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Geographical Distributions of Planktic Foraminifera in Japan Sea Surface Sediments

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The Japan Sea is a nearly landlocked marginal sea that connects with the Pacific and adjacent marginal seas through four shallow and narrow straits with sill depths of less than 130 m (Fig. 1). At present, the only oceanic water flowing into the Japan Sea is that of the warm Tsushima Current that enters through the Tsushima Strait from the East China Sea and transports heat and salt to the surface water. The Tsushima Current produces a warm and humid climate over the Japan Sea side of the Japanese islands. High-salinity water of the Tsushima Current also contributes greatly to the deep circulation system of the Japan Sea. Evaporation and wintertime cooling make the saline surface water in the northern Japan Sea sufficiently dense to sink to the deep layer, thus supplying oxygen-rich water to the bottom.

Planktic foraminifera are major contributors to the extensive calcareous deposits covering the ocean floor. The abundance and species composition of planktic foraminifera are useful tools for reconstructing past surface-water hydrography. Investigations of relationships between distributions of living assemblages and environmental factors that provide basic data for inferring past environmental conditions are necessary to produce detailed paleoceanographic reconstructions based on the fossil record. In this study, we used 51 surface sediment samples

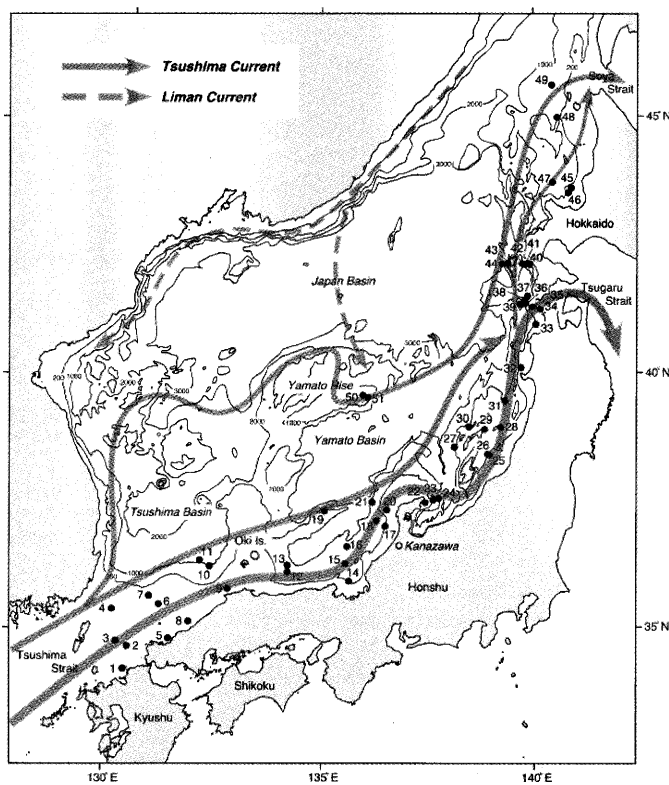


Figure 1. Locations of the 51 surface sediment samples used in this study.

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systematically collected mainly from the Tsushima Current region in the Japan Sea and examined the relationships between the species distribution of modern planktic foraminifera and the surface water masses (Fig. 1).

Twenty-four species belonging to 10 genera were identified, of which nine are described as predominant: *Neogloboquadrina incompta*, *Neogloboquadrina pachyderma*, *Globigerina quinqueloba*, *Globigerina bulloides*, *Globigerinoides ruber*, *Neogloboquadrina dutertrei*, *Pulleniatina obliquiloculata*, *Globigerinoides tenellus*, and *Globigerinita glutinata*. Comparison of four distributional patterns recognized in the geographical distributions of these nine species and of surface water masses in the Japan Sea revealed four relationships: 1) the transitional water formed by the mixture between the warm Tsushima Current and cold waters in the Japan Sea may be optimal for *N. incompta*; 2) *N. pachyderma* may relate to cold water in the northern Japan Sea; 3) *G. quinqueloba* and *G. bulloides* appear to be associated with less saline, nutrient-rich river water from the Changjiang (Yangtze River); and 4) *G. ruber*, *N. dutertrei*, *P. obliquiloculata*, *G. tenellus*, and *G. glutinata* can be regarded as indicators of Tsushima Current water.

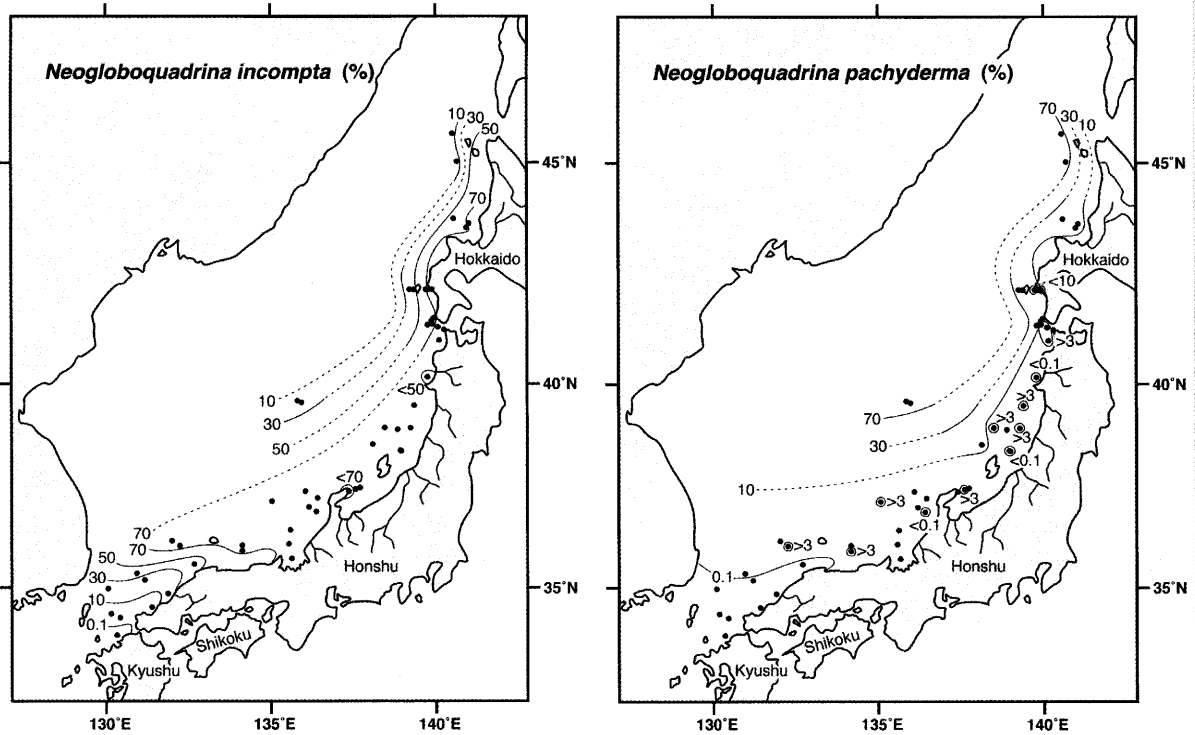


Figure 2. Relative frequency distribution of *Neogloboquadrina incompta* and *Neogloboquadrina pachyderma*.