Deltas are formed primarily by the action of a river (Barrell, 1912; Moore and Asquith, 1971; Bhattacharya and Walker, 1992). Variations in the proportion of wave, tide and river influence are thought to be the primary control on the delta morphology and facies organization (Wright and Coleman, 1973; Galloway, 1975). Recent work of modern deltas have recognized that many deltas exhibit a variety of morphologies and facies formed due to the mixing of variable proportion of river-, wave- and tide processes, and longshore drift (Bhattacharya and Walker, 1992; Galloway and Hobday, 1996; Bhattacharya and Giosan, 2003). The mixture of delta types between and within discrete lobes manifests these variations. Deltas may also change from river-, wave- and tide-dominated phases in time, with changes in relative sea level, sedimentation rates and tectonics (Boyd et al., 1989; Bhattacharya and Walker, 1992; Dalrymple 1992). Wave influenced deltas are characterized by facies and morphologic asymmetries between the updrift and the downdrift sides of the delta (Bhattacharya and Giosan, 2003). Plan view of such deltas shows asymmetric distribution of environment and facies; the updrift side comprise of sandy strandplain deposit with the sand being derived from long-strike transport of older lowstand shelf sands, while the downdrift segment is constructed from immature, river derived sediment of both mud and sand. They form barrier islands and back-barrier lagoons and bays (Dominguez et al., 1987; Dominguez, 1996).

The Pahang delta on the East coast of Peninsula Malaysia is an excellent example of modern, wave-influenced delta. Abdul Hadi and Mohamad Sakran (2004) describe the morphology and sediment dispersal trends along the Kuala Pahang coast. This paper attempts to analyze and discuss further the morphology, sedimentary processes and facies distribution, and the ongoing sedimentation trends of Pahang delta. This study is based on the analysis of topographic maps and aerial photographs (available for the last 30 years), field investigations and laboratory analysis of sediment samples collected along the Kuala Pahang coast, and analysis of recent satellite images of Kuala Pahang (1988-2000).

The Pahang Delta, the rivermouth of the longest river in Peninsula Malaysia (Pahang River), forms an assymetric deltaic cone at Kuala Pahang, on the east coast of Peninsular Malaysia (Figure 1, 2 & 3). The coastline between Tanjung Gosong-Kuala Pahang-Sungai Miang constitutes the central, most active part of the modern day Pahang delta. The coastline can be geomorphologically separated into : i) a northern, updrift sandy linear beach and strandplain complex, ii) a central river-mouth area at Kuala Pahang, and iii) a southern downdrift, well-vegetated micro-tidal, barrier-lagoon complex. The northern coast forms a broad strand plain consisting of multiple, beach ridges constructed from fine-grained, well-sorted and negatively skewed sand. Analyses of sequential topographic maps and aerial photographs shows that this wave-dominated beach forms an accreting coastline, receiving sand from river-mouths in the north and south, and reworking of shelf sediments. At Kuala Pahang, well-developed and extensive mid-channel, river mouth bars are of fine-to-coarse, moderately-sorted sand. The bars are progressively shifted seaward and drifted southward. The river-mouth area forms a transitory depositional basin for sediments from the Pahang River. Downdrift of the rivermouth, mud
and sand drifted southward from the rivermouth formed several micro-tidal barrier-spit and lagoons complexes. The tide-influenced coast is an accreting beachfront, with mature barrier beaches and elongated lagoons. The sand here are moderate-to-poorly sorted.

Three images of the Pahang coastline were acquired from MACRES; these images are from the year 1988, 1995 and 2000 (Fig. 3). Comparison of these images for the Pahang delta coastline from the year 1988, 1995 and 2000 clearly shows that the accretion and southward transport of sediment, which was also detected from the analysis of sequential topographic maps and aerial photos, is continuing. The most active site of accretion and transport is from the river mouth area at Pulau Syed Hassan, and at Tanjong Agas to Sungai Miang. These sites are clearly marked by the development of southward drifting sand spits. These images indicate that the delta is prograding in the southeastward direction via longshore drift, and in the north by the interaction of wave accretion and longshore transportation of sediments.

REFERENCES


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LIST OF FIGURES

Figure 1  Geological map of the Pahang coastal plain, on the east coast of Peninsular Malaysia.

Figure 2  A map of Pahang Delta, showing: i) a northern, updrift sandy linear beach and strandplain complex, ii) a central river-mouth area at Kuala Pahang, and iii) a southern downdrift, well-vegetated micro-tidal, barrier-lagoon complex.

Figure 3  Three satellite images of the Pahang coastline acquired from MACRES. These images are from the year i)1988, ii)1995 and iii)2000.