

Seasonal change in abundances of the methanogenic gene *mcrA* in a boreal peat wetland

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Northern wetlands are important sources of atmospheric methane and among the largest carbon reserves on the Earth. Methane in wetlands is generated by methanogenic microbes during the final step of organic matter deposition. Methanogenesis is promoted by water saturation and the activities of methanogenic organisms exhibit a vertical profile-typically increasing with depth. Accordingly, anaerobic methanogenesis can be controlled in wetlands by the depths of the water table and peat layer.

Horonobe Town in the northernmost part of Japan has a freshwater wetland, the Sarobetsu Lowland, which covers an area of 2560 ha along the eastern coast of Hokkaido Island and has a peat stratum approximately 500-cm thick. Since November 2005, this area has been included on the Ramsar List of Wetlands of International Importance, and is particularly noted as a waterfowl habitat.

In this study, we conducted a quantitative analysis of methyl coenzyme M reductase (*mcrA*), which is the key enzyme in the methanogenic process. Q-PCR analyses of *mcrA* gene were carried out in Jan to Dec in 2007. Seasonal changes of temperature, dissolved oxygen, and redox potential in peat stratum were measured by installing in three observation borehole with packers.

The main aim of this study is to understand the effect of seasonal change of environmental parameters on microbial activity in boreal wetland.