

A comparison of population structure of planktonic Foraminifera near the sea ice edge in January 2017 and 2018

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Planktonic foraminiferans are distributed broadly in the Southern Ocean (SO). However, the mesh sizes of sampling nets in previous studies were too large to estimate abundances of early stage foraminiferans. Thus, these studies might have underestimated their abundances in the water column. The typical cold water species, *Neogloboquadrina pachyderma*, is found abundantly both within pack ice and water column in the vicinity of ice edge in SO (Ojima *et al.* 2017). This suggests that planktonic foraminiferans have significant predation pressure in the marginal ice zone. The present study aimed to investigate the population structure of planktonic foraminiferans within pack ice and water column.

Foraminiferans were sampled in January of 2017 and 2018 during the training vessel *Umitaka-maru* cruise. Water column samples were collected at two stations along the 110°E transect (Fig. 1). Pack ice were collected at ice edge near the southern station. Both water and melted pack ice samples were concentrated using a 20 µm hand net and preserved by neutralized formalin sea water (final conc. 5%) for 2017 samples and neutral lugor solution (final conc. 5%) for 2018. Fixed 2017 samples were stained by Rose Bengal solution. Then, the samples were identified, counted and measured under an upright microscope in the laboratory.

This study identified three planktonic foraminiferan species from both years, *N. pachyderma*, *N. incompta* and *Turborotalita quinqueloba*, of which the most dominant species was *N. pachyderma*. Foraminiferans were found in nine out of 11 pack ice in 2017, and eight out of 10 in 2018. The abundances were various by sea ice ranging 0 – 20.5 ind./L in 2017, and 0 – 220 ind./L in 2018. It is known that foraminiferans exhibit patchy distribution in sea ice (Spindler and Dieckmann, 1986). The abundance of water column was significantly lower than that in the sea ice with ranged 0 – 2.2 ind./L in 2017, and 0 – 0.34 ind./L in 2018. *N. pachyderma* were divided into three developmental phases based on shell length and surface structure of the shell (phases A, B and C). In comparison by the phase, *N. pachyderma* found in pack ice was significantly larger than that in the water column in phases A and B in 2017 and 2018, suggesting that sea ice itself provide a favourable environment for their growth.

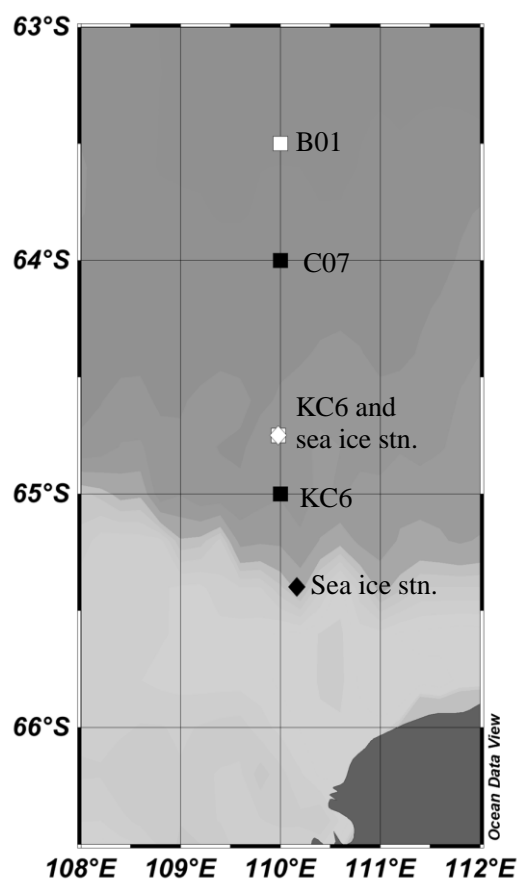


Fig. 1. Sampling stations of water column (2017:■,2018:□) and sea ice (2017:◆,2018:◇)

References

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