

Palaeontological analysis of Middle Miocene siltstone from outcrop in Wiślica (Carpathian Foredeep, Central Poland)

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The Carpathian Foredeep is a youngest tectonic unit of Poland occupies the area between the Outer Carpathians and the Mid-Polish Uplands. Origin of the Carpathian Foredeep is directly connected with the Outer Carpathians evolution (details in: Oszczytko, 2006). The Carpathian Foredeep basin was a part of the Central Paratethys which was the northern part of the disappearing Tethys Ocean. This part of the Paratethys sea was the northernmost part of the basin. Central part of The Carpathian Foredeep is filled with Miocene siliciclastic molasse with evaporites. Sediments near the margins, especially in the North of the basin are much more diverse. The axis of the sedimentary foredeep basin was moving from the south to the north during the Miocene time. The deposits of the Carpathian Foredeep cover different older rocks (e.g. Radwański, 1973).

The Middle Miocene deposits in the Wiślica region are represented mainly by gypsum of evaporitic stage - Evaporitic-Chemical Beds (Krzyżanowice Formation, Wielician) and mudstones above and below them (Alexandrowicz *et al.*, 1982).

Geographically, Wiślica (GPS coordinates: N 50° 21' 35,4"; E 20° 41'5,5") is located in Małopolska Upland, in Nida Basin. The outcrop of the studied mudstone series is located near the cemetery, in the outskirts of the town. The Miocene deposits presumably covered the Upper Cretaceous marls. However, there is no evidence for the age of the basement so far. The Middle Miocene section begins with a thin layer (thickness varies) of basal conglomerate. Above the conglomerate lies a series of mostly horizontally laminated mudstone. The deposit contain bivalves, such as oysters (*Pycnodonte* sp.) and scallops (*Amusium* sp., *Aequipecten* sp.), besides diverse microfossils. Micropalaeontological analysis has revealed that deposits are foraminiferous. Both benthic and planktonic foraminifers occur. Agglutinated species are relatively uncommon. Insignificantly more common are planktonic foraminifers, mainly from Globigerinidae group, *Orbulina* genus. The following taxa of benthonic foraminifers were identified:

Dentalina sp., *Dentalina emaciata* Reuss, 1851, *Lenticulina* sp., *Uvigerina* sp., *Nodosaria* sp., *Nonionella atlantica* Cushman, 1947, *Stilostomella lepidula* (Schwager, 1866), *Bolivina* sp., *?Cibicides* sp., *Marginulinopsis* sp., *Marginulina* sp. Among those taxa predominant are: *Uvigerina* sp., *Dentalina* sp., *Lenticulina* sp., *Nodosaria* sp. Moreover, the deposit contains numerous remains of Osteichthyes (bony fish), especially otoliths and rarely vertebras and teeth. Lots of urchins spines, ostracods and some bryozoans are also recognised.

Abundance of microfossils and their variability suggest advantageous environmental conditions for life for many groups of organisms. The presence of Pectenids, echinoderms and planktonic foraminifers points to normal salinity (e.g. Szczechura, 1982; Studencka, 1999). Presence of these fossils suggests the Badenian age, according to widely accepted fact that salinity decreased at the Badenian-Sarmatian boundary (e.g. Oszczytko, 2001). Transgressive nature of the studied deposits that begins with conglomerate suggests the Late Badenian age, after the evaporation period. Sea level of Paratethys during the evaporation period was low and had increased after that (Rögl, 1998). The evaporation period is traditionally assumed to Middle Badenian, but according to Oszczytko (2001) to Upper Badenian.

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