Depositional Processes and Predicted Stratigraphic Development of the Modern Mahakam Delta

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The Mahakam Delta covers an area of about 2700 km2 and has a lobate morphology. The delta plain is dissected by numerous channels which some are continuous to the subaqueous delta plain and reach the delta front break slope. Sand covers the bottom of the channels from the delta apex but does not extend to the channel mouths. The sand gradually fines seaward and sand and mud couplets are common. Sand also occurs as elongate intertidal bars that are perpendicular to the shoreline and attached to the lower delta plain. Mud dominates the offshore, estuaries and the distal reaches of the channels.

Hydrodynamic measurements indicate that fluvial processes dominate the upper reaches of the channels, while tides are the most important process in the lower reaches of channels and the estuaries. Waves have a significant influence on the southern coastline, where they slightly modify the geometry of intertidal sand bars. The delta is presently subsiding and being transgressed and modified by marine processes. Fluvially-supplied sand is being stored onshore in the distributaries and is not reaching the shoreline.

Overall the predicted stratigraphic succession in the modern Mahakam Delta is retrogradational. In the upper reaches of distributaries, river-dominated fluvial sand fines upward into tide-influenced fluvial sand. In the lower reaches of distributaries, tide-dominated channel sand fines upward into estuarine mud. Offshore in the submerged lower delta plain, the exposed intertidal sands are reworked by waves and tides and covered by the marine mud.