Southwest Mekong delta: the last piece of the delta evolution pazzle and its implications to recent shoreline erosion

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The Mekong delta, one of the largest deltas in the world, attracts increasing concerns about the coastal stability affected by the human-induced decrease in sediment supply. Serious erosion has been reported in the coast outlining the southwestern part of the delta, from the mouth of the Bassac River, through Bac Lieu and Camau Point, to Gulf of Thailand, where only muddy sediments are supplied by the southwestward longshore drift from the distributaries in the northeastern part. Little is known about the long-term coastal evolution of the southwest Mekong delta disproportionately to its large area (up to 40 % of the lower delta plain) as the effort has been focused on the distributary region. Here we report seven radiocarbon dated sediment cores and twenty optically-luminescence stimulated dates of beach ridges and intertidal mud flat deposits to constrain the position of shorelines at 2.4 ka, 1.4 ka, and 0.6 ka in the southwest Mekong delta. These shorelines have a similar shape with the modern shoreline and show the delta growth toward the SSW. The rate of the delta plain increment is estimated as 2 km^2/y from 2.4 to 1.4 ka, 6 km^2/y from 1.4 to 0.6 ka, and 8 km^2/y from 0.6 ka to the present, respectively, which is much more significant than that in the distributary area, 0.5–2 km^2/y. The increase in the rate after 1.4 ka may be related to the increased precipitation in the catchment as the palaeoenvironment reconstruction in Tibetan suggests a drier period of the weakened Indian summer monsoon during 2.4–1.4 ka. After 0.6 ka, the updrift part of the coast, from the Bassac River to Bac Lieu, has not prograded much, and the sediment accumulation has been concentrated around the Ca Mau Point, suggesting the increased exposure to the longshore drift in relation to the overall delta progradation. The accumulation trend after 0.6 ka also highlights the uniqueness of the modern shoreline that has been retreated almost entirely.

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