



## Soil organic matter transformation in cryoturbated horizons of permafrost affected soils

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Cryoturbated soil horizons are special feature of permafrost affected soils. These soils are known to store great amount of organic carbon and cryoturbation undoubtedly contribute to it to large extent. Despite this fact there is almost no information about soil organic matter (SOM) transformation in cryoturbated horizons. Therefore we carried out long term incubation experiment in which we inspect SOM transformation in cryoturbated as well as in organic and mineral soil horizons under different temperature and redox regimes as potential drivers. We found out that lower SOM transformation in cryoturbated horizons compared to organic horizons was mainly limited by the amount of microbial biomass, which is extremely low in absolute numbers or expressed to SOM concentration. The biochemical transformation ensured by extracellular enzymes is relatively high leading to high concentrations of dissolved organic carbon in cryoturbated horizons. Nevertheless the final step of SOM transformation leading to C mineralization to CO<sub>2</sub> or CH<sub>4</sub> seems to be restricted by low microbial biomass. Critical step of biochemical transformation of complex SOM is dominated by phenoloxidases, which break down complex organic compounds to simple ones. Their oxygen consumption greatly overwhelms oxygen consumption of the whole microbial community. However the phenoloxidase activity shows strong temperature response with optimum at 13.7°C. Therefore we suggest that apparent SOM stability in cryoturbated horizons, which is expressed in old C<sup>14</sup> dated age, is caused by low amount of microbial biomass and restricted diffusion of oxygen to extracellular enzymes in field.