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# Stratigraphy of late Quaternary deposits using high resolution seismic profile in the southeastern Yellow Sea

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ABSTRACT

High-resolution (Chirp and Sparker system) seismic profiles were analyzed to investigate the sequence stratigraphy of late Quaternary deposits in the southeastern Yellow Sea. Approximately 1560 line-km data of chirp and sparker profiles were acquired, together with 11 piston cores. Two previous long drill cores (YSDP-102 and 103) were used for comparison with seismic data. High-resolution seismic profiles image the Holocene mud deposits and the complex sedimentary structure in this area. Sequence analysis of high-resolution seismic profiles reveals that the shelf deposits form a succession of high-frequency (five-order) sequences consisting of one depositional sequence developed during the late Quaternary. The depositional sequence includes five sedimentary units, each with different seismic facies and geometry: (1) incised channel fill and lowstand deltaic wedge (unit SY1), (2) sand ridges (unit SY2), (3) estuarine/deltaic mud (unit SY3), (4) redeposited mud (unit SY4), and (5) recent distal mud (unit SY5). Based on the interpretation of high-resolution seismic records and correlation with the YSDP-102, 103 long cores and piston cores, late Quaternary deposits in the southeastern Yellow Sea consists of a set of the lowstand (unit SY1), early transgressive (unit SY2), middle transgressive (unit SY3), late transgressive (unit SY4), and highstand systems tract (unit SY5) formed since the last-glacial period. The rather unusual stratigraphic architecture including three systems tracts is largely controlled by the postglacial sea-level changes and regionally circulation pattern associated with sediment erosion and redeposition. The results of this study present firstly clear seismic evidence that the southeastern Yellow Sea mud belt (SEYSM) can be divided into three stratigraphic units (units SY3, SY4, and SY5) bounded by distinct bounding surfaces.

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## 1. Introduction

Sea-level change during the late Quaternary is one of the most important factors affecting the present-day geological records on continental shelf. This factor controls the deposition of onshore coastal plains, adjacent shelf deposits organized into terraces, and marine depositional sequences, respectively (Vail, 1987; Posamentier et al., 1988; Trincardi et al., 1994; Cattaneo and Trincardi, 1999; Tesson et al., 2000). Since the Yellow Sea has been tectonically stable, flat, and shallow (<100 m water depth) (Fig. 1), sea-level change has played an important role in the process of deposition of geological formations. Shelf deposits associated with sea-level change have been extensively studied over the world, using high-resolution seismic profiles and sediment data (Boyd et al., 1989; Ercilla et al., 1994; Trincardi et al., 1994; Tortora, 1996; Saito, 1998; Cattaneo and Trincardi, 1999; Tesson et al., 2000; Yoo and Park, 2000; Berné et al., 2002), on the basis of the framework of sequence stratigraphic concepts (e.g. Vail, 1987; Posamentier et al., 1988). Advanced high-resolution seismic data of the modern epicontinental seas help understanding the depositional processes and strata patterns of late Quaternary sediments that reflect high-frequency eustatic fluctuations in the sea-level (Trincardi and Field, 1991).

The southeastern Yellow Sea has a complex and dynamic hydraulic regime in terms of sediment erosion and deposition attributed to eustatic sea-level fluctuations during the late Quaternary glacial cycles, associated with the large tidal ranges and strong tidal currents along the west coast of Korea (Song et al., 1983; Lee and Chough, 1989; Milliman et al., 1989; Adams et al., 1990; Alexander et al., 1991; Wells and Park, 1992; Saito et al.,

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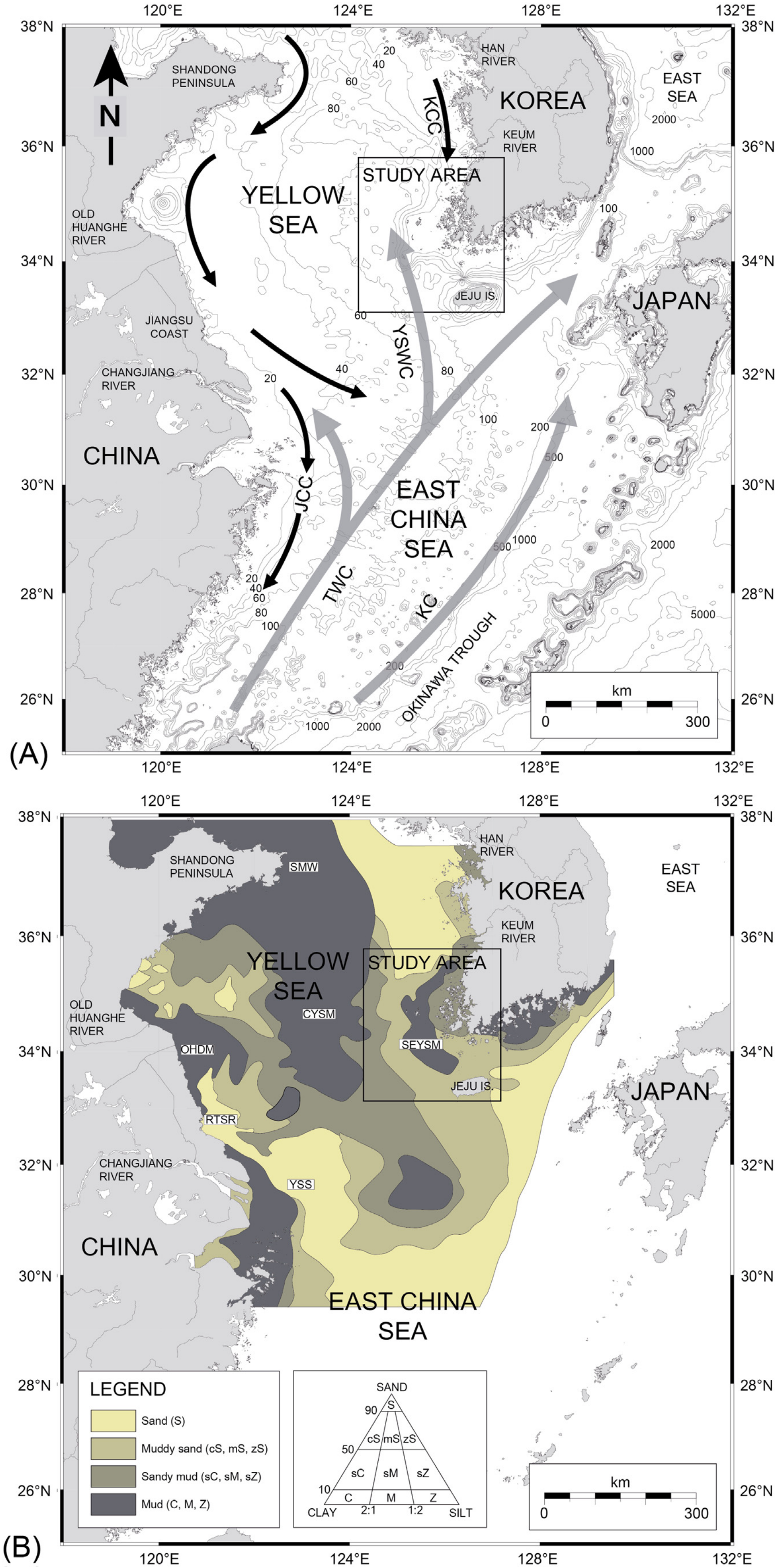
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JAPAN
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YSS
CHINA
EAST CHINA SEA
LEGEND
Sand (S)
Muddy sand (cS, mS, zS)
Sandy mud (sC, sM, sZ)
Mud (C, M, Z)
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S
50
cS
mS
zS
sC
sM
sZ
10
C
M
Z
CLAY
2:1
1:2
SILT
km
0
300

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