

The forereef interbedding limestones and argillites were deposited in front of the barrier reef (Karolinskaja suite) in Tithonian-Lower Berriassian.

Foreshore shallow formations of this age are not opened by wells.

Building up the reefogenic structures was stopped at the beginning of Lower Cretaceous by intensive trans-

gressive processes; and Upper Jurassic deposits partially were washed out and reprecipitated over the layers of argillites, somewhere with sandstones, in Upper Berriassian and Valanginian. Neocomian shoaly carbonates there consist of redeposited rounded fragments of Tithonian-Berriassian limestones (Stavchansky suite).

Lower Badenian sediments and fossils from some boreholes in the Carpathian Foredeep southwards of Brno (Czech Republic) - paleoecological and paleogeographic implications

ŠÁRKA HLADILOVÁ¹, NELA DOLÁKOVÁ¹, SLAVOMÍR NEHYBA¹ & JANA HLADÍKOVÁ²

¹ Department of Geology and Paleontology, Faculty of Science, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic

² Czech Geological Survey, Klárov 3, 118 21 Praha 1, Czech Republic

In the past, many boreholes were drilled in the Carpathian Foredeep southwards of Brno (Czech Republic). Authors had the possibility to study samples from three of them, namely HJ-1 Chrlice, HJ-2 Otmarov and HJ-103 Opatovice, their importance consisting in their position on the slopes of the Bohemian Massif in the continuation of the Nesvačilka trough. In the profiles of the studied boreholes sediments of various ages (Lower Badenian, Karpatian, ?Lower Miocene, ?Oligocene) belonging to the Tertiary filling of the Carpathian Foredeep were found. For the time being, only Lower Badenian sediments, representing the majority of samples, were studied in detail because of their uncommon sedimentary development.

The investigation of the Lower Badenian sediments from the HJ-1, HJ-2 and HJ-103 boreholes was made with the maximum possible complexity, therefore it included the sedimentological, paleontological (molluscs, fossil pollen and spores) and isotopic analyses (C and O of the carbonate molluscan shells). The results were used for paleoecological and paleogeographic interpretations.

The study confirmed that no significant lithological change can be observed between the sediments of Karpatian and Lower Badenian ages. This fact could be probably the evidence of an unbroken sedimentation. The uncommon absence of basal clastic sediments and of greater thicknesses of calcareous clays ("tegels") as well as of rhythmical interlamination of sandy and clayey layers are the typical characteristics of the Lower Badenian sediments in the studied boreholes. In the top direction the amount of coarse grained sediments increases gradually, in the upper parts of the HJ-2 and HJ-103 boreholes highly damaged shells of macrofossils were observed, moreover, in the upper parts of the HJ-2 borehole the amount of spores of Pteridophyta increases and the amount of marine microflora and foraminifers decreases. These facts document the global trend of a growing water dynamics and a shallowing of the sedimentary area.

The paleontological analyses confirm that the sedimentation took place in the marine environment with a normal

salinity (corals, bryozoans, echinoids, molluscs - *Chlamys* cf. *malvinae*, *Anadara* sp., *Comus* sp. etc., red algae, accumulation of the pollen grains of the family Pinaceae, dinoflagellates with the branched projections and tapeta of foraminifers). The environment on the sea shore was probably rather wet (spores of Fungi, pollen of the genera *Alnus* and *Ulmus*) up to swampy (pollen of the families Taxodiaceae, Myricaceae and Cyrillaceae).

The climate was warm (presence of thermophile molluscs, for example *Comus* sp., *Anadara* sp., *Chlamys* cf. *malvinae*, pollen grains of the families Sapotaceae, Palmae, genera and species *Engelhardtia*, *Platycarya*, *Quercoidites henrici*, *Quercoidites microhenrici*, *Castaneoideaepolis pusillus*, *Castaneoideaepolis oviformis*, *Tricolporopollenites liblarensis* a *Tricolporopollenites marcodurensis*), but probably not extremely with regard to the relative representation of the thermophile and arctotertiary elements (*Carya*, *Pterocarya*, *Celtis*, *Ulmus*, *Alnus*, *Liquidambar*, Poaceae, *Sciadopitys*). The depth of the sedimentary area was probably in the range of littoral, the dynamics of the sedimentary environment being evidently generally relatively high or fluctuating. These conclusions are supported not only by the character of sediments, but also by the molluscan fauna - for example by the presence of the species *Terebra* sp., *Comus* sp., *Ostrea* sp. etc.). The isotopic analyses of C and O of the molluscan shells proved that the $\delta^{13}\text{C}$ values vary between -1.4 a 2.1‰ (PDB), the $\delta^{18}\text{O}$ values between -3.0 a 1.6‰ (PDB).

It appears that the Lower Badenian sedimentation in the studied area was primarily influenced by the existence of the Nesvačilka trough, e.g. that this structure manifested itself very conspicuously not only within the Lower Miocene, but also at the beginning of the Upper Miocene, namely in the Lower Badenian. Therefore, the local sedimentation in this part of the Carpathian Foredeep differed from the typical Lower Badenian developments with the presence of the basal clastic sediments and a considerable predominance of calcareous clays ("tegels").

Acknowledgement: This study was supported by the grant 205/00/0550 (Grant Agency of the Czech Republic).