



2500 years of changing shoreline accretion rates at the mouths of the Mekong River delta

Manon Besset (1), Toru Tamura (2), Edward Anthony (1), Guillaume Brunier (1), Yoshiki Saito (2), Philippe Dussouillez (1), Van Lap Nguyen (3), and Oahn Ta (3)

(1) Aix-Marseille University, CEREGE - OSU PYTHEAS, Aix en Provence cedex 4, France (besset@cerege.fr), (2) Institute of Geology and Geoinformation, Geological Survey of Japan (GSJ), AIST, Central 7, Higashi 1-1-1, Tsukuba, Ibaraki, 305-8567, Japan (toru.tamura@aist.go.jp), (3) HCMC Institute of Resources Geography (HCMCIRG) Vietnam Academy of Science and Technology (VAST) 01, Mac Dinh Chi Str., Dist. 01, HoChiMinh City, Vietnam (Nguy ̣n V ̣n Lp (nvlap@hcmig.vast.vn)

The Mekong River delta prograded rapidly in a relatively sheltered bight in the South China Sea under the influence of high fluvial sediment supply 5300 to 3500 years ago, developing from an estuary into a delta. This >200 km seaward growth resulted in increasing exposure of the delta to ocean waves that led to a more wave-influenced mode of progradation characterized by the construction of numerous sets of beach ridges in the eastern sector of the delta, which shows a system of multiple distributary mouths. The growth pattern of this river-mouth sector over the last 2500 years has been determined from OSL dating of these beach-ridge deposits, while the most up-to-date trends (1950-2014) have been highlighted from the analysis of maps and satellite images. The OSL ages show that the area of the delta in the mouths sector remained nearly constant till about 500 yr BP, following which significant accretion occurred, possibly in response to changes in catchment land-use and monsoon rainfall and attendant river water and sediment discharge. A fine-tuned analysis of changes since 1950 shows dominant but fluctuating accretion, with two periods of erosion. The first (1965-1973) occurred in the course of the second Indochina war, and the second more recently from 2003 to 2011, followed by mild recovery between 2011 and 2014. These fluctuations most likely reflect changes in sediment supply caused by the vicissitudes of war and its effect on vegetation cover, as well as variations in monsoon rainfall and discharge, and, for the most recent period, massive sand mining in the river and deltaic channels. Accretion of the mouths sector has gone apace, over the same recent multi-decadal period, with large-scale erosion of the muddy shores of the delta in the western South China Sea and the Gulf of Thailand, thus suggesting that the mouths sector may be increasingly sequestering sediment to the detriment of the rest of the delta shoreline. The accretion in the mouths sector is likely to be further impacted in the coming years by large-scale channel bed sand mining and by sediment trapping by recent dams in China. The overall current status of the entire Mekong delta shoreline, dominated by land loss, highlights increasing vulnerability to perturbations in sediment supply driven by human activities over the last few decades.