

**Carbonate facies control on the fidelity of surface-subsurface agreement in benthic foraminiferal assemblages: Implications for index-based paleoecology**

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**ABSTRACT**

Although the field of taphonomy has existed for >70 years, the majority of work has focused on siliciclastic settings at the expense of pure carbonates. The large variety of carbonate sediment types, together with the growing recognition that carbonate platforms are composed of facies mosaics that shift laterally in time and are frequently superimposed in the rock record, raises the question of whether quantitative paleoecological studies focused on the fossil record in carbonate environments are subject to significant biases with successive vertical facies changes. This study combines live-dead and surface-subsurface analyses on communities of benthic foraminifera from four localities around San Salvador Island, Bahamas, that represent a spectrum of energy settings, bioturbation intensity, and local anthropogenic impact, in order to test the fidelity with which community data are translated from life to death assemblage on the surface, and from death assemblage to the subsurface (i.e., subfossil record) in these different facies. Although the live-dead data are inconclusive, surface-subsurface analyses demonstrate that regardless of ambient water energy or local intensity of bioturbation, community indices of dominance, evenness, diversity, and equitability are translated with equivalent and minimal modification into subsurface sediments. In addition, surface-subsurface analyses at one site suggest that surface-subsurface agreement may be lower in sites affected by recent anthropogenic impact. Overall, the results of this study represent strong taphonomic vindication for quantitative paleoecological studies spanning facies changes in the carbonate fossil record.