

ZONAL ARRANGEMENT OF PEBBLE FABRICS IN A LITTORAL ENVIRONMENT

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Pulau Nyiur Setali is an islet on the southeastern margin of the Langkawi island group, Peninsular Malaysia. The islet is less than 20 m high and consists of well-foliated phyllite. In the littoral zone, fragments of phyllite have been abraded into disks with rounded edges (Fig. 1). The shore on the west side of the islet facing Pulau Tuba consists of a low sand berm followed seaward by three parallel zones where pebble arrangements are completely different. The zones are parallel to the shoreline. The reigning high tide level is marked by an accumulation of flotsam (twigs, leaves, mollusc shells, and some garbage). This situation was observed in early May 1982. The base of the sand berm is interpreted to mark the highest high tide level, or more probably the upper limit of wave action. Strong waves are apparently generated when wind blows from the northwest where the fetch is widest for the west side of Pulau Nyiur Setali.

On the 8 to 10 degrees, seaward sloping foreshore, the three zones of different pebble fabric are as follows. The upper zone is approximately 4 metres wide, disk-shaped pebbles are closely packed and imbrication is inclined toward land. The longer axes of somewhat elongate pebbles are generally parallel to the shoreline. Then follows a 1.5 m wide zone where similar pebbles are also packed but exhibit haphazard arrangement. There is no systematic imbrication and long pebble axes do not display preferred orientation. The lowest zone is more than 5 m wide; pebbles occur in clusters among sand. The imbricated disks are inclined down the beach and preferred orientation of the longer pebble axes is again parallel to the shoreline.

The pebble fabric of the upper zone was controlled by currents related to backwash down the beach. The exclusively planar fabric of the intermediate zone reflects turbulent conditions during high tide near the land-sea boundary. The fabric of the lowest zone indicates the influence of landward currents. On many occasions I have observed that a rising tide is accompanied by waves breaking forcefully onto the beach. In comparison receding tides are characterized by smoother sea surfaces. It seems most probable that the imbrication of the lower most zone developed by landward currents during rising tide, while currents associated with receding tide are too weak to disturb this arrangement.

These pebble fabrics are obviously relevant to studies of palaeogeography and palaeocurrents.

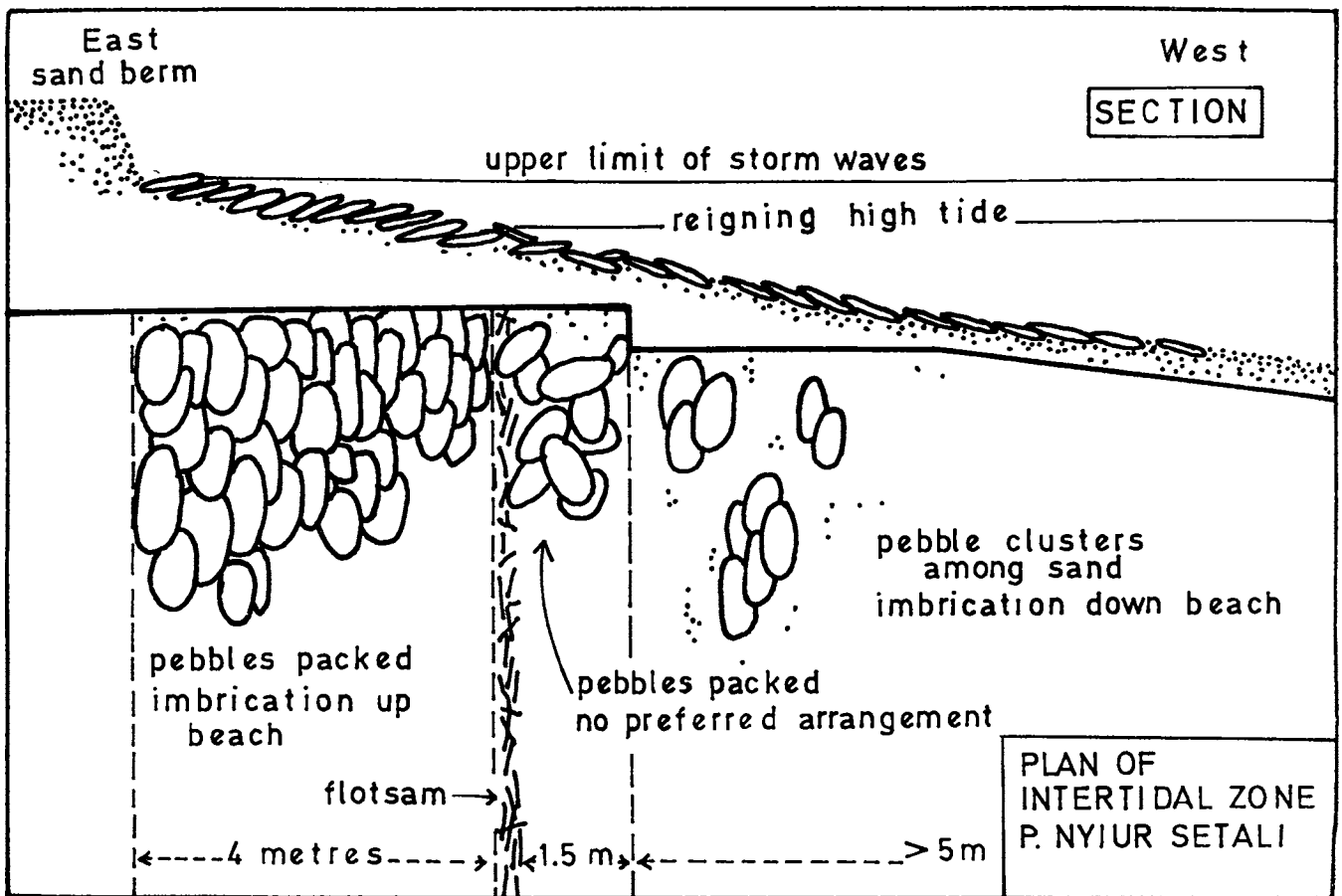


Fig. 1. The upper part is a vertical section and the lower part is a map showing pebble arrangements in the littoral zone of Pulau Nyiur Setali.

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