

A06-P14

THE RATE OF PERMAFROST CO₂ AND METHANE RELEASE UNDER AEROBIC AND ANAEROBIC CONDITIONS USING A SPECIALLY DESIGNED LOWER TEMPERATURE CONTROLLED INCUBATION SYSTEM AND ITS POTENTIAL EFFECTS ON WARMING CLIMATE

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The release of carbon from the decomposition of organic matters in permafrost soils are very important for the acceleration of global warming (Lee et al., 2012). We applied our dynamic system to Alaskan permafrost in Tundra and boreal forests and measured temperature dependence of greenhouse gases (CO₂, CH₄, N₂O, NO, H₂, CO) emission/uptake. Several core samples were placed on petri-dishes which were put into chambers whose temperature was controlled between -5 and 25°C. An example of CO₂ emission from soils showed variations different from sample to sample. Even at -5°C, CO₂ emissions were observed. From the time series of CO₂ emission rates, we estimated Q10 values. Q10 values were similar between 5-15°C and 15 and 25°C. The distinct relation between carbon content and Q10 values were not found. Some permafrost soils also temperature-dependently emit NO, CO and N₂O. It was difficult to observe CH₄ emission from the soils probably because the experiment did not catch CH₄ emission just after the initial thawing. The details of our results will be presented in the conference.