

Contrast in preservation of bivalve death assemblages in siliciclastic and carbonate tropical shelf settings

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ABSTRACT

Determining the selectivities, rates, and key agents of destruction in the post-mortem accumulation of skeletal carbonate is important for understanding the possible bias in the fossil record. This is particularly important for tropical settings, since they are areas of high biodiversity today and in the past. Bivalve death assemblages of the San Blas Archipelago, Caribbean Panama, were collected from ten carbonate and siliciclastic shelf environments, across a range of water depths, sediment compositions, grain sizes, water chemistries, biological communities, and porewater chemistries. Taphonomic signature can differ significantly among environments and individual sites. Shells from reefal carbonates display high levels of encrustation, macroscopic bioerosion, edge rounding, and surface alteration, while those from nonreefal carbonates display microboring, patchy to pervasive chalkiness, and pitting. Shells from siliciclastic sediments display extensive staining, moderate-high patchy surface alteration, occasional encrustation, root etching, and microboring. Patterns of damage in these death assemblages reveal strong differences in taphonomic processes among environments that bear additional testing, in particular contrasts between exposure and burial, carbonate versus siliciclastic, and microstructure and organic content. Death assemblages in siliciclastic sites show moderate-low taphonomic damage, whereas carbonate reefs show high levels of damage, and this contrasts with predictions based on temperate siliciclastics, where seasonal dissolution is intense. The differences observed in taphonomic conditions across the range of environments in this study suggest that the fossil records of these environments should be biased relative to each other.