

# Preface

The Thakuran River is one of the many highly seasonal and tidal rivers flowing along the south coast of West Bengal, eastern India. The river is tidal for its entire 80 km length from north to south. The channel is sinuous to meandering having connections with many salt water courses. In the strict sense, the Thakuran River, like many other so-called rivers, viz. the Saptamukhi and the Matla, is a large tidal creek in this low-lying coastal plain. It has no perennial freshwater source. The river is the result of tidal incursion and retreat. It drains through the recent alluvial sediments of the Bengal Basin and flows more or less parallel to the Hugli River in the west and Matla in the east. The Thakuran has a funnel-shaped estuary at its mouth having a width of approximately 8 km. During the dry season, the river regime is controlled by tidal water, whereas during rains, the headwater discharge has a strong influence over the river regime. Much of the estuarine plain is inundated by floodwater during wet seasons, but during dry seasons, the estuarine plains are completely dried up and even register evidence of desiccation with salt encrustation. During dry times, the tidal flows accumulate in the river channels. Discontinuous stretches of mangrove forests fringe the river.

The Thakuran River is truly a major tidal creek in the low-lying, tropical coastal plains of the Ganges–Brahmaputra delta. It is fed by to-and-fro moving flood and ebb flows without any headwater supply. Geomorphologically defined areas such as mid-channel bars or flood-tidal delta, the river mouth bar or ebb-tidal delta, point bars, swash platforms, wash-over flats, and riverbanks have been identified. These areas are delineated based on studies of their physical sedimentary structures, bioturbation structures, and granulometric properties.

The Thakuran is totally a tide-influenced creek in which the process of sediment movement is accomplished by bidirectional tidal flows and wind-induced waves. The luxuriant mangrove forests here belong to a tide-dominated setting. The macrotidal mangrove-fringed creeks and estuaries are typically funnel-shaped, and the wide-opening of the Thakuran River at the seaface is no exception to this rule. The width of this water course, on the other hand, decreases exponentially with increasing distance from the seaface.

Tidal marshes of the Thakuran Basin are characterised by natural halophytic vegetation and dwarf mangrove bushes in the upper intertidal to supratidal regions, which are important for understanding the hydrodynamics of marsh sedimentation and the role of vegetation as sediment baffles. They specify different environmental zones marginal to the creek. The mangrove swamps marginal to the river basin migrate with tidal rhythms and perform a vital role in binding the intertidal sediments. Both marsh and swamp vegetation play a major role in sediment baffling and accretion.

Depositional features typical of a tidal environment such as mud couplets, tidal bedding, and tidal bundles have been recognised. Both ebb-flood and neap-spring cycles have been established from the preserved physical sedimentary structures. A general increase in the thickness of cross-bedded and laminated sets with an increase of tidal amplitude has been observed. Macrobenthic animals include various species of gastropods, pelecypods, crustaceans, polychaetes, and fishes. They play a vital role in the formation of several surface and internal bioturbation structures which can be further used for identifying specific geomorphic zones. Supratidal and intertidal depositional features of the Thakuran River have been clearly separated. Mineral suits including both light and heavy fractions have been examined to infer the acidic igneous and metamorphic provenance. The assemblage of heavy minerals refers to a major Himalayan source derivation of the sediments together with contributions from the Precambrian terrains and Pleistocene terraces. It is expected that the findings of this study would be a potential contribution in the field of tidal sedimentation of the depositional environment of estuarine and coastal Sundarbans of eastern India.

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Tidal Sedimentation of the Sunderban's Thakuran Basin

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2017, XVII, 151 p. 77 illus., 38 illus. in color., Hardcover

ISBN: 978-3-319-44190-0