

The core-recorded sedimentary environments since the late Quaternary, South Yellow Sea coast to inner shelf and adjacent Yangtze Delta regions, eastern China

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The South Yellow Sea is a semi-enclosed epicontinental sea between China to the west and Korea Peninsula to the east. Since the late Quaternary, the South Yellow Sea has experienced several eustatic sea-level changes, together with source material supplied differentially from paleo-Yellow River to the north and paleo-Yangtze River to the south. Previous work has not documented the sedimentary successions and sedimentary environments since the late Quaternary. Many boreholes were drilled by different research sectors of China in the study areas. This study aims to: 1) report the depositional facies and radiocarbon ages of several cores obtained from the study areas; 2) reconstruct the long term evolution of sedimentary environment since the late Quaternary; 3) evaluate the driving forces controlling the formation of the whole strata since the late Quaternary.

Five sedimentary units in a descending order from lower to upper part have been distinguished based on the assemblage of sedimentary facies and major erosional surfaces. Unit 5 (not penetrated completely) is mainly composed of fluvial point bar coarse sands with minor granule component and overbanking silty clay. Superimposed fining-up successions can be easily recognized from the unit. The unit has been constrained as deposited during MIS5 according to regional core correlation and OSL datings. Unit 4 consists of tidal influenced fluvial deposits in the lower part to prodelta in the middle and delta front in the upper part composing a complete transgression to regression cycle. The unit 4 was dated as deposited as MIS5 according to OSL datings. Unit 3 is mainly composed of delta front deposits displayed as silty clay and silt interlayered bands. Fluid mud was observed in this unit further proof the facies interpretation. The unit 3 was constrained as deposited during MIS3 according to AMS ¹⁴C and OSL datings. The unit 2 was not observed from all cores, but remains as a fluvial point bar deposits within paleo-Yangtze valley and overbanking silty clay or clayey silt beyond the paleo-valley, the latter converted to paleo-soil (Chinese researchers call it stiff clay and usually thought of deposited in MIS2). The unit 1 has of great partitioning characteristics. It deposited as intertidal and subtidal flat superimposed by tidal sandy ridge in the South Yellow Sea coast and by deltaic deposits in the abandoned Yellow River delta to the north. A post glacial infilling succession (tidal influenced river in the lower, estuary in the middle and deltaic deposits in the upper part) has characterized the unit in the present Yangtze River delta regions.

The core-recorded strata have revealed deltaic successions deposited to the north of the South Yellow Sea and the adjacent Yangtze River delta regions during the MIS 5 and MIS 3 separately. The source province indicates the deltaic successions to the north were attributed to paleo-Yellow River and the ones to the south were attributed to paleo-Yangtze River. The sandy-mud couplets frequently contained in all cores also indicate a tidal dominated environment controlling the study areas throughout the late Quaternary. Sea-level cycles, source material changes and differential subsidence are main driving forces for the late Quaternary successions.

Keywords: deltaic successions, fluid mud, driving forces, South Yellow Sea