

Predominance of small zooplankton in surface layer along the 110°E transect in the Southern Ocean

*Ryosuke Makabe^{1,2}, Mio Sasaki³, Shintaro Takao^{1,2}, Masato Moteki^{1,3}, Tsuneo Odate^{1,2}

1. National Institute of Polar Research, 2. The Graduate University for Advanced Studies (SOKENDAI), 3. Tokyo University of Marine Science and Technology

Small zooplankton community can be one of the key component in surface ecosystem because it is believed to be more abundant with global warming and to have different roles from larger taxa in biogeochemical cycling, especially in biological carbon pump. Surface monitoring using a continuous plankton sampler (CPR) has also been conducted in the South Ocean for a long period of time. Although CPR is ideal gear for long-term monitoring, abundances of numerically predominant smaller taxa are significantly underestimated by the coarser mesh. Thus, alternative method is needed to understand long-term changes of the community. For the long-term monitoring, the method have to meet following requirements, i.e. the method (1) can cover wider area with high spatial resolution, (2) requires less ship-time and (3) should be simple with low cost. In this study, we tried to establish the method for monitoring smaller zooplankton assemblage satisfying above requirements, and then, to reveal accurate abundance and composition of surface zooplankton and its temporal variability. The water sampled underway from ship bottom was concentrated by a hand net (20 μ m mesh) along the 110°E transect in January 2014, 2016 and 2017, during training vessel *Umitaka-maru* cruises and in December, 2015 and 2016 during icebreaker *Shirase* cruises. Zooplankton samples were preserved by neutralized formalin sea water (final conc., 5%), and then, analyzed under microscopes. Zooplankton abundance in most samples was dominated by copepod nauplii accounting more than 50% in total abundance which was followed by *Oithona* spp. Distribution of smaller taxa varied with water mass distribution rather than diel rhythm. The high abundances of smaller taxa, reached more than 50000 ind. m⁻³, were usually found between the Polar Front and the southern Antarctic Circumpolar Current front. This value is comparable to the maximum abundance reported in previous studies in the Southern Ocean. Furthermore, it seems that interannual variation of the abundance is related with the Southern Annular Mode. Accumulating such data using finer mesh nets is important to reveal the causes of predominance of smaller taxa found in this study.

Keywords: The Southern Ocean, small zooplankton, Underway sampling