

Foraminiferal Record of the Onset of the Middle Miocene Badenian Salinity Crisis in Central Paratethys

Peryt, Danuta¹; Peryt, Tadeusz M.² (1) Institute of Paleobiology, Polish Academy of Sciences, Warszawa, Poland. (2) Państwowy Instytut Geologiczny, Warszawa, Poland.

The isolation of some parts of the Paratethys Sea (Middle East, Red Sea, Carpathian Foredeep, Transylvania) at the end of late Langhian resulted in the “Middle Badenian” salinity crisis. The scenario of events leading to the deposition of widespread evaporites in the Badenian shows great similarities to the onset of the Messinian salinity crisis in the Mediterranean. Isotopic studies of Badenian foraminifers occurring below evaporites in the Carpathian Foredeep basin suggest that the interrupted communication of the Paratethys with the ocean was a consequence of eustatic sea-level fall, possibly related to climatic cooling, and it was coupled with a tectonic closure of connection with the Tethys. Badenian evaporites are underlain by deep-water deposits, and the previous interpretation assumed that the onset of evaporite deposition was sudden but not synchronous in all facies zones: the evaporites deposited in the basin centre preceded the beginning of evaporite sedimentation in the marginal basin. Giant gypsum intergrowth facies occurring at the base of gypsum section in the northern Carpathian Foredeep originated from density-stratified brines. This density stratification possibly started during the deposition of the Ervilia Bed, a thin limestone layer containing fauna almost exclusively composed of two mollusk species particularly adapted to an increased salinity and low oxygenation. Recently clays underlying giant gypsum intergrowth unit in the Borków gypsum quarry (southern Poland), one of the best studied Badenian gypsum outcrops, have been exposed. The study of foraminiferal microfauna occurring in those clays shows that benthic foraminiferal assemblage is very well preserved and moderately diversified; it is dominated by infaunal morphogroups represented mainly by thin-walled, delicate, elongate smooth and serial-shaped genera. Planktonic foraminifera are rare. The recorded foraminifera indicate marine environment where bottom waters were oxygen deficient but of normal marine salinity. The foraminiferal assemblage immediately below the gypsum is moderately diversified and shows different taxonomic composition, possibly due to increased salinity. In any case, the transition from normal marine to evaporite deposition was rapid and this implicates a roughly synchronous onset of evaporite deposition in the entire Carpathian Foredeep basin.