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Sequence stratigraphy of the North Alpine Foreland Basin: an example from the Early Miocene Hall Formation (Upper Austria)

Patrick Grunert (1), Ralph Hinsch (2), Stjepan Ćorić (3), Ali Soliman (1), Mathias Harzhauser (4), Werner E. Piller (1), and Hanns Sperl (2)

(1) University of Graz, Austria (patrick.grunert@uni-graz.at; ali.soliman@uni-graz.at; werner.piller@uni-graz.at), (2) Rohöl-Aufsuchungs AG, Schwarzenbergplatz 16, A-1015 Vienna, Austria (ralph.hinsch@rohoel.at; hanns.sperl@rohoel.at) , (3) Geological Survey of Austria, Neulinggasse 38, A-1030 Vienna, Austria (stjepan.coric@geologie.ac.at) , (4) Natural History Museum Vienna, Geological-Paleontological Department, Burgring 7, A-1014 Vienna, Austria (mathias.harzhauser@nhm-wien.ac.at)

The regional stratigraphic concept of the Central Paratethys is largely based on the biostratigraphy of benthic, often endemic species thus hampering a precise correlation to the international time scale. Alternative approaches to address this problem like sequence- or cyclostratigraphy have been widely ignored.
The North Alpine Foreland Basin (NAFB) comprises one of the main sedimentation areas of the Central Paratethys from Oligocene to Early Miocene. A project co-funded by the Rohöl-Aufsuchungs AG and the Commission for the Paleontological and Stratigraphical Research of Austria (Austrian Academy of Science) intends to provide a high-resolution analysis for three N-S-oriented wells from the late Oligocene – Early Miocene in the NAFB. Based on the combined information from micropaleontology, geochemistry, well-log data and seismic images the outcome of the project will contribute to an improved age-model for the Central Paratethys as well as it will reveal new insights on the paleoceanographic and paleogeographic setting in the NAFB.
The potential of this integrated approach for a refined stratigraphy is exemplary shown for the Early Miocene Hall Formation. Facies analysis based on benthic foraminiferal communities and geochemical proxies has been applied to the interpretation of seismic images and allows the detailed description of a sedimentary sequence within the Hall Fm. A succession of turbiditic channels, slope environments and a prograding delta can be clearly separated with the microfossil data, representing the systems tracts of the sequence. A time frame of c. 19-20.4Ma (early Burdigalian) and a correlation to the Bur 1 cycle (Abreu and Haddad, 1998) is indicated for the sequence by biostratigraphy (foraminifers, dinoflagellate cysts, calcareous nannoplankton) and cyclostratigraphy (gamma and sonic logs). However, further analysis will be necessary to estimate a potential bias of the revealed sequences by regional Alpine tectonics.

Abreu, V.S., Haddad, G.A., 1998. Glacioeustatic fluctuations: The mechanism linking stable isotope events and sequence stratigraphy from the early Oligocene to middle Miocene. In: Graciansky, C.-P., Hardenbol, J., Jacquin, T., Vail, P.R. (Eds.), Mesozoic and Cenozoic Sequence Stratigraphy of European Basins. SEPM, Special Publications 60, 245–260.