sents a transition between the bioturbation patterns of the channel and overbank deposits—that is, it results from a transition in the factors that dictate the preservation of biogenic sedimentary structures.

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Cay Sal Bank, Bahamas—A Partially Drowned Carbonate Platform

Recent high resolution seismic profiling, sediment sampling, scuba observations, and Landsat imagery show that Cay Sal Bank (CSB) has very limited reef development, no active sand shoals (ooid or otherwise), few islands, a thin to nonexistent sedimentary cover, and a relatively deep margin (20 to 30 m [66 to 100 ft]) and shelf lagoon system (10 to 20 m [33 to 66 ft]). Windward and leeward margins can be discerned, but their health and general development are poor when compared to the shallower, more active margins of Little Bahama Bank (LBB) and Great Bahama Bank (GBB).

Windward margins (facing north and east) along CSB are generally deep, rocky, sediment barren terraces supporting limited, low relief, relict(?) reefs. Leeward margins do have small sand bodies (maximum thickness 10 m [33 ft]) covering reef structures at the bank edge, indicating the offbank transport of sands has occurred. However, these marginal sand bodies are limited in extent, suggesting that this transport system was not ubiquitous along these south and west facing margins.

Seismic and grab sample data from the deep (200 to 500 m [660 to 1,650 ft]) slopes seaward of the leeward margins show a thin, discontinuous unit of periplatform, shallow-water derived *Halimeda*, molluscan, nonskeletal sands. The limited extent (no deeper than 330 m [1,080 ft]) of this unit, which is easily recognized by its reflection-free seismic facies, also indicates that sand production and transport off the bank were never prolific. This is in stark contrast to new seismic data from the leeward margins of GBB which clearly show thick (20 m [66 ft]) sand bodies covering 12 to 15 m (40 to 50 ft) high reefs along the outer margin and multiple reflection-free units extending to great depths (600 m [2,000 ft]) all along the adjacent slope.

The apparent immature development of normal bank-top processes and facies and the absence of key modern depositional environments on CSB may be related to the rate at which this platform was submerged. Due to its comparatively low elevation, the initial Holocene flooding occurred at approximately 8 to 10 ka when sea-level rise was rapid (6 m/ka [20 ft/ka]). By comparison, the higher LBB/GBB were flooded later at a much slower rate (1.5 m/ka [5 ft/ka]). The relatively rapid flooding of CSB provided little time for the shallow depositional environments to start up. The continued rapid rate of rise after drowning, plus offbank sediment transport and the export of chilled waters (formed during winter), prevented the resulting facies from catching up. Consequently, CSB appears to be partially drowned, particularly when compared to the other, healthier, rimmed Bahamian platforms.

Other investigators have pointed out that drowned carbonate banks are very common in the ancient and that these features potentially provide excellent stratigraphic traps for hydrocarbons. CSB provides us with a modern example of a bank that may be in the very early stages of termination.

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Two Depositional Models for Pliocene Coastal Plain Fluvial Systems, Goliad Formation, South Texas Gulf Coastal Plain

The Goliad Formation consists of four depositional systems—the Realitos and Mathis bed-load fluvial systems in the southwest and the Cuero and Eagle Lake mixed-load fluvial systems in the northeast. Detailed facies analysis indicates that Goliad bed-load and mixed-load fluvial systems represent two contrasting depositional environments.

Five facies are recognized in the Realitos and Mathis bed-load fluvial systems: (1) primary channel-fill facies, (2) chaotic flood channel-fill facies, (3) complex splay facies, (4) flood plain facies, and (5) playa facies. Both channel-fill and splay deposits consist primarily of gravel, sandy gravel, and coarse to medium gravelly sand. Primary channel-fill deposits are characterized by large-scale accretionary foresets and trough cross-beds, localized scour-and-fill structures, and massive beds. Fining upward trends are crudely developed to absent, and no diagnostic vertical sequence of sedimentary textures and structures has been recognized. Chaotic flood channel-fill deposits are characterized by erratic interbedding of coarse and fine units, and of erosional and accretionary features. Individual beds have chaotic or poorly ordered textural profiles, and an absence of well-developed internal structures. Extensive flocks of stacked scour-and-fill structures are common. Complex splay deposits share characteristics of both crevasse and sheet splays.

A model for Realitos-Mathis depositional environments shows arid-climate braided stream complexes with extremely coarse sediment load, highly variable discharge, and marked channel instability. Broad, shallow, straight to slightly sinuous primary channels were flanked by wide flood channels. These acted as part of the flood plain under most conditions, but as channels during high intensity flood flow. Flood channels passed laterally into broad, low-relief flood plains. Small playas occupied topographic lows near large channel axes.

Three facies are recognized in the Cuero and Eagle Lake mixed-load fluvial systems: (1) channel-fill facies, (2) crevasse splay facies, and (3) flood plain facies. Channel-fill deposits consist of coarse to medium sand and gravelly sand, with a variety of large- and intermediate-scale sedimentary structures. Small-scale structures are common in finer grained beds. Fining-upward sequences are moderately well developed and commonly stacked. Crevasse splay deposits consist of medium to fine sand and silt, with abundant small-scale sedimentary structures.

A model for Cuero–Eagle Lake depositional environments shows coarse-grained meander belts in a semi-arid climate. Slightly to moderately sinuous meandering streams were flanked by low, poorly developed natural levees. Crevasse splays were common, but tended to be broad and ill-defined. Extensive, low-relief flood plains occupied interaxial areas.

While a number of models for coarse-grained meander belts exist in the literature, there are few models for arid-climate, gravel-rich braided stream complexes. These systems are likely to be characterized by extreme hydrodynamic complexity, which will be reflected in the resultant sedimentary package. The model proposed for the Realitos and Mathis fluvial systems may aid in recognition of analogous ancient depositional systems. In addition, since facies characteristics exercise broad controls on Goliad uranium mineralization, the proposed depositional models aid in defining target zones for Goliad uranium exploration.

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Carbonate and Siliciclastic Deposits on Slope and Abyssal Floor