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METHANOGENETIC DIVERSITY AND ACTIVITY IN THE FOREHEAD OF AUSTRE LOVÉNBREEN AND MIDRE LOVÉNBREEN GLACIER

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Subglacial ecosystem has been regarded as the considerable environment with methane production and may have the impact on global methane budget and climate change. Liquid water was beneath the polythermal glaciers in Artic which was necessary for life been there. Methanogens was the key organic carbon degradation player in the subglacial sediment and its metabolic product, methane which was a powerful greenhouse gas, may has positive feedback to the climate change. Artic glacier, Austre Lovénbreen and Midre Lovénbreen were strongly affected by the global warming. Frozen and thawed cycle made liquid water available beneath the glaciers. More information about the methane producer beneath those glaciers was urgent needed.

In this study, we employed the integrated approach including *in vitro* cultivation and molecular techniques to study the diversity and activity of methanogens under the two glaciers. Sediment was sampled from the forehead of the two glaciers respectively. After incubated for three weeks at 4℃with acetate or H_2+CO_2 supplied, methane production was observed with impressive rate: 4.29-13.5 nmol/h/g. The diversity of methanogenetic marker gene, *McrA* gene, was analyzed with clone library. Methanomicrobiales was the main methanogens which can utilize H_2 + CO_2 to produce methane.

These preliminary results showed that methanogens was existing beneath the two glaciers and showed the potential methane production ability. This finding is helpful to the understanding of the global methane budget and global climate change.