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Paleoenvironments of the Plio-Pleistocene strata in Canterbury Basin based on fossil ostracode assemblages

NAKAMURA, Megumi[1*], Satoko Kusunoki[1], Katsura Ishida[1], Kouichi Hoyanagi[1]

[1]Department of Geology, Shinshu University, Japan

Integrated Ocean Drilling Program (IODP) Expedition 317 was devoted to understanding the relative importance of global sea-level (eustasy) versus local tectonic and sedimentary processes in controlling continental margin sedimentary cycles. Drilling in the Canterbury Basin, off the South Island of New Zealand, takes advantage of Plio-Pleistocene samples, which preserves a high-frequency (0.1?0.5 m.y.) record of depositional cyclicity. The Pliocene and Pleistocene periods are characterized by cyclic sea-level changes induced by glacial and inter-glacial climatic shifts. Numerous investigations found cyclic sea-level changes caused by glacio-eustasy from the Plio-Pleistocene sequences. However, it is little known vertical and temporal changes of the paleodepth corresponding to glacial and interglacial cycles through long-term periods of the Plio-Pleistocene. The object of this study is to reveal Plio-Pleistocene sea-level changes and their vertical and temporal distributions on the continental shelf of Canterbury Basin. We used the samples which were collected in sites U1354 (water depth 113.4 m) and U1353 (water depth 84.7 m) on the continental shelf. Samples less than 20 cc were freeze-dried and washed through a 63 micrometer opening sieve. The residues were dried and then divided into aliquot parts containing around 200 specimens using a sample splitter. As a result, 116 fossil ostracode species belonging to 48 genera and 136 species belonging to 57 genera were identified from 81 samples of U1354 and from 40 samples of U1353, respectively. Q-mode factor analysis was proceeded by using total 81 samples of U1354 and 29 samples of U1353. The vertical changes of varimax factor loadings indicate that at least thirteen and eight transgressive-regressive cycles were recorded in sediments of U1354 (3.3 to 0.5 Ma) and U1353 (3.7 to 1.5 Ma), respectively. , Total seventeen transgressive-regressive cycles were recognized between 3.7 to 0.5 Ma due to comparison of both cores based on the biostratigraphy The amplitude of paleodepth changes and the cycles of about 40.000 year reveal that some cycles were induced by glacio-eustasy. In addition, four high stand periods could be compared with MIS G7, G1, 61, and 59.