Geophysical Research Abstracts
Vol. 13, EGU2011-1750, 2011
EGU General Assembly 2011

Eustatic control of conodont migration and phytoplankton distribution patterns in the Anisian of the Peri-Tethys Basin

Annette E. Götz
TU Darmstadt, Institute of Applied Geosciences, Darmstadt, Germany (goetz@geo.tu-darmstadt.de)

The Anisian deposits of the central European Peri-Tethys Basin display a characteristic facies diachroneity linked to the eustatic evolution. The basin was bordered by landmasses and open to the Tethyan shelf by three tectonically controlled gates in the south and south-east, known as the East Carpathian, Silesian-Moravian, and Western (Swiss) Gates. The East Carpathian Gate was already active in the Late Induan, the Silesian-Moravian Gate opened in the Olenekian and the westernmost communication to the Tethys developed during the Anisian. The semi-closed situation of the basin and the diachronous communication with the Tethys Ocean resulted in a distinctive facies differentiation between the western and eastern parts of the basin. While in the Silesian and Carpathian domains the Early Anisian is already represented by carbonates, the central and western areas were still dominated by siliciclastic red beds (Röt facies). In the eastern subbasin, open marine sedimentation continued during almost the entire Anisian, while the western part experienced restricted circulation during the Early and Late Anisian.
Two major transgressive and flooding phases in the Bithynian and Pelsonian are marked by conodont migration from the western Tethys Ocean into the peripheral basin. Early highstand deposits are characterized by the highest abundance and species diversity. Marine phytoplankton shows maximum abundance during the flooding events. Laterally, a dominance of different plankton groups within these intervals is documented. In the central part of the basin, prasinophytes reach 80% percent of the total plankton association. Sediments of the basin margin, the gate areas and proximal shelf show high amounts of acritarchs ranging from 76% to 95% percent. These palaeontological data, corresponding to characteristic stable isotope signatures, clearly reflect the basin evolution of the Anisian Peri-Tethys and the interaction between a restricted, intracratonic basin and an open ocean.
Generally, the Peri-Tethys Basin is characterized by a stratified water column with oxygen depleted bottom waters and maximum abundance of prasinophytes. During phases of transgression, cooler waters from the shelf flooded the restricted basin, displayed in the acritarch dominated plankton associations of the shelf and gate areas as well as conodont immigration. Marginal parts of the basin are generally well oxygenated and dominated by acritarchs. During phases of high sea level, these areas display diverse conodont assemblages.