Tidal successions of the wave-dominated Baram Delta Complex, Brunei

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The Baram Delta complex of northwest Borneo has long been regarded as a wavedominated delta succession. However, recent outcrop and subsurface studies in Brunei indicate that in some areas more than half of the sandstones were deposited by tidal currents in shallow water environments. The strata often consist of repeated, coarseningupward successions of lagoonal shales which grade upward through mixed tidal flat sandstones and mudstones into flood and ebb tidal delta sandstones. A sharp contact between a sandstone and an overlying shale marks the top of each succession; the upper surface of the sandstone often is heavily burrowed with an ichnofacies indicative of a lagoonal to shallow marine environment.

The stacked successions of coarsening-upward lithologies capped by what could easily be interpreted as flooding surfaces strongly suggest a series of progradational units separated by marine flooding events. This is especially true when successions that are below seismic resolution are interpreted from wireline logs. However, the facies transitions indicate exactly the opposite; the lagoon-tidal flat-flood tidal delta-ebb tidal delta succession is one of transgression. Each succession is terminated by an abrupt landward facies shift from ebb tidal delta sandstones to lagoonal shales.

Modern analogues for the various tidal successions occur on the Brunei coast amid a variety of tidal environments that are contemporaneous with the active wave-dominated Baram Delta. Structural segmentation of the margin results in differential subsidence and controls sediment supply; these processes interact with eustatic sea-level changes to generate repetitive shoreline geometries that accumulate tidal sediments, thereby accounting for the abundant tidal successions.

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