

The Holocene monsoonal storm Pahang River Delta Complex, the Malay Peninsula: Behaviour in space and in time

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The Holocene Pahang River Delta Complex is situated approximately mid-point on the east coast of the Malay Peninsula, Malaysia, and progrades eastward into the monsoonal storm-dominated South China Sea. Current studies and the present day active lobe indicate that the delta complex may be a unique type, jointly and variably influenced and controlled by seasonal coarse-grained fluvial input, mesotidal reorientation of bars, and wave and longshore current redistribution of sediments, and is building out semi-cuspately into a tropical

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sea dominated by seasonal storms and waves. It seems not to fit into the classification of Galloway (1975) or Orton & Reading (1993).

Aerial photographs and satellite imagery studies indicate that the Pahang Delta Complex as a whole has been shifting its course and locus of deposition at least twice. The present day lobe progrades eastwards. Prior to this, it prograded northeastward and now almost abandoned, leaving an estuarine river mouth. Before this, it prograded southeastwards, now totally abandoned, with its delta plain area undergoing subsidence, and its river mouth undetectable.

Sediment supply into the Pahang sedimentary basin comes from a drainage basin of about 25,000 sq km, flowing for a distance of about 300 km long from the west. Water discharge and river flow are not uniform annually. Maximum discharge and swiftest flow are during the Northeast Monsoon, blowing from November to January. During the Southwest Monsoon from May to July, discharge is minimum and flow is at its slowest.

Sediments come from the weathering of Permian schists, phyllite, quartzite and limestone, middle Triassic tuffaceous shales, sandstones and conglomerates and volcanoclastics, late Triassic granitoids, and Jurassic-Cretaceous coarse-grained sandstones, shales and conglomerates, with the latter two being the dominant source rocks. They form side and mid channel bars along the upper reaches, side and point bars along the middle course, and coarse-grained fluvial braid bars along the lowermost course, and the tidal bars, coarse-grained spits and river mouth bars around the river mouth.

Tidal range is 1.5 m to 2.5 m, i.e. mesotidal. Tidal surge is detected some 10 km upstream. The high tidal range and appreciable tidal surge, realign the coarse-grained braid bars.

Strong Northeast Monsoon storms, which blow during the months of November to January, graze over the South China Sea, and generate waves with amplitude up to 2.5 m high, propagating southwesterly against the east coast of the Malay Peninsula, striking at right angles along the coast immediately north of the Pahang River mouth, translating into a weak northwesterly long shore drift, but striking the coast immediately south of the Pahang River mouth at angles of about 40° to 50°, thus generating strong longshore current southerly along the middle part of the east coast of the Peninsula. Prevalent longshore current, especially along the northern and southern parts of the east coast of the Peninsula, is northwesterly.

The marine regimes leave the north coastline of the Pahang Delta rather stable. The river mouth areas, river mouth bars and the southern coastline are however, very dynamic, undergoing deposition and erosion in response to the seasonal change in wind, wave and longshore current strength and directions.

Process model of the Pahang Delta Complex is being worked out.

Drilling data indicated the bedrock to range from 130 m to as shallow as 40 m along the coast. Bedrock crop out about 80 km inland. The valley seems to be structurally controlled.
