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THE IMPORTANT ROLE OF CARBONATES IN THE STRATIGRAPHIC ARCHITECTURE OF LATE PLEISTOCENE-MODERN MAHAKAM RIVER DELTA-BUILDING CYCLES

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ABSTRACT

Glacioeustatic cycles of the Late Pleistocene modulate accommodation space for delta building. The stratigraphic architecture of the shelf indicates that vertical stacking of deltaic deposits is responsible for shelf edge accretion during periods of falling-to-low sea level. Distinct depocenters are definable in seismic data sets for the regressive deposits of each sea level cycle. These depocenters shift positions between cycles. Trangressive deposits that separate cycles are dominated to carbonate buildups in the form of individual mounds and pinnacles plus fused mounds that form sizable carbonate platforms. They establish themselves on the truncated clinoforms of abandoned, lowstand deltas and their associated horizontal-to-subhorizontal delta plain stratal units. Carbonate buildups, dating from shelf flooding following the last glacial maximum, range from inner shelf mounds (to 25m relief) with a high terrigenous mud content to shelf edge pinnacles (to 80m relief) that are composed almost entirely of biogenic carbonates. The former and to some extent the latter buildups are composed largerly of aragonitic flakes from the calcareous green alga *Halimeda*. In inner and middle shelf buildups (biotherms), *Halimeda* flakes are in a foram-rich terrigenous mud matrix. Mud content decreases toward the shelf edge. As the Holocene highstand delta progrades, delta front sediments bury once viable bioherms. High resolution seismic profiles (>3000 line km) indicate that clinoforms from both highstand and falling-to-lowstand deltas downlap and encase carbonate buildups as they prograde toward the shelf edge. Delta switching and lowstand progradation provides sea floor topography on which bioherms develop during transgressive and highstand times. Widespread occurrence of *Halimeda* is attributed to flooding of the shelf with nutrient-rich Pacific intermediate water flowing through the Makassar Strait and forced on-shelf largerly by interval waves. Biohermal buildups of *Halimeda*-rich sediments are important components of both modern and Late Pleistocene delta-building cycles. Stratigraphic/sedimentary architecture of the shelf over which the modern Mahakam delta is prograding provides an excellent example of the interplay between terrigenous and carbonate sedimentary systems that have been modulated by high frequency changes in sea level.

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