

HOLOCENE REEF DEVELOPMENT AT SALT RIVER SUBMARINE CANYON, ST. CROIX, USVI

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Eleven reef cores were taken in water depths of 1m - 30m at Salt River submarine canyon on the north shore of St. Croix, U.S.V.I. Four of the cores were drilled vertically into both deep and shallow reefs surrounding the canyon head. Eight horizontal cores were drilled into the steeply sloping canyon walls.

The deep-reef fabric consists of alternating coral framework (primarily Montastrea annularis and Acropora palmata) and open or sediment-filled voids up to 2m across. This pattern is related to the complex system of channels, caverns and overhangs common in this steep reef face. The development of present-day reefs as well as the styles of framework within the cores can be explained by the east-to-west sediment movement in this Trade-Winds dominated area.

The horizontal cores show a surprising lateral accumulation of Holocene reefal material. Core SR-5 from 30m of water indicates at least 25m of lateral Holocene accretion since 9600 ybp (rate = 2.6m/1000 yrs). Lateral accretion

rates at Salt River averaged over 1m/1000 yrs (range = 0.8 - 2.6). The water depth, the turbidity of the canyon environment and the orientation of the cores would all seem to preclude such accretion. The surprisingly high rates at Salt River are largely the result of down-faulted reef blocks causing numerous repetitions of section.

These rates become even greater if we consider that the cores show numerous periods of inactivity throughout the development of the Salt River reefs. Furthermore, the deep reefs within the canyon have become progressively more inactive since about 4500 ybp. Vertical cores through the barrier reef separating the canyon from adjacent Salt River bay indicate that this deterioration of the canyon reefs may be linked to the formation of the estuary as the barrier reefs enclosed it.