

VII. CALCAREOUS NANNOPLANKTON BIOSTRATIGRAPHY OFF THE BOSO PENINSULA

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Introduction

During the GH80-2 research cruise many times of bottom sampling were attempted. In them nineteen samples yielded abundant and well preserved nannoplankton flora ranging from middle Pliocene to Holocene in age.

In the present article the writer reports their calcareous nannoplankton assemblages and correlate with neighboring land section.

Samples and method

Sampling locations and their lithologic features are represented in Chapter I and VI in this report.

Concentration and observation methods of the calcareous nannoplankton fossils were followed by NISHIDA (1975 and 1978). Identification and counting of nannoplankton fossils were done with a scanning electron microscope technique.

Nannoplankton fossil assemblage and correlation

Nannoplankton fossil species occurred from the samples are listed in Table VII-1. Their state of preservation is well in most samples.

In the Pacific side of Japan, late Cenozoic calcareous nannoplankton biostratigraphy has been established by NISHIDA (1978) and its revised range chart of representative species is represented in Fig. VII-2.

Based on their nannoplankton fossil assemblage, present samples are divided to following seven age groups.

Middle Pliocene; D381, D383-1, D387-1, D397-1, D402-1

Late Pliocene; D390-1, D392-1

Early Pleistocene; D382-1, D399-1, D399-4, D401-1

Middle Pleistocene; RC70cc

Late Pleistocene; RC68cc

Late Pleistocene-Holocene; RC66cc, RC69cc

Indefinite Pleistocene; RC73cc, RC76cc, RC77cc, P183cc

Middle Pliocene group is characterized with the occurrence of *Reticulofenestra pseudoumbilica*, *Discoaster brouweri*, *Discoaster surculus* and lack the occurrence of *Pseudoemiliana lacunosa*. Associated species of this group are *Coccolithus pelagicus*, *Cyclococcolithus leptopora*, *Cyclococcolithus macintyreii*, *Reticulofenestra japonica* and *Umbilicosphaera sibogae*. The assemblage is safely correlated with that of the Anno Formation in the Boso Peninsula (NISHIDA, 1977).

Late Pliocene nannoplankton fossil group is characterized of *Reticulofenestra japonica*,

Table VII-1 Calcareous nanoplankton fossil occurrence in GH80-2 samples, off Boso Peninsula.

NANOPLANKTON SPECIES	GH-80-2 SAMPLES																						
	D381	D383-1	D385-1	D387-1	D390-1	D392-1	D397-1	D399-1	D399-4	D401-1	D402-1	R66cc	R68cc	R69cc	R670cc	R671cc	R673cc	R676cc	R677cc	R679cc	P180cc	P183cc	
<i>Bracardosphaera bigelovi</i>																							
<i>Ceratolithus cristatus</i>																							
<i>Ceratolithus rugosus</i>																							
<i>Coccolithus pelagicus</i>																							
<i>Coccolithus productus</i>																							
<i>Cyclococcolithus leptopora</i>																							
<i>Cyclococcolithus mactintyreii</i>																							
<i>Cyclolithella annula</i>																							
<i>Discoaster browleri</i>																							
<i>Discoaster challengeri</i>																							
<i>Discoaster pentaradiatus</i>																							
<i>Discoaster surculus</i>																							
<i>Discoaster variabilis</i>																							
<i>Emiliania hualeyi</i>																							
<i>Gephyrocapsa caribbeanica</i>																							
<i>Gephyrocapsa oceanica</i>																							
<i>Gephyrocapsa protohualeyi</i>																							
<i>Helicopontosphaera hyalina</i>																							
<i>Helicopontosphaera kamptneri</i>																							
<i>Helicopontosphaera wailichi</i>																							
<i>Oolithotus fragilis</i>																							
<i>Pontosphaera discopora</i>																							
<i>Pontosphaera japonica</i>																							
<i>Pontosphaera syracusana</i>																							
<i>Pontosphaera macropora</i>																							
<i>Pseudoemiliania lacunosa</i>																							
<i>Reticulofenestra japonica</i>																							
<i>Reticulofenestra pacifica</i>																							
<i>Reticulofenestra pseudoumbilica</i>																							
<i>Rhabdosphaera claviger</i>																							
<i>Seyphosphaera pulcherrima</i>																							
<i>Sphenolithus abies</i>																							
<i>Syracosphaera pulchra</i>																							
<i>Umbilicosphaera hulburtiana</i>																							
<i>Umbilicosphaera sibogae</i>																							

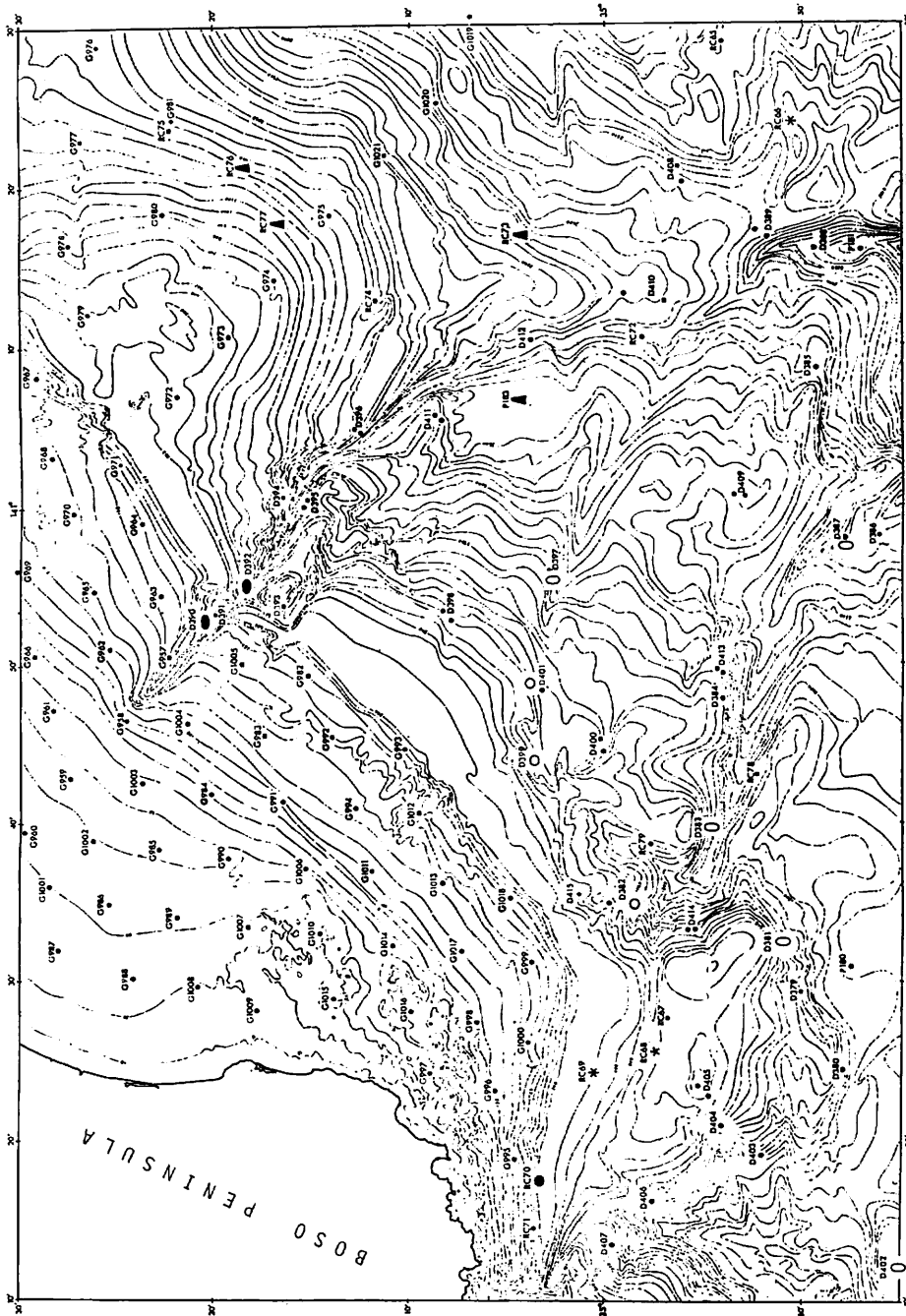


Fig. VII-1 Calcareous nannoplankton fossil assemblage, off Boso Peninsula. (see attached for symbols)

- : Middle Pliocene nannoplankton assemblages
- : Late Pliocene nannoplankton assemblages
- : Early Pleistocene nannoplankton assemblages
- : Middle Pleistocene nannoplankton assemblage
- *: Middle to Late Pleistocene nannoplankton assemblage
- *: Late Pleistocene to Holocene nannoplankton assemblages
- ▲: Indefinite Pleistocene nannoplankton assemblages

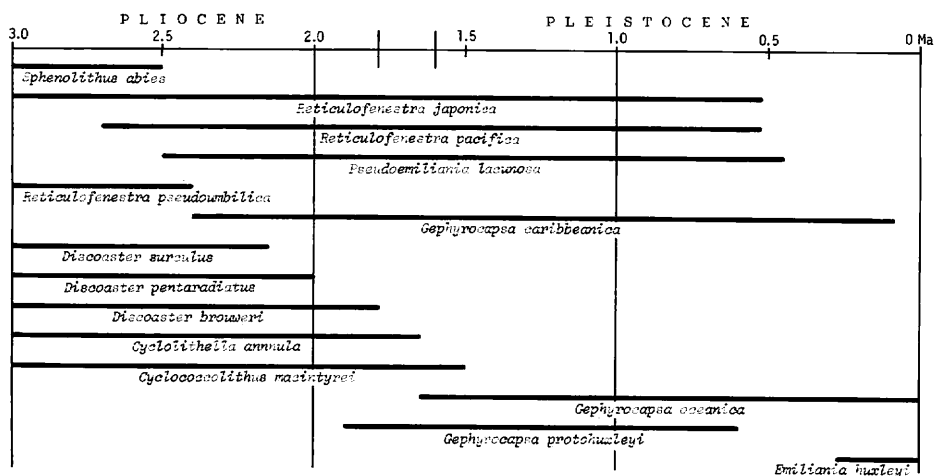
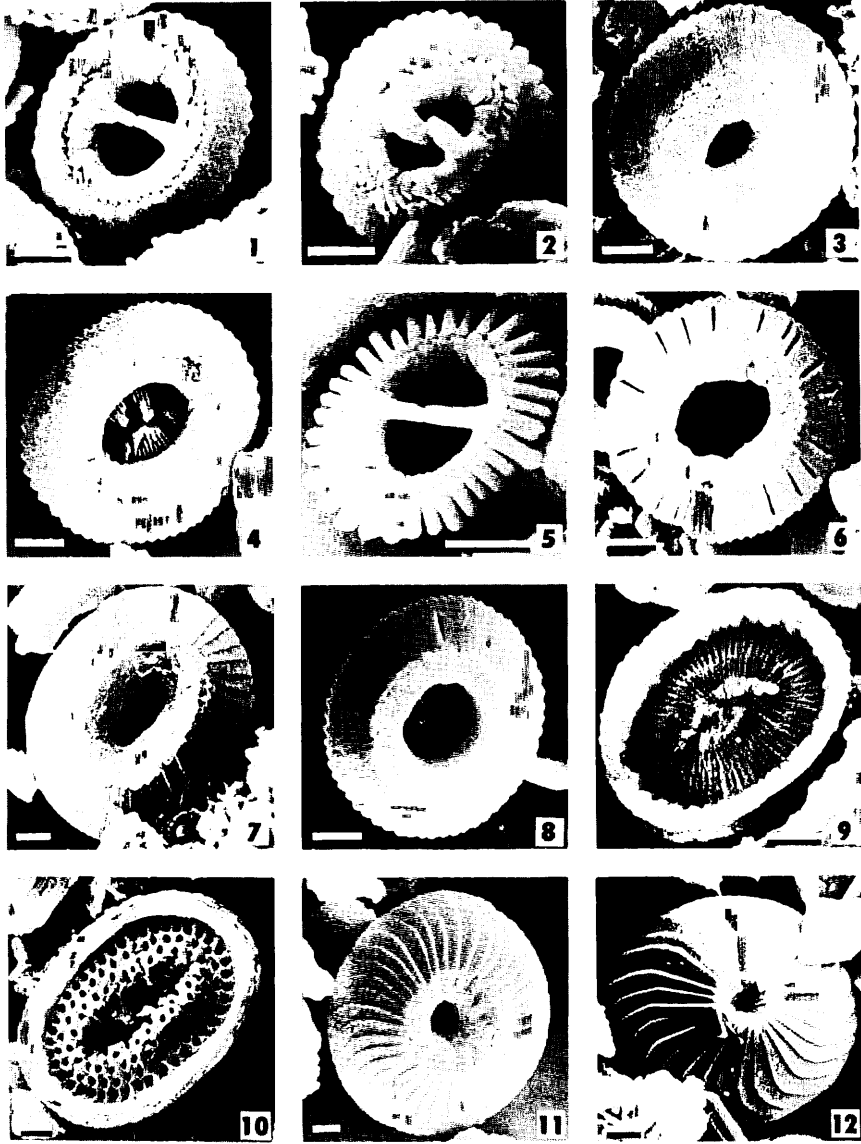


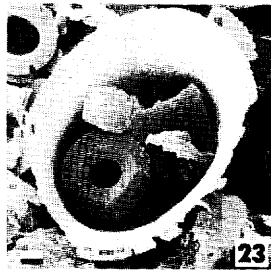
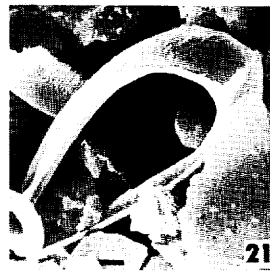
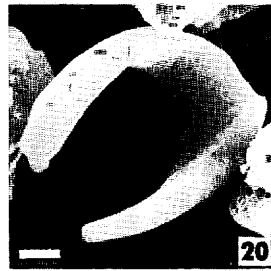
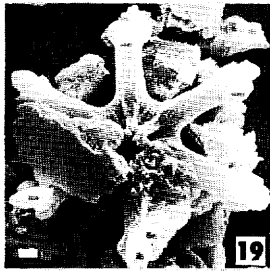
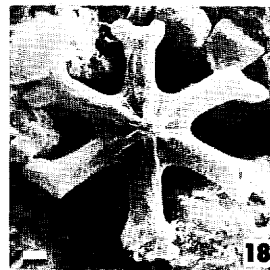
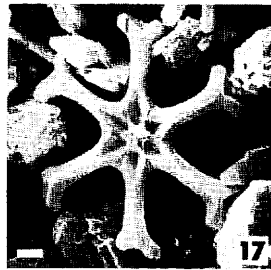
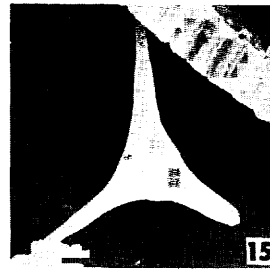
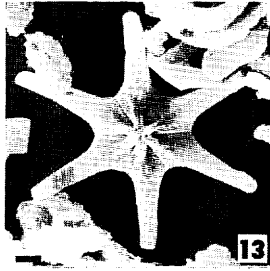
Fig. VII-2 Revised calcareous nannoplankton fossil ranges in the Pacific side of Japan.

Plate VII-1. Calcareous nannoplankton fossils in GH80-2 samples. Scale bar represents 1 micrometer.

1. *Gephyrocapsa oceanica* KAMPTNER D399-1, NUESEM-11-444.
2. *Gephyrocapsa oceanica* KAMPTNER D399-4, NUESEM-11-403.
3. *Reticulofenestra japonica* (NISHIDA) NISHIDA D399-1, NUESEM-11-451.
4. *Reticulofenestra pseudumbilica* (GARTNER) GARTNER D397-1, NUESEM-11-464.
5. *Gephyrocapsa protohuxleyi* MCINTYRE D399-4, NUESEM-11-398.
6. *Pseudoemiliania lacunosa* (KAMPTNER) GARTNER D399-1, NUESEM-11-443.
7. *Coccolithus pelagicus* (WALLICH) SCHILLER D399-4, NUESEM-11-395.
8. *Reticulofenestra pacifica* NISHIDA D399-4, NUESEM-11-414.
9. *Syracosphaera pulchra* LOHMANN D399-4, NUESEM-11-397.
10. *Pontosphaera discopora* (BRAMLETTE and SULLIVAN) BURNS D399-4, NUESEM-11-409.
11. *Cyclococcolithus macintyreii* BUKRY and BRAMLETTE D397-1, NUESEM-11-463.
12. *Cyclococcolithus leptopora* (MURRY and BLACKMAN) KAMPTNER D399-4, NUESEM-11-419.
13. *Discoaster brouweri* TAN SIN HOK D381, NUESEM-11-423.
14. *Discoaster brouweri* TAN SIN HOK D381, NUESEM-11-421.
15. *Discoaster brouweri* TAN SIN HOK D381, NUESEM-11-430.
16. *Discoaster pentaradiatus* BRAMLETTE and RIEDEL D397-1, NUESEM-11-461.
17. *Discoaster challengerii* BRAMLETTE and RIEDEL D381, NUESEM-11-437.
18. *Discoaster variabilis* MARTINI and BRAMLETTE D381, NUESEM-11-422.
19. *Discoaster surculus* MARTINI and BRAMLETTE D381, NUESEM-11-428.
20. *Ceratolithus rugosus* BUKRY and BRAMLETTE D381, NUESEM-11-439.
21. *Ceratolithus cristatus* KAMPTNER D399-4, NUESEM-11-415.
22. *Helicopontosphaera kamptneri* HAY and MOHLER D399-1, NUESEM-11-449.
23. *Pontosphaera syracusana* LOHMANN D399-1, NUESEM-11-454.
24. *Scyphosphaera pulcherima* DEFLANDRE D399-4, NUESEM-11-394.



(1)



(2)

Pseudoemiliana lacunosa, *Cyclococcolithus macintyreii* and *Discoaster brouweri*, and lacks *Reticulofenestra pseudoumbilica*. Associate species of this group are *Coccolithus pelagicus*, *Cyclococcolithus leptopora* and *Umbilicosphaera sibogae*. Present assemblage is correlated with that of the Naarai Formation in Choshi district (NISHIDA, 1977 and 1980).

Early Pleistocene group is characterized with common occurrence of *Cyclococcolithus leptopora*, *Gephyrocapsa oceanica*, *Pseudoemiliana lacunosa* and *Reticulofenestra japonica*. Associate species are *Coccolithus pelagicus*, *Cyclococcolithus macintyreii*, *Gephyrocapsa protohuxleyi* and *Umbilicosphaera sibogae*. Especially in them, *Cyclococcolithus macintyreii* and *Gephyrocapsa protohuxleyi* show the exact stratigraphic position of this group. Present nannoplankton group is correlated with that of the Kiwada Formation in the Boso Peninsula and the lower part of the Obama Formation in the Choshi district (NISHIDA, 1977 and 1980).

Middle Pleistocene group is composed of *Cyclococcolithus leptopora*, *Gephyrocapsa oceanica*, *Pseudoemiliana lacunosa* and *Reticulofenestra japonica* in common occurrence, and lacks *Cyclococcolithus macintyreii* and *Gephyrocapsa protohuxleyi*. Therefore this assemblage is assigned to the middle Pleistocene one and correlated to the upper part of the Kurahashi Formation in the Choshi district (NISHIDA, 1980).

Late Pleistocene assemblage is characterized with common occurrence of *Cyclococcolithus leptopora* and *Gephyrocapsa oceanica*, and lacks both *Pseudoemiliana Lacunosa* and *Emiliana huxleyi*. Consequently this assemblage is assigned to the upper Pleistocene and correlated with the upper part of the Kurahashi Formation of the Choshi district (NISHIDA, 1980).

Modern assemblage is characterized by the occurrence of *Emiliana huxleyi*. Therefore the present modern assemblage extends to back 0.26 Ma which is the first appearing level of *Emiliana huxleyi*.

Indefinite Pleistocene assemblage is assigned with the common occurrence of *Gephyrocapsa oceanica*, but its exact horizon cannot be defined for the reason of its ill state of preservation in associate nannoplankton fossils.

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