Seismic-based lower and middle Miocene stratigraphy in the northwestern Vienna Basin (Austria)

Mathias Harzhauser[1], Dörte Theobalt[1, 2], Philipp Strauss[3], Oleg Mandic[1], Matthias Kranner[1], Werner E. Piller[2]

[1] Geological-Palaeontological Department, Natural History Museum Vienna, Burgring 7, 1010 Vienna, Austria; e-mails: mathias.harzhauser@nhm-wien.ac.at, dtheobalt@gmail.com
[2] Institute of Earth Sciences, University of Graz, NAWI Graz Geocenter, Heinrichstr. 26, 8010 Graz, Austria; e-mail: werner.piller@uni-graz.at
[3] OMV Exploration & Production GmbH, Trabrennstraße 6-8, 1020 Vienna, Austria; e-mail: Philipp.Strauss@omv.com

New high-resolution 3D-seismic data of the OMV-AG reveal spectacular insights into the tectonic setting of the highly structured northwestern Vienna Basin (VB). Strongly tilted lower Miocene strata are separated from middle Miocene formations by a major erosional phase and discordance, including canyon-like features. An integrated approach allows establishing a modern lithostratigraphic scheme for all seismic units. Based on biostratigraphy and correlation with adjacent parts of the VB, these units are discussed in terms of chronostratigraphy and paleogeography. Synsedimentary tectonics is considerably strong during the early Ottnangian and strengthens again during late Karpatian times, when erosive features become widespread. Terminal Karpatian deposits reflect a "pre-Styrian Tectonic Phase".

The overlaying Iváň Formation, a sedimentary infill of the 500-m-deep canyon, can be dated for the first time as early Badenian (Langhian). This canyon cuts into strongly tilted lower Miocene strata and clearly postdates the major tectonic reorganization during the Styrian phase, when the area became terrestrial. Thus, the hiatus between the Karpatian and the onset of marine sedimentation during the Badenian spans about 1 Ma, providing ample time for tilting and major erosion during the Styrian Tectonic Phase.

A second major outcome of the study is the first documentation of evaporites in the Vienna Basin, that had formed during the Badenian Salinity Crises. The corresponding sea level of about 200 m, resulted in a rapid shift from deeper marine depositional environments to coastal and freshwater swamps. This is the first evidence of evaporite precipitation during the Badenian Salinity Crisis in the Vienna Basin.