

MEASUREMENT OF WATER TEMPERATURE PROFILE IN COASTAL POLYNYAS USING AXBT (ABSTRACT)

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Some open water areas between fast ice and pack ice zones are often observed off the Prince Olav Coast and Riiser-Larsen Peninsula all year round. In such open waters, called coastal polynyas, which are exposed to the cold air, sea ice newly forms with high growth rate. It is considered that coastal polynyas serve as more efficient ice factories than ice-covered areas where sheet ice gradually grows. So heat loss to the atmosphere is very large. In addition, large salt flux occurs there as sea ice excludes brine. In this way large quantities of heat to the air and salt to the ocean are supplied through the processes of sea ice production in polynyas, which have great influence on global climate.

In 1990-1991 (JARE-31) we carried out oceanographic observations to clarify the thermal structure in the polynya region off Lützow-Holm Bay using aircraft-deployed expendable bathythermographs (AXBT, made by the Tsurumi Seiki Co., Japan) from a Cessna plane. This polynya is commonly called 'Ôtone Suiro' and is located about 50 miles north of Syowa Station. Temperature and depth accuracies of the AXBT are $\pm 0.1^{\circ}\text{C}$ and 5 m or $\pm 2\%$ of depth, respectively. Sixteen temperature profiles down to about 500 m in depth were obtained from March 1990 to January 1991 except for the polar night season. The thickness of the convective mixed-layer with near freezing temperature was 300-500 m. These mixed layers were clearly thick and cold as compared with those in fast ice and pack ice zones. From spring to early summer, the temperature of the surface 50 m layer rose to about $-1.5\sim-1.0^{\circ}\text{C}$ because of absorption of solar radiation.

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