonic diatoms represent rapid sedimentation rates. In contrast, the thicker and darker interlayers with higher inorganic siliciclastic content and mostly fragmented siliceous plankton tests are an indication for slower sedimentation (tending to obscure annual events) and thicker bedding units.

In the Limberg Member, the diatoms are the most abundant siliceous microfossils. Together with the less abundant silicoflagellates, as well as chrysomonads with archeomonad cysts and ebridians, they are the principal rock-forming components of the diatomites. The diatom assemblages show low species diversity with about 90 taxa belonging to 46 genera. The most frequent genera are *Thalassionema*, *Chaetoceros*, *Coscinodiscus*, *Rhizosolenia*, *Stephanopyxis* and *Thalassiosira*. In the Parisdorf pit the whitish layer surfaces commonly comprise horizontally oriented, large disc-shaped *Coscinodiscus* tests. In the upper part of the Parisdorf profile, tests of the genera *Thalassionema*, *Chaetoceros*, *Rhizosolenia*, *Thalassiosira* and *Stephanopyxis* dominate.

The diatom flora of the Limberg Member stratigraphically belongs to the upper part of the Lower Miocene (Ottangian-Karpatian).

The diatomites of the Limberg Member from Parisdorf lack calcareous nannoplankton. Laminated calcareous layers of the Zellerndorf Formation in the Parisdorf pit are very rich in well-preserved nannoplankton assemblages dominated by two taxa: *Coccolithus pelagicus* and *Coronosphaera mediterranea*. The accompanying assemblages consist of *Coccolithus miopelagicus*, *Cyclicargolithus floridanus*, *Helicosphaera ampliaperta*, *H. carteri*, *H. euphratis*, *H. mediterranea*, *Pontosphaera multipora*, *Reticulofenestra bisecta*, *R. daviesii*, *R. pseudumbilica*, *Sphenolithus disbelemnus* and *Sphenolithus moriformis*. *Helicosphaera ampliaperta* (stratigraphic range: from upper NN2 to the NN4/NN5 boundary) is rare but present in investigated sediments from Parisdorf and Niederschleinz. Although *Sphenolithus belemnus* was not observed, the co-occurrence of *S. disbelemnus* with *H. ampliaperta* and *H. mediterranea*, as well as the absence of *Sphenolithus heteromorphus*, indicate the uppermost part of nannoplankton Zone NN2 and Zone NN3 (Martini, 1971). This also corresponds with the regional Ottangian position of the succession.

Within the lower part of the sequence, overlying the Limberg Member diatomites, a horizon of agglutinated *Bathysiphon filiformis* was observed. The foraminiferal fauna in more calcareous clays is dominated by very small planktonic species, with floods of *Tenuitellinata selleyi*, *Tenuitellinata* and *Turborotalita*. From the same groups, *Tenuitella clemenciae*, *T. minutissima* and *Turborotalita quinqueloba* occur throughout. Other common small globigerinids are *Globigerina lentiana*, *G. ottangiensis* and *G. praebulloides*. The planktonic foraminiferal assemblages show high numbers of *Globigerina ottangiensis* and few *Globigerinoides* specimens together with *Globoturborotalita woodi*, indicating an Early Miocene age.

In the benthic assemblages, agglutinated and miliolid species are scarce. Abraded tests occur regularly. The calcareous benthic fauna consists of small species or specimens, often in small numbers but with high species diversity. The richest assemblage was observed in the marly bed. Most common are *Amphimorphina haueriana*, *Mylostomella advena*, *M. recta*, *Fursenkoina halkyardi*, *Bolivina dilatata*, *Pseudoparrella exigua*, in some samples also *Melonis* and *Nonion*. In marly sediments from Parisdorf and Niederschleinz the fauna changes to a *Lenticulina-Uvigerina* assemblage. For the first time in Ottangian sediments, *Uvigerina acuminata* occurs frequently, together with *U. cf. saprophila* and *U. mantaensis*. The new species *Nonion gudrunae* Rögl n. sp. is described from the Ottangian Zellerndorf Formation in the diatomite pit Parisdorf, and a lectotype of *Nonion commune* (d'Orbigny, 1846) is designated.