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allochthonen Dinozysten vollständig. Umgekehrt nehmen die Anteile an umgelagertem kalkigen Nannoplankton und an umgelagerten Foraminiferen zum Hangenden hin zu. Dies kann nur mit einer Frachtsonderung der allochthonen Komponenten durch Erosion und Transport erklärt werden.

Bezüglich des kalkigen Nannoplanktons und der Dinozysten kann kein eindeutiges Herkunftsgebiet für die umgelagerten Arten festgelegt werden. Auch müssen diese nicht zwangsläufig aus demselben Ablagerungsgebiet stammen. Die Arten können sowohl aus dem Nordseebereich, als auch aus dem Alpenbereich abgeleitet werden und treten auch im benachbarten Pariser Becken auf. Ein Großteil der umgelagerten Foraminiferen-Arten ist kosmopolitisch verbreitet und zumindest die eozänen Arten können z.T. auch aus dem südlichen und mittleren Oberrheingraben selbst stammen.

Die autochthonen Anteile der untersuchten Mikrofossilgruppen ergaben eine Einstufung des Profils in die Globigerinidae-Miliolidae-Häufigkeitszone, in die Dinoflagellatenzone D14na und in die Kalknannoplanktonzone NP 24.

Die Korrelation der Grenze der Dinozysten- bzw. Kalknannoplankton-Zonen D14na/D14nb bzw. NP23/NP24 ergibt jedoch für Nordost-, Nordwestdeutschland und das Gebiet Mainzer Becken/Oberrheingraben regionale Unterschiede: In Nordostdeutschland liegt die Grenze D14na/D14nb in der Zone NP23, in Nordwestdeutschland im Grenzbereich NP23/NP24 und im Mainzer Becken in der Zone NP24.

Die Diskrepanz der Korrelation der Dinozysten-Zone D14na und den Kalknannoplankton-Zonen zwischen dem Mainzer Becken, und wahrscheinlich auch dem Oberrheingraben einerseits, und Nordwest- und Nordostdeutschland andererseits kann aber auch in der paläogeographischen Situation begründet sein. Ob das erste Vorkommen von *Cyclicargolithus abisectus* (Hilfsmarker für die Basis der Zone NP24) und/oder das letzte Vorkommen von *Enneadocysta pectiniformis* diachron ist, konnte nicht entschieden werden.

UPPER MIOCENE FRESHWATER CRABS FROM THE NORTH-WESTERN MARGIN OF THE STYRIAN BASIN (BRACHYURA, POTAMOIDEA)

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Fossil crabs from the Styrian Basin are well known from marine, predominately Badenian sediments (cf. FRIEBE, 1987) but until now only one remain of a freshwater crab is recorded from a clay pit north of Graz. This specimen was found at the beginning of the 20th century in the brickyard "Wolf" at Andritz and is published by GLAESSNER (1928) as *Potamon proavitum*.

In the course of geological mapping a clay pit ("St. Stefan"; Wietersdorfer & Peggauer Zementwerke) at the vicinity of Gratkorn (10 km NNW of Graz) is studied to clarify its stratigraphical position. Although plant remains were described from the surroundings of St. Stefan by the famous Austrian paleobotanist F. UNGER in the mid of the 19th century (UNGER, 1852), paleontologists did not pay attention to these fossil-rich sediments. In contrast to existing geological maps that refer this outcrop to the Quarternary (cf. EBNER, 1983), first observations indicate that at St. Stefan Neogene sediments are exposed. The quarry is situated in the Gratkorn Basin, which is a small subbasin at the north-western margin of the Styrian Basin. No formal lithostratigraphic divisions or sedimentological analyses are available for

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this realm. Biostratigraphical hints are restricted to the south-western part of the basin (cf. FLÜGEL, 1997).

At base of the outcrop more than 1.5 m thick matrix supported gravels and bioturbated (roots) silts with numerous fragments of large mammal bones are exposed. 4 m thick marls with intercalated plant-rich layers are developed above and pass into a 10 m thick pelitic unit with subordinate lignitic and sandy layers. Gastropode-operculi, fish fragments and coaly seeds occur frequently. Crab remains are accumulated in two layers, both rich in operculi.
Results from micropaleontological investigations (ostracods) indicate an overall littoral freshwater setting in a "warm" (subtropical?) climate. Preliminary stratigraphical correlations suggest an Early Pannonian age for the strata of this clay pit (GROSS, 2005).

In contrast to other sites, where relicts of brachyuran claws dominate (e.g. cf. BACHMAYER & PRETZMANN, 1971), many fragile carapaces of freshwater crabs were found.
The recent freshwater crabs of the Old World were divided into two superfamilies by BOTT (1970a) - the Potamoidea and the Gecarcinucoidea. While the gecarcinucoid freshwater crabs lack any fossil record, potamoid fossils are known from the Neogene of Africa, Asia and Europe. The Eurasian Potamoidea are subdivided into three families, the Potamidae in Europe and the Near East and the Sinopotamidae and Isolapotamidae occurring in E- and SE-Asia respectively (BOTT, 1970b). As the least derived and most diverse potamoid fauna occurs in Asia, it is generally assumed that this group has an Asian origin.

At present only freshwater crabs of the genus *Potamon* occur in Europe, ranging as far north as the Balkan and Northern Italy. This lead to the assignment of the European fossil freshwater crabs to the genus *Potamon* and to the family Potamidae respectively (GLAESSNER, 1930). Nevertheless, many authors placed them closer to the African potamoids, i. e. the family Potamonautidae (BOTT, 1955; CAPELLINI, 1874; SCHWEIGERT et al., 1997; SZOMBATHY, 1916).

BOTT (1955) assigned the species *Potamon proavitum* to a new genus, *Pseudopotamon*, but gives neither a diagnosis for the new genus, distinctive characters respective to the genus *Potamon* nor any reference to the descriptions of GLAESSNER (1928, 1929, 1930). In fact, the taxonomic placement of *Potamon proavitum* is dependent on the relationship of the fossil species to the recent groups. There are two possible hypothesis: Either *P. proavitum* belongs to the stem-group of the genus *Potamon* or it is the representative of an earlier dispersal event of potamoid freshwater crabs to Europe.
In the first case, *P. proavitum* must be assigned to the genus *Potamon* to keep it monophyletic (as it can not be determined by carapace morphology to which species of *Potamon* it is closest related).

In the second case, it cannot be excluded that *P. proavitum* is closer related to African or SE-Asian species, as it was recently hypothesised for the Miocene freshwater crabs of Engelswies/S-Germany (SCHWEIGERT et al., 1997). This would argue for the placement of *P. proavitum* in a separate genus and thus the genus *Pseudopotamon* would keep its validity.
We favour a placement of *P. proavitum* in the genus *Potamon* and thereby in the family Potamidae because of the following reasons:

1. The modern freshwater crab fauna of Europe, the Near East and the Maghreb consists only of crabs of the genus *Potamon*. No relics of an earlier freshwater crab fauna are found in these regions today. The nearest potamoids with SE-Asian affinities are presently found on the island of Socotra.
2. The occurrence of *Potamon* in Northern Africa was connected with the Messinian salinity crisis, enabling the dispersal of freshwater crabs out of Europe (BRANDIS et al. 2000). Thus, at least in the Late Miocene morphologically modern potamids prevailed in southern Europe.

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Therefore we conclude, that the genus *Potamon* occurred for the first time in Europe at least during the Early Miocene as the first group of freshwater crabs in Europe. *Potamon proavitum* most probably belongs to this stem-group of the modern European potamids.

The new discovery of fossil freshwater crabs points out that freshwater crabs were more widespread during the Miocene than previously thought. The further investigation of the freshwater crabs fossil record will help to understand the biogeography and evolution of one of the most diverse group of brachyuran crustaceans. Moreover, an increasing knowledge of the Miocene freshwater crab fauna will add to our understanding of Miocene palaeoenvironments.

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