

CCD variation in the Japan Sea in response to glacial-interglacial cycle

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It is known that CCD (calcium carbonate compensation depth) has varied significantly in the Japan Sea (Kitazato 1984, Lee et al. 2000). However, Kitazato (1984) studied the time interval only after LGM and he discussed the variation of CCD in the Japan Sea only qualitatively based on preservation of foraminiferal shell. On the other hand, Lee et al. (2000) reconstructed the variation of CCD in the Japan Sea on tectonic scale based on the calcium carbonate content and dominance of calcareous benthic foraminifers within total benthic foraminifers. However, possibility that surface production of calcium carbonate was low cannot be excluded since there was no data from shallower depth to be compared. Moreover, his data do not have enough time-resolution to reconstruct the variation of CCD in response to glacial-interglacial cycles. Thus, there has been no study which reconstructed the variation of CCD quantitatively in the Japan Sea in response to glacial-interglacial cycles.

Quantitative reconstruction of CCD is made possible by comparison of calcium carbonate fluxes of cores at different depths. We reconstructed the variation of calcium carbonate flux of the three cores {MD01-2408 (39.88 degree N, 139.10 degree E, 800m in depth), KR05-09 PC1 (40.70 N, 139.08 E, 1784m), KR05-09 PC2 (43.77 N, 138.83 E, 3439m)} in the Japan Sea, making use of (1) alternation of light and dark layers in the Japan Sea sediment in Quaternary for correlation and age estimation, and (2) XRF microscanner for estimation of calcium carbonate content and dry bulk density. As a result, it is suggested that surface productivity of calcium carbonate in the Japan Sea has been changed significantly with age but more or less the same all over the sea in space because calcium carbonate flux and its temporal variations of two cores at MD01-2407 (900m) and MD01-2408 (800m) are very similar. Besides, it is suggested that CCD in the Japan Sea went down to 3500m between glacial maxima and interglacial maxima, and went up to shallower depths (2000m) during the other periods.