

# Stratigraphic Development During the Late Pleistocene and Holocene in the Offshore Area of the Yellow River Delta, Bohai Sea

## *Abstract*

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A 61 m-long sediment core (HB-1) and 700 km of high-resolution seismic profiles from the offshore area of the Yellow River Delta were analyzed to document the sedimentary stratigraphy during the late Pleistocene and Holocene in the shallow-sea area off the Yellow River mouth in the Bohai Sea. AMS<sup>14</sup>C datings and analyses of benthic foraminifera, ostracod and sedimentary characteristics were performed for core HB-1, and the seismic reflection data have been interpreted relative to the sedimentological data of the core. Six seismic units are identified as follows in descending order: the deposits of modern Yellow River delta (Unit 1, formed since 1855), the post-glacial transgressive deposits (Unit 2), the last glacial deposits (Unit 3) including fluvial-channel infills and flood-plain or lacustrine deposits, and the deposits defined as Unit 4, Unit 5 and Unit 6 corresponding respectively to oxygen isotope stage 3, 4 and 5. The Unit 4 is characterized by a distinct mid-reflector with excellent lateral continuity and fluctuations in relief more than 20 m, which coincides with the boundary at 40.45 m in core HB-1. The sedimentological data in the core indicate that the boundary represents a subaerially exposed surface and that the sedimentary environments evolved from shallow sea in the lower part of Unit 4 to the tidal flat in the section just the boundary and to the alternating tidal flat and coastal marsh after the boundary. The mid-reflector, therefore, is interpreted to be indicative of a short-term sea-level fluctuation during oxygen isotope stage 3. The Unit 1, thinning seaward in general, comprises up to three superimposed wedges of the Yellow River Delta which are separated by erosional surfaces, consistent with the multiple shifts of the river mouth during the past ~150 years. Below the Unit 1 occur a number of synsedimentary growth faults in the whole sea area and a large-scale synsedimentary deformation in the southeastern part, suggesting a significant influence of regional structure activity on the stratigraphic development.

*Keywords:* Late Pleistocene-Holocene; sedimentary stratigraphy; sedimentation; sea-level changes; Yellow River delta; Bohai Sea