

Geomorphic evolution of Liangzhu area since the Last Deglaciation and its influence on Liangzhu civilization

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Deltas, as critical areas for the development of economy, culture and agriculture, are very environmentally vulnerable, thus being regarded as the key areas for Man-land relationship research. The Yangtze Delta, one of the most important Neolithic culture areas in China, developed thousands of archaeological sites during the Holocene. Early human activities here were largely affected by landscape evolution, which was ultimately governed by Holocene sea level changes. Therefore, high-precision reconstruction of regional sea-level changes and geomorphological evolution are important for understanding the complicated relationship between the Neolithic human activities and the environment in this region. The framework of the regional sedimentary system since the Last Deglaciation was established through experiment analyzing AMS¹⁴C dating, XRF scanning, and microfossils samples from more than twenty high-quality sediment cores retrieved from Yangtze Delta. More evidence from lithostratigraphy, geochemistry of element, grain size and micropaleontology of the cores from Liangzhu archaeological site and the surrounding area, provides significant constraints for the geomorphic evolution of Liangzhu area since the Last Deglaciation: (1) the Liangzhu area was above sea level before 10.0 ka, with braided rivers developed in the piedmont region. (2) From ca. 10.0 ka to 7.6 ka, transgression reached this area. Sea level rose rapidly from 9.0 ka to 8.0 ka, then it rose at a lower rate after that time, reaching to -3 ~ -4 m at ca. 7.6 ka. (3) Post-7.6 ka, sea level has been rising slowly (no higher than present sea-level). The land emerged from under seawater with the coastline retreat persistently during this period because the accumulation rate of sediments exceeded the rate of sea-level rise in this area. Since then, this region intermittently accumulated some marine sediments brought by storm surges and the tidal bores until 5.0 ka, when the coastline move eastward away from this area. The growth of delta shielded the Liangzhu area from the influence from marine, which provided the necessary material basis for Liangzhu people to settle down and developing agriculture.