Geophysical Research Abstracts
Vol. 21, EGU2019-10234-1, 2019
EGU General Assembly 2019

The evolution of Central Paratethys during latest Badenian and Sarmatian (Middle Miocene): inferences from micropalaeontological studies

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Integrated foraminiferal, ostracod and calcareous nannofossils studies were carried out on seven Middle Miocene sedimentary sections deposited in the Central Paratethys Basin (CPB), including the Polish Carpathian Foredeep Basin (PCFB), western part of the Carpathians Foreland Basin (CFB), and the eastern part of the CFB known as the Eastern Carpathian Foreland Basin (ECFB), respectively Romania and Republic of Moldova. The studied strata comprise upper Badenian to lower Sarmatian deposits encompassing the so-called Badenian–Sarmatian Extinction Event (BSEE) characterised by significant taxonomic impoverishment of both foraminiferal (benthonic and planktonic) and ostracod assemblages.

Quantitative and qualitative prominent foraminiferal changes within the lower Sarmatian are also recorded. Our studies enabled the reconstruction of the palaeoenvironmental conditions of the basin including depth, salinity, oxygenation and organic matter flux, with significant modification identified during the studied interval. The occurrence of moderately diverse planktonic foraminifera (Globigerina, Globigerinita, Globorotalia, Globigerinoides, Orbulina, Velapertina) in the upper Badenian deposits of the PCFB as well as in the ECFB and their rarity in the lowermost Sarmatian indicate an almost fully marine environment during the uppermost Badenian. This was followed by a significant regression and possible appearance of much more restricted marine conditions across the boundary. The taxonomic composition of the Sarmatian foraminifera, ostracod and calcareous nannofossils indicate that during this period the salinity strongly varying – with the water regime varied from brackish to almost normal marine. In addition, the identified micropalaeontological assemblages support the existence of possible connections during the latest Badenian between different areas of the Central Paratethys as well as the existence of a gateway between Central Paratethys and the Mediterranean realm.