Cyclic paleo-salinity changes inferred from benthic foraminiferal assemblages in the Upper Burdigalian (Lower Miocene) Korneuburg Basin, Austria

Gebhardt, Holger (Geologische Bundesanstalt, Wien, AUT);
Schenk, Bettina (Universität Wien, Wien, AUT);
Wolfgring, Erik (Universität Wien, Wien, AUT);
Zorn, Irene (Geologische Bundesanstalt, Wien, AUT)

The late Burdigalian (Karpatian) Korneuburg Basin gives an excellent insight into the continuous modification of its paleo-environments and paleo-ecology and therefore into its dynamics over geological time scales. The investigated outcrops provided a unique opportunity to study the change of foraminiferal assemblages in an Early Miocene estuarinemarine system as a response to climate (precipitation) oscillations. To this end, we studied foraminiferal assemblages. Ostracods provided additional information. Paleo-salinities were estimated by applying a transfer equation using modern frequency distributions of indicative foraminiferal taxa. This technique is used here for the first time to reconstruct salinity in the past, and may facilitate further studies in shallow water paleo-environments elsewhere. On the basis of the recorded benthic foraminiferal assemblages, their modern distribution, and several diversity indices (Fisher α, Shannon, Dominance, Evenness), we were able to discriminate between five paleo-environments. Paleo-salinity was the most important environmental factor that governed the distribution of taxa in the Korneuburg Basin. Low diverse brackish environments yielded *Ammonia* and *Aubignyna*. Slightly reduced salinity conditions are dominated by Ammonia with additional taxa and are more diverse. Normal marine salinities are indicated by the dominance of *Heterolepa*, *Gyroidinoides*, or *Bulimina* and go along with a more balanced assemblage composition. Hypersaline conditions are characterized by *Cycloforina* and *Ammonia* and an intermediate diversity distribution. Freshwater samples are free of benthic foraminifera. Environmental changes and consequent ecological stress resulted in an overall low-diverse paleo-ecosystem. Salinity variations are interpreted as being caused by freshwater influx into the system. Seventeen combined increases and decreases of paleo-salinity indicate a coupling with obliquity cycles and a linkage to regional climate changes. The estuarine system of the Korneuburg Basin, that lasted over 700,000 years shows distinct effects of the regional climate regimes on the local micro-fauna.