

The annual variability in abundance and shell size of pteropods *Limacina* spp. in the seasonal ice zone of the Southern Ocean

Kunio T. Takahashi^{1,2} Haruko Umeda³ and Tsuneo Odate^{1,2}

¹ National Institute of Polar Research, Tachikawa, Tokyo, Japan

² The Graduate University for Advanced Studies, SOKENDAI, Tachikawa, Tokyo, Japan

³ Kaizansenri Incorporated, Nada, Hyogo, Japan

The Continuous Plankton Recorder (CPR) provides an effective and rapid means of monitoring surface micro- and meso-zooplankton distribution patterns to assess the effects of environmental change over large ocean scale. The extensive spatial and temporal coverage of CPR (275 μm mesh size) survey data has identified pteropods occurring in high density patches. During the 41st Japanese Antarctic Research Expedition (JARE-41) cruise in March 2000, high pteropod (*Limacina*) abundance was observed around a particular, large area in the seasonal ice zone (SIZ) of the Antarctic Ocean. The CPR was towed along West-East (WE) and South-North (SN) lines, at a latitude of 63°00'S from 133°00'E to 149°22'S, and longitude 150°00'E from 62°59'S to 47°40'S, respectively. Pteropods of the genus *Limacina*, followed by copepods, the two predominant zooplanktonic taxa, contributed (pteropods) 66% (WE line) and 42% (SN line), and (copepods) 50% (WE line) and 29% (SN line) to total zooplankton abundances, respectively. High abundances of *Limacina* spp. were concentrated along the eastern side of the WE line, and south of the Polar Front along the SN line. No relationship was apparent between *Limacina* spp. density and chlorophyll *a* concentration, so factors other than primary production may have influenced pteropod abundance throughout the sampling area, during this study. To investigate whether this abundance event was sudden, we evaluated the annual variability of abundance and shell size of *Limacina* spp. using NORPAC standard net (110 μm mesh size) data in the same area and sampling periods (March) from JARE-38 (1997) to JARE-47 (2006). Although the relative total abundance of *Limacina* spp. in 2000 was the highest in 10 years, the abundance of *Limacina* spp. was lower than the average value of 10 years. The average shell size over many years was between 200 and 300 μm , while relatively large average sizes were observed in 2000, at 444.7 μm . It is thought that CPR with mesh size of 275 was able to catch the large-sized individual dominated in 2000. This study has revealed the tendency for large individuals to increase in the year of low *Limacina* spp. The timing of reproduction and growth condition by each year may have influenced *Limacina* abundance throughout the sampling area.