Stable Sr isotope ratios of the Eastern Paratethys during the Mio-Pliocene transition; implications for interbasinal connectivity

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Introduction
Paratethys represents the large basin that extended from central Europe to inner Asia, comprising the North Alpine foreland, Pannonian and Dacian basins, the Black Sea and Caspian Sea (Fig. 1). Connectivity between these subbasins and the connectivity of Paratethys with the open ocean varied drastically because of pervasive tectono-climatic processes affecting the region.

Methods
Here, we investigate the biogenically produced carbonates of the Dacian basin for strontium analyses to monitor changes in connectivity, water geochemistry and palaeoenvironment during the Mio-Pliocene transition. We chose the well dated succession of Rîmnicu Sarat Valley section (Fig. 2). Diagenetic evaluation showed that not all contamination could be removed, but that the strontium content of our samples was not affected by post-depositional processes (Fig. 3).

Results
87Sr/86Sr ratios of ostracods and molluscs are in good agreement and show relatively constant values of 0.70865-0.70885 (Fig. 4). These are much lower than coeval Mio-Pliocene ocean water (0.7089-0.7090), which indicates that no long-standing connection existed to the Mediterranean.

Conclusion
The newly obtained strontium ratios for Paratethys are best explained by a mixture of Danube, Dnieper and Don river water, implying connectivity between Dacian basin and Black Sea during the latest Miocene - earliest Pliocene. We observed no evidence for connectivity to the Caspian Sea during this period. The 87Sr/86Sr ratios of the Dacian basin are similar to the ones measured in the Mediterranean “Upper Evaporites/Lago Mare” facies (Fig. 4). The major fresh water deluge at the end of the Messinian salinity crisis could thus have been caused by drowning of Eastern Paratethys waters into the Mediterranean.