

Preliminary results of marine geological observation during the R/V Hakuho-Maru KH07-4 cruise off Lutzow-Holm Bay, Antarctic Ocean

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1. Introduction

The Southern Ocean plays a very important role in the global climate system on a present and geologic past Earth. The Southern Ocean has also become a region of paleoceanographic focus because of the key role it plays in global deep-water circulation and its potential significance for the global carbon. For example, it has been proposed that new production was higher and utilization of preformed nutrients in surface waters was more efficient in the glacial Southern Ocean than today, effectively lowering the glacial atmospheric CO² concentration. To resolve causes and processes of a CO² change, it is important to understand a mechanisms and processes of sub-systems in the Antarctic Cryosphere such as a change of biological productivity, sea surface temperature, surface water frontal system, sea-ice distribution, and East Antarctic ice sheet during the glacial-interglacial climate cycle. Based on such backgrounds, we are planning the marine geological observation cruise off Lutzow-Holm Bay, Southern Ocean.

2. Observation strategies

The KH07-4 Leg 3 cruise was conducted from 28 January to 26 February 2008 (Cape Town to Fremantle) using the R/V Hakuho-Maru. In the expedition, we conducted sediment sampling using piston corers and a multiple corer with swath bathymetric survey by SeaBeam and 3.5kHz subbottom profiling by BATHY2000 as site survey. We also conducted seismic reflection survey.

Our research targets are as follows.

- (1) Reconstruct the distribution map of sea ice and iceberg during the last glacial maximum (LGM) and last interglacial Eemian.
- (2) High-resolution reconstruction for the north-south oscillation of the Southern Ocean frontal system such as the Antarctic Polar Front (APF), Antarctic Convergence (AC), and summer/winter sea-ice extent.
- (3) Reconstruct the biological productivity variation in the glacial to interglacial time scale.
- (4) Temporal and spatial changes of the East Antarctic ice sheet.

In the presentation, we will discuss the preliminary results of the observations during the R/V Hakuho-Maru KH07-4 Leg 3.