

Holocene evolution of the Outer Lake of the Hwajinpo Lagoon on the Eastern Coast of Korea: Environmental changes with Holocene sea-level fluctuation of East sea (Sea of Japan)

[동해안 화진포 외호의 홀로세 동안의 진화 : 동해의 해수면 변동과 관련된 환경변화]

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Abstract

The Holocene sequence of the Outer Lake of the Hwajinpo Lagoon displays six sediment types within which the preservation of lithologic and geochemical data and fossil are highly variable. Its evolution has been reconstructed using a range of these environmental proxies with chronological provided by seven AMS radiocarbon dates. Grain size analysis, water content analysis, and soft X-ray analysis from the core of outer coastal lakes (HJ99) were used to reconstruct sedimentary environments, as were total organic carbon, C/N, S and C/S chemical records. Assemblage of mollusc remains also provided paleoenvironmental information. The environmental changes of the Outer Lake of the Hwajinpo Lagoon can be divided into seven different depositional facies. The basin of the Outer Lake of the Hwajinpo was exposed and took weathering process before the Holocene period. Muddy sand layer on the weathered

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bedrock indicated an estuarine system about 6,000 14C yr BP. Laminated layer implies the stagnant lagoonal system in oxygen poor condition between 5,500~2,800 14C yr BP. Marl layer implies the relatively oxic lagoonal condition with mollusk presence about 2,500 14C yr BP. The layer of very low sulfur content indicates a fresh water lake system isolated by the sand barrier about 1,700 14C yr BP. Beginning about 1,000 14C yr BP, the river delta deposits progress progradation on the marl layer. Two erosional landforms (benches of ~0.8 m and ~1.6 m above mean sea level) could be related with high standing sea level span during the Holocene. These environmental changes are considered mainly due to the lake/sea level fluctuation. Highstand sea levels by transgression are appeared about at 5,700 14C yr BP, and 2,200 14C yr BP.

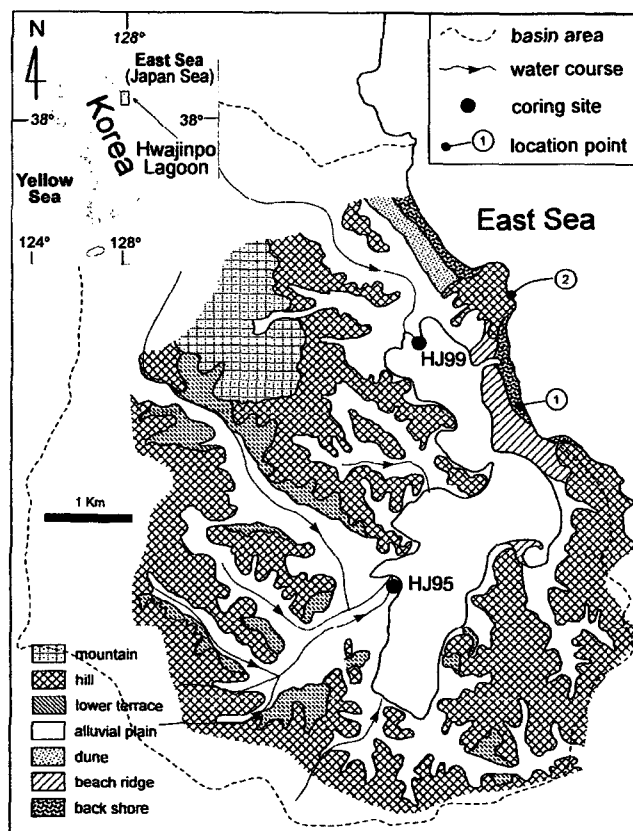


Fig. 1 Geomorphic map and drainage basin of the Hwajinpo Lagoon; the largest stream, Chungphyon-river has about 10 m wide near the river mouth; Number of circle indicate the location of measured erosional landforms in Fig. 2

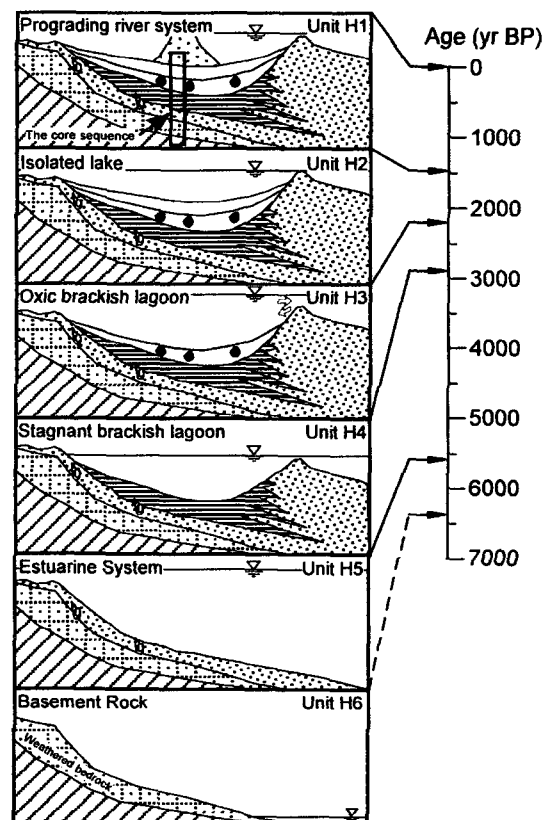


Fig. 9 The conceptual evolution model of the Outer Lake of the Hwajinpo Lagoon. The ages are estimated from 14C age dating on the hypothesis of a constant sedimentation rate; the sea-level changes are presented on a relative scale; *core sequence: the upper most part of the core covered with deltaic sand deposits (Unit H1). left side connected to the Inner Lake and right side connected to the sea side.