

Plio-Pleistocene sea-level changes in Canterbury Basin, off New Zealand based on fossil ostracode assemblages

Megumi Nakamura^{1*}, KUSUNOKI, Satoko¹, YAMADA, Katsura², HOYANAGI, Koichi²

¹Graduate School of Science & Technology, Shinshu Univ., ²Faculty of Science, Shinshu Univ.

High-resolution analysis of fossil ostracode assemblages was examined to clarify detailed sea-level change during the late Pliocene and early Pleistocene in IODP (Integrated Ocean Drilling Program) sites U1353 (85 m water depth), U1354 (113 m) and U1351 (122 m), which are located on the continental shelf of Canterbury Basin, off New Zealand. Forty, eighty and nineteen samples from Plio-Pleistocene strata of U1353, U1354 and U1351 were chosen respectively. In addition, the samples from core top in each shelf site and a slope site (344 m water depth) were also used to reveal recent ostracode assemblages in the study area. At least, 178 ostracode species belonging to 70 genera were identified, and many of them inhabit in the recent continental shelf around New Zealand (e.g. Swanson, 1979). We examined 103 samples containing more than 40 ostracode specimens and 78 taxa which occupied more than 3.5% of total relative abundance in any samples for Q-mode factor analysis. As a result, first six varimax factors explained 69.3% of total variance and their factors were interpreted as follows: Factor 1, inner-middle shelf (40-80 m); Factor 2, middle-outer shelf (80-200 m); Factor 3, middle-outer shelf (50-180 m); Factor 4, middle-outer shelf (75-125 m); Factor 5, lagoon/estuary and inner shelf(0-50 m); and Factor 6, outer shelf (ca. 200 m). Vertical paleobathymetric shifts were reconstructed based on Q-mode factor analysis and lithofacies. At least, seven, fourteen and three transgressive-regressive cycles with the amplitude of ca. 25-115 m water depth were recognized in U1353, U1354 and U1351, respectively. These paleobathymetric changes can be correlated with the LR04 stack curve (Lisiecki & Raymo, 2005) based on the frequency of cycles, the datum of trustworthy microfossil bioevents and unconformities. Thus, some high-stand and low-stand periods might coincide with MIS M2, G10, G10-7, G6-4, G3, G2, G1, 104, 103, 102, 101, 100, 99, 63, 62, 61, 60, 59, 43, 42, 41 and 40. In this study area, these paleobathymetric changes were strongly influenced by sea-level fluctuations because the rates of sediment accumulation and basin subsidence were nearly equal and they canceled each other.

Keywords: IODP Exp.317, Ostracode assemblage, Plio-Pleistocene, New Zealand, Sea-level change