



Tundra methane emission is moderated by methane oxidation by symbiotic methanotrophs in *Sphagnum*

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CH₄ emission from arctic wetlands is a potential positive feedback to climate change. However, these emissions show a strong spatial variation. In a northeast Siberian tundra area spatial variation over an order of magnitude (1-60 mg CH₄ m²hr⁻¹) has been observed in wetland vegetations with a similar water table. These spatial differences are related to vegetation type. Emission increases in the order submerged *Sphagnum* hollows > *Carex/Eriophorum* meadows > Floodplain sedge and grasses vegetation.

We present evidence that the low emission of *Sphagnum* vegetations is at least partly caused by within-plant oxidation of CH₄ by symbiotic methanotrophic bacteria. Observed oxidation rates in *Sphagnum* samples are 0.5 and 80 micromol CH₄g⁻¹ d⁻¹ on a dry weight basis. Samples from submerged sites show the highest oxidation rates, while samples from *Sphagnum* hummocks show negligible oxidation. Since *Sphagnum* vegetation covers large areas of arctic wetlands, emission estimates should take symbiotic CH₄ oxidation into account.

Next to CH₄ oxidation, the differences in emission can be attributed to differences in ecosystem net primary production (NPP) which is probably lowest in the oligotrophic *Sphagnum* sites and highest on the floodplain where flood water adds nutrients to the ecosystem.