



Depositional sequences and faunal composition and evolution in an ocean-periphery basin: An example of the Middle Triassic Muschelkalk, Central Europe

J. Szulc

Institute of Geological Sciences, Jagiellonian University, Olenadry Str. 2a, Cracow, Poland

Faunal migration between marine basins is one of the most important aspects of palaeobiogeography and biota evolution. The Western Tethys Ocean and its northern peripheral area (Germanic or Muschelkalk Sea), provide an excellent example of biotic exchange between the semiclosed, epicontinental sea and the ocean.

During Middle Triassic, the Muschelkalk basin was intermittently connected with the Tethyan Ocean. Faunal assemblages of the Muschelkalk are composed of both Tethyan and endemic forms

Changes in fauna composition and diversity of the Middle Triassic sequences (Muschelkalk facies) in Upper Silesia, analysed in terms of the Tethyan *vs.* local (endemic) species proportion, indicate tight reliance between the structure of the community and the type of systems tracts. The Tethyan immigrants dominated always in transgressive systems tracts while their contribution decreases substantially in highstand systems tracts. By contrast, the fauna diversity is always much higher during highstand phases than in transgressive intervals.

These phenomena reflect the biota response to ecological pressure. The basic environmental parameters (water depth, energy, light and oxygen supply) changed rapidly during transgression hence the biota could not accommodate to the mutable environmental conditions. In consequence the population became dominated by immigrant elements and impoverished in species number. During the highstand phase the environmental conditions established and the fauna became more diversified and richer in species number. The main mechanism of this enrichment was speciation of local species.

The maximum flooding events are marked by two peculiar phenomena. The first one is the exceptionally great number of Tethyan immigrants (brachiopods, pelecypods, echinoderms, conodonts and dasycladales) which invaded the Germanic area in this time.

The second one, typical for very fast transgression, is the explosive appearance of some groups of organisms, which spread very quickly over the entire basin. For the Muschelkalk the explosive spreading of brachiopods - *Coenothyris vulgaris* and *Coenothyris cycloides* - are very good examples. The rapid transgressions caused an environmental uniformity over vast areas of the basin. This in turn led to the basin-wide biological homogenisation as indicated by similar composition of fauna assemblage in the entire basin.