

STRATIGRAPHIC SEQUENCE DEVELOPMENT IN HIGH SEDIMENT SUPPLY, HIGH ACCOMODATION SPACE BASINS

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ABSTRACT

Stratigraphic sequence development in any basin is a function of three interacting variables; sea level, subsidence, and sediment supply. In the Columbus Basin, high sediment supplies in the Cenozoic (>3 meters/1000 years) contribute to subsidence and influence relative sea level. Accomodation space is generated in abundance by: (1) subsidence withdrawal of substrate; (2) growth fault development; and (3) large magnitude eustatic sea level rises. Accomodation space is focused near shelf-break depocenters and shelf-to-basin, transition-zone slopes are steepened by tectonically-induced subsidence.

The overall stratigraphic record of the Columbus Basin, Trinidad is characterized by prograding and aggrading sequences which are largely a product of unforced regression. Bypass shorefaces develop only as a result of filled accomodation space on the shelf and are associated with slope and basin fan development. Times of high sediment supply and accomodation space generation are characterized by thick, aggradational stratigraphic sequences, narrow facies belts, and limited shoreline translation during sea level change. Times of low sediment supply and accomodation space generation are characterized by thin stratigraphic sequences, wide facies belts and shoreline translation over long distances in response to relative sea level change.

Explorationists must consider the implications of high sediment volumes on timing and amount of deep water sedimentation, diachronous or sparse fauna assemblages, seal and reservoir quality and thickness. In addition, traditional biostratigraphic approaches to chronostratigraphy are often hampered by incredible expansion of section limiting the resolution of time markers, lack of good planktonic foraminiferal time markers and limited marine incursion across the basin.