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TITLE: Deep-sea ostracod faunal dynamics in a marginal sea: biotic response to oxygen variability and mid-Pleistocene global changes

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ABSTRACT:

Abstract Deep-sea benthic ostracod assemblages covering the last 2 Myr were investigated in Integrated Ocean Drilling Program Site U1426 (at 903 m water depth) in the southern Sea of Japan. Results show that (1) orbital-scale faunal variability has been influenced by eustatic sea-level fluctuations and oxygen variability and (2) secular-scale faunal transitions are likely associated with the mid-Brunhes event (MBE, ~0.43 Ma) and the onset of the Tsushima Warm Current (TWC, ~1.7 Ma). Krithe , Robertsonites , and Acanthocythereis are the three most abundant genera throughout the core, accounting for 78.5% of total specimens. Multiple-regression tree analysis indicated that the TWC, the MBE, and oxygen content are the significant controlling factors of ostracod dominance. Changes in assemblages exhibit decline and recovery patterns corresponding to orbital-scale cyclicity of sea-level changes. In the Sea of Japan marginal ocean setting, this cyclicity shows a close relationship with bottom-water oxygen variability since the onset of the TWC influx. The MBE amplified the influence of the TWC and oxygen variability to the deep-sea ecosystem through larger sea-level fluctuations. Acanthocythereis dunelmensis , a circumpolar species, dominates before the TWC onset. After the TWC onset and during the mid-Pleistocene transition (MPT, ~1.2?0.7 Ma) Krithe spp., known for their low-oxygen tolerance, substantially increase under moderate oxygen depletion. At the end of the MPT, Krithe dominance diminishes and is replaced by Robertsonites hanaii and Propontocypris spp. after the MBE. The post-MBE assemblage, characterized by R. hanaii , suggests a slightly warmer environment under the development of the TWC. In addition, the post-MBE high-amplitude climate system may have caused the increased abundance of active-swimming Propontocypris spp. due to their superior migration ability. Benthic ecosystems in marginal seas are sensitive and vulnerable to both short- and long-term climatic changes, and the MBE is suggested to be a global biotic event affecting benthic ecosystems substantially.

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