

# NOTES ON THE CASSIDULINID FORAMINIFERA FROM JEJU ISLAND, KOREA

Ritsuo NOMURA\*

## ABSTRACT

Six taxa of cassidulinid foraminifera were obtained from the Seoguipo Formation, Jeju Island, Korea. The cassidulinid assemblage is characterized by the abundant occurrence of *Cassidulina norvangi* Thalmann, and in spite of small numbers of individuals it contains a few Pacific forms such as *Paracassidulina minuta* (Cushman) and *Globocassidulina venustas* Nomura. Such an assemblage is considered to be transitional between the Japan Sea and the Pacific Provinces.

## INTRODUCTION

In late Cenozoic and Recent deposits of Japan, cassidulinid foraminifera are taxonomically very diverse. The geographic distribution of these taxa indicates the existence of three cassidulinid provinces in the Japanese Islands during the late Cenozoic age: the Japan Sea Province, the Pacific Transitional Province, and the Pacific Tropical to Subtropical Province (Nomura, 1984).

The Japan Sea Province is dominantly of cold water elements, but includes Pacific elements in several horizons as a result of intermittent inflow of warm currents into the Japan Sea side (Nomura, *op. cit.*). The southern limits of the Japan Sea Province are not well documented. Asano (1939) stated, in his study of Recent foraminifera of Wakasa Bay in the Japan Sea, that the transitional region between the Pacific and the Japan Sea cassidulinid provinces may be around Wakasa Bay area.

In 1981, the writer visited Jeju Island, Korea, which is located between the Korean Peninsula and the Japanese Islands, as the excursion of IGCP-114 International Workshop on Pacific Neogene Biostratigraphy, held at Osaka. At that time, the writer collected several samples from the Seoguipo Formation in order to examine the cassidulinid assemblage.

According to Kim (1972) and Yoon et al. (1981), who were the leaders of this excursion, the Seoguipo Formation is exposed in a limited area along the southern coast of Jeju Island. This formation consists of coarse- to fine-grained sandstone and sandy mudstone containing various kinds of molluscan fossils. Benthic foraminifera of the Seoguipo Formation were studied by Kim (1972), but cassidulinid foraminifera were not obtained.

The purpose of this paper is to describe the cassidulinid foraminifera with remarks on their paleobiogeographic distribution.

## METHODS

Each sample, weighing 160 g, was processed by the naphtha method to disintegrate sediments, and washed over a 200 mesh sieve. Although three samples were examined by the

---

\* Department of Earth Sciences, Faculty of Education, Shimane University, Matsue 690

above methods, only one sample yielded cassidulinid foraminifera.

### RESULTS AND DISCUSSIONS

Although the stratigraphic horizon of the cassidulinid-bearing sample is unknown because the collection came from reworked rock, the sample assemblage seems to be similar to the sixth or seventh fauna of Kim (1972), in the dominance of such species as *Hanzawaia nipponica* (15\*), *Textularia articulata* (9\*), *Miliolinella circularis* (8\*), *Cibicides lobatulus* (7\*), *Quinqueloculina sawanensis* (6\*), *Quinqueloculina polygona* (6\*), *Triloculina trigonula* (5\*), *Nonion manpukujiensis* (5\*), *Elphidium crispum* (3\*), and *Spiroloculina communis* (3\*).

The number of cassidulinid foraminifera obtained from this assemblage is very few, and no cassidulinid foraminifera is a characteristic species of the assemblage. The following species were obtained with extra picking :

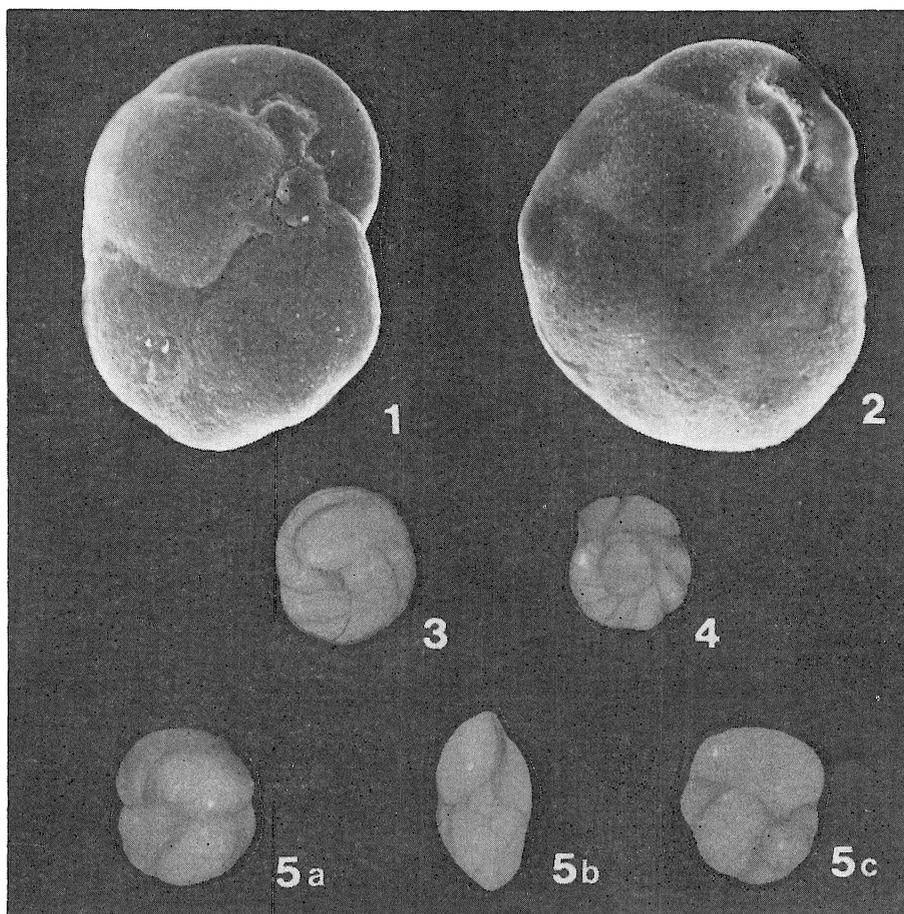


Fig. 1. Cassidulinid foraminifera occurred from the Seoguipo Formation, Jeju Islands. 1, 2, *Cassidulina norvangi* Thalmann, cat. no. 84001, 84002, x 365. 3, *Paracassidulina* cf. *neocarinata* (Thalmann), cat. no. 84003, x 130. 4, *Globocassidulina venustus* Nomura, cat. no. 84004, x 130. 5a-c, *Paracassidulina minuta* (Cushman), cat. no. 84005, x 130.

\* percentage of the total of 195 individuals in the benthic foraminiferal assemblage.

<i>Cassidulina norvangi</i> Thalmann .....	56 individuals
<i>Cassidulina</i> ? sp. indet. ....	44
<i>Paracassidulina minuta</i> (Cushman) .....	5
<i>Paracassidulina</i> cf. <i>neocarinata</i> (Thalmann) .....	1
<i>Globocassidulina venustas</i> Nomura .....	1
<i>Globocassidulina</i> spp. ....	6

Among these species, *Cassidulina norvangi* Thalmann is dominant, attaining 54% of the total cassidulinid assemblage. The specimens of these species are characterized by a very small size (less than about 180  $\mu\text{m}$ ). Six specimens of *Globocassidulina* are too small to determine the specific name.

From the biogeographic point of view, *Cassidulina norvangi* is mainly distributed in the Japan Sea Province (Nomura, 1984), and is rare or absent in the Pacific Province. However, the two species, *Globocassidulina venustas* and *Paracassidulina minuta*, are characteristic Pacific forms. *Globocassidulina venustas*, which was originally reported from the Nojima Formation of the Miura Peninsula, is particularly common in lower Pleistocene deposits of the Miura and Boso Peninsula, Japan. Considering the distributional patterns of these species, the Seoguipo Formation of Jeju Island is therefore noted as having a mixed assemblage of the Japan Sea Province and Pacific Province. This interpretation seems to be consistent with molluscan paleontology, for Yoon et al. (1981) noted that the Seoguipo fauna correlated with so called Omma-Manganzian fauna which is dominated by cold water elements, but also influenced by warm water ones.

On the other hand, the transitional region of the Japan Sea and the Pacific Provinces has been noted to be in Wakasa Bay area by Asano (1939). Because of the lack of Pliocene to Pleistocene marine deposits on the Japan Sea coast of southwest Japan, the detailed paleobiogeographical pattern of cassidulinid foraminifera is unknown. However, this study may indicate that the transition of the Japan Sea and the Pacific Provinces of cassidulinid foraminifera extends to the region of Jeju Island in Pliocene and Pleistocene times.

#### ACKNOWLEDGEMENTS

The writer expresses his deep gratitude to Professor B. K. Kim of Seoul National University and Professor S. Yoon of Busan National University, for their kind leadership during the excursion. Special thanks are due Prof. S. Yoon, for his useful suggestion on molluscan fauna.

Thanks also to B. W. Hayward, New Zealand Geological Survey, for kindly reading the manuscript.

#### REFERENCES

- Asano, K., 1939, Report on the Recent foraminifera from the Urashima Bank, Wakasa, Bay. *Botany and Zoology*, v. 7, no. 10, p. 39–45. (in Japanese).
- Kim, B. K., 1972, A stratigraphic and paleontologic study of the Seoguipo Formation. *Mem. Celeb. Sixtieth Birth. Professor Chi Moo Son*, p. 169–182.
- Nomura, R., 1984, Cassidulinid foraminiferal provinces around Japan during the latest Cenozoic. *Paleogeogr. Paleoclimatol. Paleocol.*, 46, p. 185–202.
- Yoon, S. and IGCP-114 International Workshop on Pacific Neogene Biostratigraphy, 1981, Seoguipo Formation of the Jeju Island. In S. Yoon (Editor), *Neogene geology of southern Korea: Guidebook for Excursion 2*, p. 21.