

Sediment Facies of Amazon Fan Architectural Elements Revealed By Drilling on ODP Leg 155

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Amazon Fan is typical of "mud rich" deep-sea fans and was the first modern fan to be systematically drilled and continuously cored by the Ocean Drilling Program. Leg 155 recovered >4 km of sediment from 31 holes at 17 drill sites that encompass all major architectural fan elements including: (1) levee/overbank deposits, (2) channel-fill deposits (HAR units), (3) depositional-lobe and crevasse-splay deposits (HARP units), and (d) regional mass-transport deposits. The levee or overbank deposits are constructed of color-banded mud with laminae and thin beds of graded silt. In contrast, sediments in the axis of the youngest channel (HARs) are predominantly thick-bedded, coarse facies. The coarsest and thickest sand beds occur in the thick (>100 m), laterally extensive HARP units at the bases of individual channel-levee systems, and in lower-fan deposits, which presumably represent coalescing depositional lobes (i.e. HARPs) on the lower fan. Wire-line logs and Formation MicroScanner™ (FMS) images allowed interpretation of ~400 m of poorly recovered coarse-grained sediments from HARPs. The thick, regionally extensive mass-transport deposits are mainly chaotic muddy facies indicative of slumps and debris flows. Individual channel-levee systems aggraded at very rapid rates (~150m per 5000 yrs) during glacio-eustatic lowstands and early rise, and entire levee complexes were formed during a single glacial/interglacial period (~100 ka). In contrast, Holocene and previous glacio-eustatic highstands caused the entire fan to become temporarily inactive for short periods (~10 k.a.). Drilling on Amazon Fan demonstrates that some elements of so called "mud-rich" submarine fans can contain extensive coarse deposits, which should provide excellent reservoir potential.