

Interactive comment on “Thermokarst-lake methanogenesis along a complete talik profile” by J. K. Heslop et al.

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The manuscript "Thermokarst-lake methanogenesis along a complete talik profile" of J.K. Heslop et al. is actual and timely. Temperature of permafrost is rising in the Arctic and in the following decade may start ubiquitous permafrost degradation. Object of investigation was chosen very well in the manuscript. Vault Lake is a typical young lake, it is situated near the Vault Creek permafrost tunnel. This allowed to investigate the same sediments in detail both in thawed and frozen conditions. All experiments were handled very accurately and data looks statistically reliable. During the investigation, the authors assess methane production in yedoma permafrost at +30°C. The emission is several times higher than emission measured earlier in the middle of the lake. I see no any contradiction in the values and trust the incubation results. Even so the

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lake is young, but the results show that taberal sediments lost almost all labile carbon. Now, methane production from fresh thawed sediments in the lake (temperature is about 0°C) is not high. I believe, when the sediments will warm to +30°C methane production will be the same as authors have gotten in the incubation. I guess that methane emission from the lake surface was underestimated. Methane bubbles could accumulated in the sediment up to 10% of their volume. They release usually during moving a cyclone of very low pressure. Such event may happen not each year. The results of the work can be used for prediction of methane release from the lakes and for various modeling.

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