



## **Deltaic Depositional Systems, Evolution Characteristics, and Petroleum Potential, Palaeogene Sub-Basin, South China Sea**

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Deltaic depositional systems are detailed characterized by morphology and facies in a Palaeogene continental sub-basin of Beibuwan Basin, South China Sea. Based on examination of 435 m of conventional cores from 30 wells, three major types of deltaic facies have been recognized: delta, beach and shoreface. Morphology and facies asymmetry between the down-drift and the up-drift sides present a typical asymmetric delta system: 1) the down-rift, sourced primarily by the feeding river, are influenced by mixed river and wave processes. Deposits on this side are muddy and consist of barrier, bar, bay-fill, and bayhead delta facies with variable bioturbation intensity; 2) the up-rift, in contrast, is sourced by a second sediment source and typically consists of laterally continuous sandy beach and shoreface facies. Finally, two fundamentally different depositional models are established and reflect a different style of sequence stratigraphic patterns: 1) Multiple-stage faults slopes developed in the down-rift side feed fine grained sediment into two stages channelized front deltaic system; 2) Flexure slope break of the up-rift side, combining with deeper gradual slopes, conversely, feed coarser grained sediment from larger drainages into sandy beach and shoreface systems. Such a distinction has well explained the differentiation of the proven hydrocarbon reserves because the up-rift consists of well-sorted, mature, and laterally continuous homogeneous beach-shoreface reservoirs, whereas the down-rift, in contrast, is muddier and consists of less continuous, less mature, heterolithic reservoirs. The Delta asymmetry concepts and models don't only challenge the traditional definition of deltas in Fushan sub-basin, but also provides strong theoretical support for the future exploration. This process-based model may be applicable to many deep-water settings and provides a framework within which to interpret the stratigraphic and spatial distribution of these complex deposits.