

Badenian Marginal Marine Environment in the Medvednica Mt. (Croatia)

Durdica PEZELJ & Jasenka SREMAC

Miocene deposits in NW Croatia are particularly well developed at Medvednica Mt., where they outcrop in a ring-like belt surrounding the mountain.

A section with Middle Miocene clastic beds is exposed along the forest road at the locality Borovnjak (SW Medvednica). The basal part of the section is represented by conglomerates and weathered *Lithothamnium*-limestones. They are overlain with biocalcarenes and carbonate sands, containing scarce biocalclutite intercalations.

Microfossil community is, in general, preserved poorly (abraded, often with broken tests) and scarce, except in marly sediments. A total of 14 species and 8 genera of benthic foraminifera and 10 species and genera of ostracods were identified.

The biostratigraphy of the studied section is based on the standard Zonations for the Paratethys (BRESTENSKÁ & JIRÍČEK 1978; ČIČHA et al. 1998). Late Badenian age (*Ammonia beccarii* Zone) was proved on the basis of dominant presence of *Ammonia viennensis*, elphidiids and miliolids, as well as ostracod species *Phlyctenophora farkasi* and genus *Neocyprideis* (*Miocyprideis*).

The interpretation of palaeoenvironment was based upon the quantitative analysis of fossil communities. Planktonic/benthic ratio, number of species of benthic foraminifera and ostracoda, Benthic Foraminiferal Number and benthic foraminifera/ostracod ratio has been determined for each standardized sample. Dominant and common species were separated, and their variations across the profile were examined. Four diversity indices: Fisher α index, Shannon-Wiener index, Equitability and Dominance have been used to define species diversity of benthic foraminifera. Benthic Foraminiferal Oxygen Index (KAIHO 1994), dissolved oxygen indicators and epifauna/infauna ratio were also estimated.

A small number of species, low faunal diversity, strong dominance of a few taxa and a small number of specimens characterize foraminiferal community. Dominant taxa *Asterigerinata planorbis*, *Elphidium macellum*, *E. crispum* and *Ammonia viennensis* are typical for shallow-marine environment, which is in accordance with the absence of planktonic foraminifera, high oxic conditions and dominance of oxic indicators and epifaunal taxa. Broken and abraded tests can indicate long-shore transport by littoral drift and tidal currents.

The most common taxa in the lower and upper part of this section are *E. macellum*, *E. crispum*, *E. fichtellianum* and *A. planorbis*, mostly typical for normal marine environments. Ostracod specimens generally participate with 8% in the communities, and the most frequent taxa are *P. farkasi* and *Loxoconcha hastata*.

Appearance of a brackish genus *Neocyprideis* (*Miocyprideis*) in fine-grained intercalations in the central part of the section, together with euryhaline ostracod taxa *Cytheridea pernota* and *Xestoleberis glabrescens*, and high percentage (>30%) of an opportunistic species *A. viennensis*, indicate the temporary input of freshwater into the basin.

Micropalaeontological features, together with sedimentological data indicate that the Upper Badenian deposits of Borovnjak were deposited in relatively turbulent near-shore marine environment with temporary oscillations of salinity.

References

- BRESTENSKÁ, E. & JIRÍČEK, R. (1978): Ostrakoden des Badenien der Zentralen Paratethys. – In: PAPP, A., CÍCHA, I., SENEŠ, J. & STEININGER, F. (eds.): M4 Badenien. Chronostratigraphie und Neostratotypen, Miozän der Zentralen Paratethys, 6: 405-439, Verlag der Slowakischen Akademie der Wissenschaften, Bratislava.
- CÍCHA, I., RÖGL, F., RUPP, C. & ČTYROKA, J. (1998): Oligocene – Miocene foraminifera of the Central Paratethys. – Abhandlungen der senckenbergischen naturforschenden Gesellschaft, 549: 1-325, Frankfurt/Main.
- KAIHO, K. (1994): Benthic foraminiferal dissolved-oxygen index and dissolved-oxygen levels in the modern ocean. – *Geology*, 22: 719-722, Colorado.

Authors address:
Durdica Pezelj & Jasenka Sremac
University of Zagreb
Faculty of Science
Department of Geology
Horvatovac 102A
HR-10000 Zagreb
durpezelj@yahoo.com