PRESERVATION OF MOLLUSCA IN COPANO BAY, TEXAS. THE LONG-TERM RECORD

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Downcore changes in carbonate content can be produced by varying rates of taphonomy, physical and biological reworking or changes in rates of carbonate addition. Only the latter can be used to investigate changes in carbonate productivity in the living community. Only the latter indicate unequivocal changes in community structure. The stratigraphic, taphonomic and biologic records from two cores in Copano Bay, Texas were analyzed to determine (1) whether variations in shell content with depth were caused by variations in carbonate preservation, carbonate production or sedimentation rate and (2) the extent to which characteristics of fossil assemblages such as species composition, numerical abundance, biomass, and trophic and habitat structure, identified similar or different trends. Below the top few cm of the sedimentary column, variations in carbonate content with depth could be attributed to variations in carbonate production. Most biological attributes varied similarly with depth and, hence, time on both long (≥ 100 yr) and short (~ 10 yr) temporal scales. These variations could not be explained by any taphonomic process, sediment reworking and burial, or sedimentation rate. Despite a vigorous taphonomic milieu, explaining the shell content of Copano Bay sediments requires the preservation of nearly all carbonate produced. Doing so requires the preservation of most of the relatively large-shelled biota (large species and adults) which retain important evidence of changes in the community's history in this area. The results reemphasize the importance of large individuals and biomass in paleontologic reconstruction and suggest that changes in community productivity, which in paleontologic usage, must be carbonate productivity, are preserved in the fossil record in some assemblages. Taphofacies analyses might be used to identify such assemblages.

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