The Korean Journal of Quaternary Research
Vol. 17, No. 2, p. 165 (2003)

Paleoenvironmental Changes in the Northern East China Sea and the Yellow Sea During the Last 60 ka

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ABSTRACT

A borehole core ECSDP-102 (about 68.5 m long) has been investigated to get information on paleoenvironmental changes in response to the sea-level fluctuations during the period of late Quaternary. Several AMS ^{14}C ages show that the core ECSDP-102 recorded the depositional environments of the northern East China Sea for approximately 60 ka. The Yangtze River discharged huge amounts of sediment into the northern East China Sea during the marine isotope stage (MIS) 3. In particular, δ^{13}Corg values reveal that the sedimentary environments of the northern East China Sea, which is similar to the Holocene conditions, have taken place three times during the MIS 3. It is supported by the relatively enriched δ^{13}Corg values of -23 to -21‰ during the marine settings of MIS 3 that are characterized by the predominance of marine organic matter akin to the Holocene.

Furthermore, we investigated the three Holocene sediment cores, ECSDP-101, ECSDP-101 and YMGR-102, taken from the northern East China Sea off the mouth of the Yangtze River and from the southern Yellow Sea, respectively.

Our study was focused primarily on the onset of the post-glacial marine transgression and the reconstructing of paleoenvironmental changes in the East China Sea and the Yellow Sea during the Holocene. AMS ^{14}C ages indicate that the northern East China Sea and the southern Yellow Sea began to have been flooded at about 13.2 ka BP which is in agreement with the initial marine transgression of the central Yellow Sea (core CC-02). $\delta^{18}O$ and $\delta^{13}C$ records of benthic foraminifera Ammonia ketienziensis and δ^{13}Corg values provide information on paleoenvironmental changes from brackish (estuarine) to modern marine conditions caused by globally rapid sea-level rise since the last deglaciation. Termination 1 (T1) ended at about 9.0-8.7 ka BP in the southern and central Yellow Sea, whereas T1 lasted until about 6.8 ka BP in the northern East China Sea. This time lag between the two seas indicates that the timing of the post-glacial marine transgression seems to have been primarily influenced by the bathymetry. The present marine regimes in the northern East China Sea and the whole Yellow Sea have been contemporaneously established at about 6.0 ka BP. This is strongly supported by remarkably changes in occurrence of benthic foraminiferal assemblages, $\delta^{18}O$ and $\delta^{13}C$ compositions of *A. ketienziensis*, TOC content and δ^{13}Corg values. The $\delta^{18}O$ values of *A. ketienziensis* show a distinct shift to heavier values of about 1‰ from the northern East China Sea through the southern to central Yellow Sea. The northward shift of ^{18}O enrichment may reflect gradually decrease of the bottom water temperature in the northern East China Sea and the Yellow Sea.

Keywords: East China Sea, Yellow Sea, MIS 3, post- glacial marine transgression, Ammonia ketienziensis, stable oxygen and carbon isotopes, paleoenvironmental changes