Vertical and horizontal distribution of living planktonic foraminifera around Japanese Island: Plankton tow results

Azumi Kuroyanagi[1], hodaka kawahata[2]

[1] Graduate School of Science, Tohoku Univ, [2] AIST

Planktonic foraminifera reflect the upper ocean environments in terms of water temperature, salinity, food supply and so on. Fossil foraminiferal shells thus provide paleo-surface ocean information. Better understanding of the living planktonic foraminiferal ecology and the relationship between foraminifera and oceanographic conditions is important for more detailed reconstruction of paleoenvironments.

In order to show the relationship between foraminiferal distribution and surface ocean environments, we conducted the plankton tow in the upper 200 m for seven depth intervals (0-20 m, 20-40 m, 40-60 m, 60-80m, 80-120 m, 120-160 m, and 160-200 m) at eight sites around Japanese Island from late May 2002 to early June 2002. In situ, prior to the tow, the hydrographic conditions (temperature, salinity, chlorophyll, light intensity, and Fv/Fm dark chambers) were measured with Conductivity Temperature Depth sensor (CTD) and Fast Repetition Rate Fluorescence (FRRF). We used the number of foraminifera in bigger than 125 um fraction as the total foraminifera.

In this study area, the variability of species decreased and standing stocks of foraminifera increased as surface water temperature decreased. Furthermore, the relative abundance of Neogloboquadrina incompta decreased and of Globigerina quinqueloba increased with decrease in surface temperature in the Japan Sea. The vertical profiles of standing stocks were closely correlated with that of chlorophyll a concentrations except for the two southern sites, Sites E and A. Though G. ruber occurs abundantly in warm and surface waters in the equatorial and tropical ocean, the species was observed both in the surface water (less than 30-60 m) and in deeper water (80-200 m) in this study sites due to food availability. It suggests that G. ruber sometimes records deeper environments in the middle latitudes. Neogloboquadrina pachyderma dwelled in the subsurface water (deeper than 20 m) at a temperature of lower than 12 C (10-14 C) at all studied sites except for at the southernmost site, Site E. It indicates that this species can be a good proxy for subsurface temperature rather than for sea surface temperature.