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Changes in benthic foraminiferal assemblage following an abrupt sea level rise after the LGM

Jae Ung Choi (1), Han Jun Woo (2), Jeongwon Kang (3), Chan Mi Park (4), and Dhongil Lim (5)

(1) Korea Institute of Ocean Science & Technology, 385 Haeyang-ro, Busan 49111, Republic of Korea (jaeung@kiost.ac.kr), (2) Korea Institute of Ocean Science & Technology, 385 Haeyang-ro, Busan 49111, Republic of Korea (hjwoo@kiost.ac.kr), (3) Korea Institute of Ocean Science & Technology, 385 Haeyang-ro, Busan 49111, Republic of Korea (jwkhang7@kiost.ac.kr), (4) Korea Institute of Ocean Science & Technology, 385 Haeyang-ro, Busan 49111, Republic of Korea (cm3827@kiost.ac.kr), (5) South Sea Research Institute, Korea Institute of Ocean Science & Technology, Geoje 53201, Republic of Korea (oceanlim@kiost.ac.kr)

The Yellow Sea, located between Korea and China, is a flat continental basin with a current depth of about 150m. This depth is corresponding with the height of sea level rise since the last glacial maximum (LGM). This makes the Yellow Sea ideal for studying changes in a marine environment in response to rising sea levels. To better understand how sea level rise has changed the paleo marine environment of the Yellow Sea, we analyzed piston core samples from three depths (EZ02-20, depth 110 m; EZ04-10, depth: 47 m; EZ-06-16, depth: 70 m) to determine changes in benthic foraminiferal assemblages relative to depth. Our radiocarbon analysis showed that sediment deposited since the LGM ranged from 25,000 y BP (deepest sediments) to 2,000 y BP (shallowest sediments). Using Q-mode cluster analysis on benthic foraminiferal assemblages identified in the cores, we determined that assemblages of the cores segregated into two types: Cluster I located at the upper (more recent) portion of the cores and Cluster II located in the lower (older) segment of the cores. Cluster I exhibited low number of species and abundances, with Ammonia beccarii and Elphidium clavatum dominating the assemblage. In contrast, Cluster II displayed high number of species and abundances, with Bolivina robusta and Pseudorotalia gaimardii dominating. Unexpectedly, the faunal succession from Cluster II to Cluster I in all cores changed abruptly sometime between about 14,000 and 11,000 y BP. The sea revel rise since LGM has not been sustained. Specifically, there were two relatively rapid rise in sea level about 14,000 and 11,000 y BP. It is commonly accepted that MWP-1B occurred after MWP-1A. Prior to the initial rise in sea level following the LGM, we speculate that the Yellow Sea would have been a brackish or intertidal environment because A. beccarii and E. clavatum dominated the sediments. Because R. robusta and P. gaimardii dominated sediments in the area of the Yellow Sea after about 14,000 y BP, we speculate that sea level rose rapidly (MWP-1A and 1B) and changed to a continental shelf environment. We conclude that the dramatic faunal succession revealed by our cores was due to an abrupt sea level rise that occurred after the LGM.