Facies model and paleoenvironmental analysis of sandy braided Brahmaputra-Jamuna River, Banglades

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Brahmaputra-Jamuna, the newly developed sandy braided fluvial system of the world, branched off Old Brahmaputra at Bahadurabad met to Ganges at Aricha. Over the last 200 years, remarkable changes have undergone on the geomorphological and sedimentological aspects of the river reach. A comprehensive study has been carried out to build the mutual relationship among the geomorphological elements and their sedimentary facies at the lower part of Brahmaputra-Jamuna river. From Landsat TM imagery the major morphological elements of the Jamuna River recognized are channels (major, secondary and abandoned), mid-channel bars, sandflats, and well developed vegetative islands and flood plains. Mid-channel bars are relatively stable, diamond shaped and becoming wider due to lateral expansion. They are frequently shown as erosional remnants and linear to flow direction. Bedforms are dominated by dunes and megaripples. The bottom part of the major channel and secondary channel deposits are marked by the development of facies with large scale sedimentary structures in medium to coarse-grained sand (Sh, Sp, Sl, St). Mid-channel bar comprises large sets of planar tabular cross-bedding (Sp) and horizontal stratified sand (Sh). Whereas sandflats are mostly composed of small scale planar tabular sets, with some parallel lamination (Sl), trough cross-bedding (St), and ripple cross-lamination (Sr). Facies with small-scale sedimentary structures, comprising fine-grained sand, silt and mud (Fl, Fc, Sm, Fm, Fcs) are observed in abandoned channel and overbank deposits. The upper part of active channel and somewhere the basal part of abandoned channel deposits show the development of facies with medium-grained sand. The trough cross-bed facies units indicate unidirectional dune migration downchannel. The large scale planar tabular sets, associated with the trough cross-bedded facies, indicate the paleo-flow divergence, suggesting the lateral movement of in-channel transverse bars. Whereas the smaller planar tabular sets occur topographically higher part, and the ripple silts and mud over that indicate the vertical accretion in the fluvial system. The depositional model in the section shows the fining upward sequence including the thickness of individual unit and the scale of cross-bed sets in vertical stratigraphic unit as well as lateral distribution of facies associations. Moreover, the depositional environment of this modern Brahmaputra-Jamuna fluvial system is also influenced by the fluctuation of climate and tectonic activities over the past 200 years.