SAMPLE ABSTRACT

BIOGEOGRAPHY OF SELECTED PALEOZOIC LARGER FORAMINIFERA (FUSULINACEA)

Ursula Leppig, Freiburg University, Germany and Martin Langer, Bonn University, Germany (e-mail: martin.langer@uni-bonn.de)

The Paleozoic fusulinids constitute the earliest and widely diversified group of larger foraminifera as documented in the fossil record of the earth's Phanerozoic history. They arose in the Lower Carboniferous and became extinct at the end of the Permian. They are abundant in shallow-water carbonates of the late Paleozoic Tethys as well as in the western parts of Northern and Southern America. They also occur around the Uralian, in Spitsbergen and Greenland. In many Permian reefal settings larger fusulinid assemblages represent the major carbonate producers at this time and are rock-forming elements that often constitute significant and economically important source rocks for hydrocarbons.

We have compiled occurrence data of selected larger and potentially symbiont-bearing fusulinid foraminifera to analyze their biogeographic distribution in time and space and to examine their latitudinal ranges within the Upper Paleozoic Oceans. The latitudinal ranges of individual taxa are used to infer sea surface temperature (SST) ranges and the heat transfer regulated by the major ocean current regimes. The longitudinal range of taxa is applied as measure for dispersal capabilities as controlled by the prevailing currents and SST patterns. The biogeographic data compiled also allowed us to assess diversity patterns among assemblages of larger fusulinid foraminifera from different localities within the Carboniferous and Permian oceans and to identify hotspots of diversity. To analyze the factors regulating both diversity and biogeographic distribution, the Paleozoic data set is compared to data sets from modern symbiont-bearing foraminifera.

The distributional data for fusulinids compiled generally appear to exhibit three general distribution patterns: (1) global, (2) superregional and (3) regional occurrences of taxa. The primary factors governing their dispersal capabilities and regulating their distribution thus appear to be comparable in both modern and Paleozoic oceans. For modern symbiont-bearing larger foraminifera, sea surface temperatures, size of the available area and the trophic level were considered to be the prime factors controlling diversity and distribution. In comparison, however, larger fusulinid taxa seem to have had a distinctly wider latitudinal distribution thus reflecting a pronounced climate-controlled heat transfer from the poles towards higher latitudes.