

Radiolarian fossils from the Kokumoto Formation

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The Kokumoto Formation of the Kazusa Group distributed in Ichihara City, Chiba Prefecture, contains the Matsuyama-Brunhes polarity reversal event (772 ka), and the Chiba composite section of the formation was proposed as a candidate of GSSP for lower-middle Pleistocene boundary. In this study, we analyzed radiolarian fossils for 47 samples collected from the Chiba composite section, and discussed about paleoceanographic features based on fossil records. The section examined in this study covers through 810 to 740 ka including marine isotope stage (MIS) 20 to 18.

Total concentrations range between 80 and 1300 individuals/g, and show higher values during the peak of MIS19c. More than 36 taxa have been recorded. Radiolarian assemblage is characterized by warm water species such as *Dictyocoryne* spp., *Didymocyrtis* spp. and *Tetrapyle* spp., especially during MIS 19 in the Chiba composite section. At present, higher abundances of these groups occur in the Kuroshio Current where sea-surface temperature range between 20 and 29°C. On the other hand, *Lithomelissa setosa* is related to cold waters ranging between 12 and 18°C and tends to increase in abundance when warm water species decrease. *Stylochlamydium venustum* predominates in the Oyashio Current today. Although its relative abundance is less than 3% in the section, it clearly increased during the glacial MIS 20 and MIS 18 and was absent during MIS 19. Because this species is predominant in the Oyashio water in the present day, it is likely that the Chiba composite section was under the mixed area of the Kuroshio-Oyashio waters. Radiolarian sea-surface temperature index, the Tr value, fluctuates considerably between 0.2 and 0.8 through the examined interval, and the several maxima and minima recorded likely reflect oscillations of the Kuroshio Current. This pattern is consistent with results from the oxygen isotope ratio of planktonic foraminifera. *Cycladophora davisiana* is a known indicator of cold intermediate water and tends to increase in relative abundance in MIS 18 and 19b. Such high abundance of *C. davisiana* suggests that the influence of North Pacific Intermediate Water (NPIW) had spread in this area.

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