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Sequence Stratigraphy of a Linked Shelf to Basin Floor System, Pleistocene, North Kutei Basin, East Kalimantan, Indonesia

The upper Pleistocene was studied from shelf to basin floor with 3-D seismic data north of the Mahakam delta, offshore East Kalimantan. The last three shelfal cycles (10-370 ka) are defined by progradational packages separated by parallel reflectors. These are interpreted as falling-stage systems tracts (FSST) separated by transgressive systems tracts. During the third Pleistocene lowstand (270 ka), a lowstand delta prograded over the underlying shelf margin, and coarse sediment spilled downslope to a basin-floor fan. Deep-water strata extend downslope from the basinward clinofolds of the FSST without onlap, thus demonstrating the linkage between shelf and deep-water sedimentation. Growth faults and regional subsidence prevented coarse sediments from reaching the slope during the last two lowstands of sea level. Transgressive surfaces are the most robust horizons for regional correlation.

The modern slope contains canyons, ridges, mud waves, and toe-thrust anticlines. Most canyons are straight and were shaped by deep-marine processes. One canyon has a sinuous morphology and connects a lowstand delta to a basin-floor fan. The canyon fill has two parts: (1) a lower high-amplitude part inferred to be sand-rich, and (2) an upper low-amplitude channel-levee complex inferred to be shale-rich.

Similarly, the basin floor fan contains a lower part with high-amplitude, continuous reflectors (interpreted as sand-rich lobes), and an upper part with an aggrading channel-levee complex. The levees are apparently shale-dominated, while some channel-fills are apparently sand-rich. The channel-levee complex prograded over the lower fan and fed an additional high-amplitude (sand-rich?) lobe.