

TETHYAN BENTHIC FORAMINIFERA AND TROPHIC REGIMES IN UPPER BATHYAL-TO-ABYSSAL ENVIRONMENTS AT THE END OF THE CRETACEOUS

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ABSTRACT

We quantified the horizontal distribution of Late Cretaceous (late Maastrichtian) benthic foraminifera for 10 upper bathyal-to-abyssal localities, which cover a wide range of environmental settings throughout the Tethyan realm. For the first time, a quantitative faunal study is performed in order to identify and explain the differences between Late Cretaceous benthic foraminiferal faunas from the deep open ocean and from the shallower marginal seas of the Tethys.

The results from correspondence analysis indicate that the main arrangement of the various sites coincides with a paleobathymetric ranking, which we consider to be primarily a reflection of gradients in trophic resources and oxygen levels. Five benthic foraminiferal assemblages were found to characterize bathymetrically and latitudinally different environmental settings within the Tethyan realm: (1) a Marginal Tethyan Assemblage (e.g. large *Cibicidoides* spp. and *Sliteria varsoviensis*) characteristic of the relatively highly fertile environment of the southern Central Tethyan margin, (2) an Abyssal Tethyan Assemblage (e.g. *Aragonia* spp. and *Nuttallides truempyi*) that signifies the more oligotrophic deep open-ocean conditions in the Western Tethys, (3) a Northwestern Tethyan Assemblage containing some high latitude ("boreal") faunal elements (e.g. *Gavelinella pertusa* and *Stensioeina pommerana*) characteristic of the northernmost part of the Western Tethys, (4) a Shallow Bathyal Assemblage (e.g. *Bolivinoidea draco* and *Eouvigerina subsculptura*), which is composed of more or less ubiquitous taxa, and finally, (5) a Deep Bathyal Assemblage (e.g. *Bulimina trinitatensis* and *Gavelinella beccariiformis*), which also has a quite ubiquitous distribution except for the shallow sites of the southern margin of the Central Tethys, where it is virtually absent.

Morphotype analysis of the total fauna reveals distinct differences in proportions of endobenthic and epibenthic morphologies between the various sites, but a clear trend between the deep open ocean and the marginal seas cannot readily be discerned. However, a comparison of the proportions of morphotypes within the five assemblages resulting from correspondence analysis signifies clear trends between the various environmental settings. This enables us to distinguish various trophic regimes within the Tethyan realm; yet, we found no faunal indications of either true oligotrophic or eutrophic settings. We conclude that large areas of the latest Cretaceous bathyal environment of the Tethys were more or less mesotrophic in character, but nevertheless, abundance-patterns of morphogroups within each of the five assemblages were found to reflect depth-related gradients, which in turn are influenced by variations in food availability and oxygen concentrations at the seafloor.