Mind the gap! The Sarmatian/Pannonian boundary at the western margin of the Vienna Basin (Austria)

Harzhauser, Mathias (Naturhistisches Museum Wien, Wien, AUT);
Mandic, Oleg (Naturhistorisches Museum Wien, Wien, AUT);
Kranner, Matthias (Naturhistorisches Museum Wien, Wien, AUT);
Lukeneder, Petra (Naturhistorisches Museum Wien, Wien, AUT);
Kern, Andrea K. (University of São Paulo, São Paulo, BRA);
Gross, Martin (Universalmuseum Joanneum, Graz, AUT);
Carnevale, Giorgio (Università degli Studi di Torino, Torino, ITA);
Jawecki, Christine (Magistratsabteilung 29, Brückenbau und Grundbau, Wien, AUT)

Sarmatian and Pannonian cores, drilled at the western margin of the Vienna Basin in the City of Vienna, reveal a complex succession of marine and lacustrine depositional environments during the middle-late Miocene transition. Two Sarmatian and two Pannonian Transgressive-Regressive sequences were studied in detail. Identical successions of benthic faunal assemblages and similar patterns in magnetic susceptibility logs allows a correlation of the boreholes over about 3.5 km distance across one of the major marginal faults of the Vienna Basin. For the first time, a distinct and widespread horizon of tubular pyrite aggregates is documented from Lake Pannon deposits. These are explained by sulfate-driven anaerobic oxidation of methane by archaea and sulfate-reducing bacteria during the maximum flooding. Biostratigraphic data combined with rough estimates of sedimentation rates reveal large gaps between the sequences, suggesting that only major transgressions reached this marginal area. In particular, during the Sarmatian-Pannonian transition the basin margin completely emerged and turned into a terrestrial setting for at least 600 ka.

Another hiatus of at least 200 ka separates the two Pannonian sequences. Consequently, the seemingly continuous cores captured relatively short glimpses of geological time. Only careful biostratigraphic and paleoecological analyses of the cores are able to detect these hidden gaps, which may turn into pitfalls for paleomagnetics.

This contribution is part of the project “The Sarmatian/Pannonian Extinction Event within the City of Vienna”, which was supported by the Cultural Department of the City of Vienna and the Commission for Geosciences of the Austrian Academy of Sciences.