

The summary of atmospheric bioaerosols observation during the 54th Japanese Antarctic Research Expedition (JARE54, 2012-2013)

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Airborn microorganisms, atmospheric bioaerosols, may consist of viruses, bacteria, fungi, pollen, plant fibers and are airborne particles that are biological in origin. The bioaerosol over the Antarctica is getting a lot of attention as meteorology, cloud physics, phylogeography, phylogeny, extremophile, environmental medicine, and so on.

During the 54th Japanese Antarctic Research Expedition (2012-2013), the bioaerosols in the atmospheric boundary layer were observed at Syowa Station, Antarctica. We carried out the sampling of bioaerosols using our bioaerosol sampler at C-heliport using a tethered balloon (from December 26, 2013, to January 10, 2014) (Fig.1) and at container yard (from January 11 to January 21 and from February 2 to 8, 2014) in Syowa Station. Bioaerosols near to the ground were directly sampled beside the colony of Adélie penguins at the Hukuro Cove. We carried out the sampling using the bioaerosol sampler from 11:06 to 12:06 (LT) and from 16:18 to 17:18 (LT) on January 22, 2013 (Kobayashi et al., 2016) (Fig.2). We carried out the sampling using the bioaerosol sampler in the observation room at the top of the icebreaker Shirase. The sampling performed on the outward journey, from November 30 to December 15, 2012, and the return journey, from February 16 to March 16, 2013. The bioaerosols near to the ground were sampled by the bioaerosol sampler at the Yukidori Valley, the Langhovde Glacier from 9:00 to 10:00 and from 16:00 to 17:00 during January 25 and 31, 2013. DNAs were extracted from membrane filter sample and 16S rRNA gene was sequenced using the illumina-MiSeq platform.

In this study, I summarized the bioanalyzed results of atmospheric bioaerosols sampled at Syowa Station using a tethered balloon, container yard, Hukuro Cove near the colony of Adélie penguins, the Antarctic Ocean on the top of the icebreaker Shirase and the Yukidori Valley, the Langhovde Glacier.

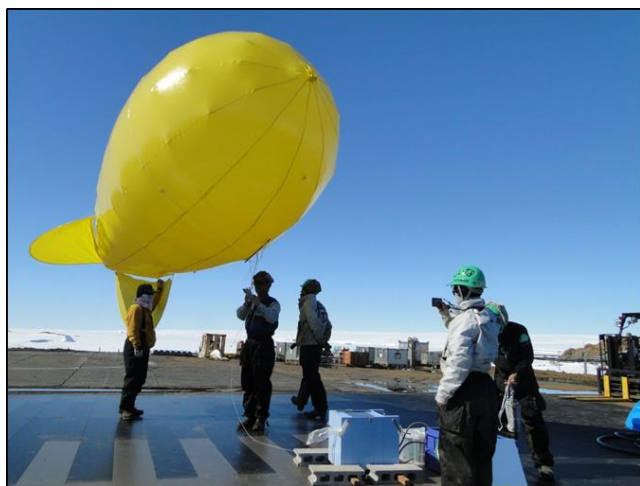


Figure 1. Atmospheric bioaerosol sampling using a tethered balloon.



Figure 2. Atmospheric bioaerosol sampling beside the colony of Adélie penguins at the Hukuro Cove

References

Kobayashi, F., Maki, T., Kakikawa, M., Noda, T., Mitamura, H., Takahashi A., Imura, S., Iwasaka, Y., Atmospheric bioaerosols origination from Adélie penguins (*Pygosceolis adeliae*): Ecological observations of airborne bacteria at Hukuro Cove, Langhovde, Antarctica, *Polar Science*, 10, 71-78, 2016.