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# Molluscs as useful ecological and stratigraphical tools within a Middle Miocene (Sarmatian) endemic system

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13 – 11.5 Ma ago the Paratethys was almost separated from the Mediterranean basins. The semi-enclosed sea extended from eastern Austria to the Caucasus and was populated by an increasingly endemic fauna of molluscs with comparatively low number of species but high morphological variety. This is well studied and understood for the localities of the Vienna Basin and the Pannonian Basin system, but quantitative data, allowing further correlation with the Eastern Paratethys, are still punctual. The present study is the very first quantitative comparison of Sarmatian mollusc assemblages from the Eastern and Central Paratethys. For this purpose, 63,258 shells (39 samples, 84 species) from 8 localities of different Sarmatian age of Central and Eastern Europe were quantitatively evaluated.

The Sarmatian stage of the Central Paratethys (s. str.) corresponds to the Volhynian and the Lower Bessarabian of the Eastern Paratethys. While equivalents of the Lower Bessarabian within the Central Paratethys are overlain by the freshwater deposits of Lake Pannon, the Sarmatian deposits (s. lato) of the Eastern Paratethys continue with the Upper Bessarabian and the Chersonian stages.
The Sarmatian deposits of the Vienna Basin were deposited between 12.5 and 11.9 Ma. While the Siebenhirten section (12.5 Ma) belongs to the regional Mohrensternia zone, the sections of Kettlasbrunn (11.9 Ma), Hauskirchen (12.1-12.0 Ma) and Nexing (12.0 Ma) belong to the regional Upper Ervilia zone. The sediments of Soceni are located in the northwest of Rumania and like Siebenhirten belong to the Mohrensternia zone (approximately 12.5 Ma).
Zhabiak is located in the Ukraine, about 150 km eastward of the border with Poland. Only 5 m of the 24 m thick section are of Sarmatian age (earliest Sarmatian - approximately 12.7 Ma). The sections of Jurkino and Zavjetnoje are located in the eastern part of the Peninsula Crimea (Kertch, Ukraine). Both are Bessarabian deposits (11.5-11.0 Ma) of the western part of the eastern Paratethys.

Cluster analysis and detrended correspondence analysis of the investigated assemblages of Central and Eastern Europe are strongly separated into Bessarabian and Volhynian localities. In the Volhynian, the samples from the Vienna Basin are well separated in those from the Upper Ervilia Zone and those from the Mohrensternia Zone. Four different palaeoenvironments can be deciphered: a shallow to moderately deep sublittoral (Bessarabian age), a freshwater influenced shallow sublittoral (Volhynian age), an ooid shoal (Volhynian age), and a muddy foreshore with phytal cover (Volhynian age). Salinity and water depth are identified as the most significant environmental parameters in the studied assemblages.