**Acta Geologica Hungarica**

Publisher: Akadémiai Kiadó

Issue: Volume 48, Number 3 / 2005

Pages: 235 - 257

# Sedimentary cycles and rhythms in a Sarmatian to Pannonian (Late Miocene) transitional section at Oarba de Mures/Marosorbó, Transylvanian Basin

Orsolya Sztanó [A1], Csaba Krézsek [A2], Imre Magyar [A3], Ferenc Wanek [A4], Györgyi Juhász [A5]

[A1] Department of Physical and Historical Geology, Eötvös Loránd University H-1117 Budapest, Pázmány P. sétány 1/C, Hungary
[A2] Exploration Division, Romgaz S.A., Present: Department of Earth Sciences, Dalhousie University 551025 Medias/Medgyes, Unirii u. 4, Romania, Present: Halifax B3H 4J1, Nova Scotia, Canada
[A3] MOL Rt. H-1039 Budapest, Batthyány u. 45, Hungary
[A4] Sapientia Hungarian University of Transylvania 400112 Cluj-Napoca, Mátyás király u. 4, Romania
[A5] Geological Institute of Hungary H-1143 Budapest, Stefánia út 14, Hungary

## Abstract:

A continuous Sarmatian/Pannonian boundary section, which rarely crops out within the Pannonian Basin, was studied near Oarba de Mures/Marosorbó. Alternating beds of clay marl, calcareous marl, siltstone, sandstone and andesitic tuff are present up to a thickness of about 100 m. Traditionally the Sa/Pa boundary was placed at the top of the last significant tuff layer, which has been confirmed by mollusk-bearing strata a few meters above belonging to the "Lymnocardium" praeponticum Zone. This zone is coeval with the Early Pannonian Mecsekia ultima dinoflagellate zone and the C5r magnetic polarity zone. Three ranks of cyclicity connected to sediment gravity flows are present in the outcrops. Coarse silt to sandstone beds were formed by low-density turbidity currents. These individual events represent "dilution cycles" connected to the intensity and abundance of turbidity currents. Turbiditic beds, some 2-5 m-thick series of sandstones, form coarsening/thickening upward cycles of 8-20 m of thickness. This cyclicity may reflect autocyclic lobe switching in deep lacustrine fans. The lowermost 70 m of the succession comprises a major thickening to thinning cycle, while the uppermost part of the sequence seems to represent a longer turbidite-free interval. The last may either reflect climatically-driven allocyclic lake-level variations or impulses of hinterland structural evolution (tectonic activity vs. quiescence). The background sediments show two sorts of seemingly independent rhythmicity: there is marl with variable carbonate content, occasionally forming a few cm of thickening-upward series of calcareous marl, and it also shows various grades of bioturbation. Calcareous marl is often associated with the appearance of fibrous gypsum laminae. The alternating carbonate content of the marl might be generated either by "production cycles" in the photic zone over which the climatic influence is straightforward, or they were formed as the first products of the evaporite succession from hypersaline bottom waters. The lack of bioturbation combined with gypsum may reveal hypersaline and/or dysaeroabic abiotic bottom conditions. These also indicate that turbidity currents had transported not only terrestrial sediments but less saline, O2-bearing water down to the lake floor, interrupting the biota-poor periods. The salinity of the bottom waters in the deepest basin segments might significantly differ from that of the main water mass, and might have been regulated by the composition and amount of ions dissolved from Mid-Miocene salt diapirs cropping out at the lake bottom elsewhere. Accumulation of hypersaline bottom waters may also be facilitated by climatically-determined density stratification of the lake water.