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General morphology and sediment patterns in tidal inlets

Miles O. Hayes

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Abstract

Tidal inlet sediments make up a significant portion of most barrier island complexes. Inlet-affiliated sedimentary units usually include an ebb-tidal delta (seaward shoal), a flood-tidal delta (landward shoal) and inlet-fill sequences created by inlet migration and recurved spit growth.

The morphological components of ebb-tidal deltas include a main ebb channel flanked by linear bars on either side and a terminal sand lobe at the seaward end. This channel is bordered by a platform of sand dominated by swash bars which is separated from adjacent barrier beaches by marginal flood channels. The ebb-delta sand body is coarser-grained than other sedimentary units of the inlet and contains polymodal cross-bedding with a slight ebb dominance.

Flood-tidal deltas consist of a flood ramp and bifurcating flood channels o the seaward side, which are dominated by flood currents and flood-oriented sand waves, and ebb

shields, ebb spits and spillover lobes on the landward side, which contain an abundance of ebb-oriented bedforms. A proposed stratigraphic sequence for a typical flood-tidal delta contains bidirectional, large-scale crossbedded sand at the base, predominantly large-scale (flood-oriented) crossbedded sand in the middle, and finer-grained tidal flat and marsh sediment at the top.

Inlets migrate at rates that vary from a few to several tens of meters per year, depending upon such variables as rate of longshore sediment transport and depth of the inlet. Inlet-fill sequences, which fine upward, contain coarse, bidirectional crossbedded sediments at the base, polydirectional crossbedded sands in the middle, and finer-grained aeolian sand at the top.

Both tidal-delta morphology and relative size and abundance of ebb- and flood-tidal deltas are considerably different in different oceanographic settings. Microtidal (tidal range T.R. = 0â€“2 m) areas tend to have smaller ebb-tidal deltas and larger flood-tidal deltas; whereas, mesotidal (T.R. = 2â€“4 m) areas show just the opposite trend. Large waves tend to inhibit the development of ebb-tidal deltas and accentuate the growth of flood-tidal deltas.

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