

## Natural levees and human settlement in the Song Hong (Red River) delta, Northern Vietnam

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The Song Hong (Red River) delta, northern Vietnam, is characterized by huge natural levees in an area of the delta plain known as the West Floodplain where fluvial sedimentation predominates. The natural levees along the Day River, a major distributary of the Song Hong, are larger than those of the main course of the Song Hong. The Day River levees are 3.8 km wide and rise 3.5 m above the adjacent backswamps and have played an important role in human settlements since the late Metal age. We reconstructed the Holocene evolution of the Day River levees to determine their relationship to Holocene sea-level change, delta progradation, and the distribution of archaeological sites on the delta plain. During the early Holocene, the accumulation of sediment discharged by the Song Hong enhanced both aggradation of the levees and river mouth progradation within the drowned valley of the Song Hong. Radiocarbon dates from cores, trench exposures, and archaeological sites record a dramatic slowing of aggradation when sea level stabilized during 6.4 cal kyr BP (the Holocene sea-level highstand). As sea level fell to the present level during 4.0 cal kyr BP, the river mouth prograded rapidly toward the Gulf of Bac Bo (Gulf of Tonkin) and the river channels extended seaward. In the West Floodplain, lateral accretion overtook vertical accretion to generate the present longitudinal profiles of the Song Hong and Day rivers. During this period, human settlements spread across the backswamp and Holocene terrace area, lagging around 2 kyr behind the shoreline migration.

Keywords: accumulation rate, archaeological sites, delta, natural levees, sea-level change