

極域における微小生態系研究のための微小環境測定装置および軽量型無菌掘削機の開発

小川麻里¹、宮川厚夫²、石崎教夫³、吉村義隆⁴、三田肇⁵、鈴木忠⁶、伊村智³
¹安田女子大学、²静岡大学、³国立極地研究所、⁴玉川大学、⁵福岡工業大学、⁶慶應義塾大学

Development of the equipment for measuring the microenvironment and a model of lightweight germfree excavator, to study the micro-ecosystems in the polar area.

Mari Ogawa¹, Atsuo Miyakawa², Norio Ishizaki³, Yoshitaka Yoshimura⁴,
Hajime Mita⁵, Atsushi Suzuki⁶ and Satoshi Imura³

¹Yasuda Women's Univ., ²Shizuoka Univ., ³NIPR, ⁴Tamagawa Univ., ⁵Fukuoka Institute of Technology, ⁶Keio Univ.

In the 49th Japan Antarctic Research Expedition, the internal environments of the Antarctic MARIMO in Antarctic lake, Skallen Ôike, and of the moss pillar in lake Hotoke Ike (B-4) were measured by several kinds of available equipments (Ref. 1, 2). The accurate measurement was very difficult by uses of these commercial devices in the extreme field condition. The ice auger, for ice sheet surface digging, was too heavy to handle by a few peoples, and finally it was broken due to a lack of storength.

A measuring equipment and a light weight germfree excavator were developed in order to investigate the micro-ecosystem that has been created by microorganisms in the polar area.

1) A microenvironment measuring equipment

It was deigned to examine the inside of the aggregates of the microorganism. It is a firm stick sensor of a small diameter that can measure the temperature, pH and ORP underwater in real time.

It is useful up to a depth of 50m.

2) A model of lightweight germfree excavator

An ice auger of NIPR was imprieved.

The weight of the main body of the ice auger was reduced for easy transportation. The parts of the ice auger can easily be attached or removed. A support device was added to handle safely by few persons. A stopper for an inner tube was added to prevent falling off of the sample. It has made possible easy collection of aseptic samples.

An excavator for bedrock using the commercial charge-type hammer drill was produced.

References

1) Hashida, C. et al., Evolution and adaptation of living in the extreme environments. 2. Bacteria and microorganisms. XXVI Symposium on Polar Biology, 2008.

2) Ogawa, M. et al., Antarctic MARIMO as ecosystem. - Structure, microorganisms and organic matter in a mass of algae -. Xth SCAR International Biology Symposium, 2009.