

Winter CO₂ emission from Oi layer on a High Arctic deglaciated terrain

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To clarify CO₂ emission from leaf litter during winter in a high arctic terrestrial ecosystem, we investigated 1) CO₂ flux from snow surface in the ecosystem and 2) temperature dependence of CO₂ emission from leaf litter on low temperature.

The study area was situated in Ny-Alesund, Svalbard, Norway (79°N). Air sampling in the snow and snow surface was conducted in late May 2005 using vacuum glass vials and CO₂ concentration in the air was determined by a gas chromatography. CO₂ flux from snow surface was calculated using Fick's law. On the other hand, frozen leaf litter (*Salix polaris*, *Saxifraga oppositifolia* and *Sanionia uncinata*) under the snow was collected and CO₂ emission rate at low temperature (-13°C - +1°C) was measured using a closed chamber method in a laboratory.

CO₂ efflux from snow surface was estimated to be 0.21-0.27 mg CO₂ m⁻² h⁻¹. Those values were much smaller than that of Fahnestock et al. (1998) (2.6-21.9 mg CO₂ m⁻² h⁻¹) in Alaska. Significant CO₂ emission from leaf litter was detected even at -13°C and increased exponentially with increasing temperature up to +1°C. Our results suggested that CO₂ flux is occurred and leaf litter is one of sources of the CO₂ emission during winter in the High Arctic terrestrial ecosystem.