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Isolated Carbonate Platforms - Lessons Learned from Great Bahama Bank

Studies of carbonate platforms in the Bahamas continue to refine stratigraphic, depositional, and diagenetic models. Stratigraphic insights include understanding how isolated platforms may coalesce through progradation along leeward margins by highstand shedding of bank-top derived sediment. Also, that seismic reflectors in pure carbonate systems have been shown to be the result of lithologic and diagenetic change, and many regionally correlatable seismic sequence boundaries are indeed chronostratigraphic horizons. The failure of platform margins and slopes and subsequent deposition of megabreccias may occur during both lowstands and highstands of sea level.

Lithofacies, which are relatively consistent across platforms, are dependent upon paleogeography and paleoceanography. The role of antecedent topography in initiating development of both reefal and sand bodies is strongly coupled to a windward margin location, and the sedimentary make-up (grain vs. mud dominated) of proximal slope facies is also dependent on the windward/leeward orientation of the margin. In addition, details of the genesis of shallowing upward cycles in different environments, coupled with the realization that unfilled accommodation space is common, adds to our understanding of ancient platform equivalents and suggest limitations inherent to cyclostratigraphic correlation.

Syndepositional marine cementation takes place in shallow subtidal and intertidal environments, but also to much greater depths, suggesting that paradigms associated with slope stabilization and the formation of submarine hardgrounds and seismic reflector horizons need to be revisited. Other recent work has focused on the role of microbial communities in cementation and documenting the presence of ‘meteoric-like’ moldic porosity fabrics in the deep marine phreatic environment.