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Variation in physical composition of soil organic matter in black spruce forests within a slope in Interior Alaska

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In boreal region, rapid climate warming compared to lower latitude region can accelerate decomposition of soil organic matter (SOM) and, together with an increase in active layer depth, shift patterns of nutrient use and growth of boreal forests. In discontinuous permafrost region of Interior Alaska, black spruce (*Picea mariana*) grows in environments with various active layer depths and different degree of nutrient limitation. These environmental gradients can also be obtained from different positions in a single slope where climatic condition and fire history are similar. To clarify accumulation pattern of SOM and its relationship to tree growth and slope position, we set a transect plot of 1.5km-long in black spruce forests in Caribou Poker Creek Research Watershed. Tree growth rate at lower altitude (250 m) with shallow active layer in growing season is low compared to that at higher altitude (450 m) with deep active layer. We collected samples from organic layers and mineral soil horizons in 14 soil profiles. The thickness of organic layer ranged 7 to 45 cm and was not correlated with altitude. Soil samples are separated into light and heavy fractions by density fractionation approach. The light fraction of topsoil (surface horizon of mineral soil) accounted for 269 g kg^{-1} of soil mass and 598 g kg^{-1} of soil organic carbon in average. The relationship between light fraction content of topsoil and slope position was unclear. In the session, we focus on the ^{15}N natural abundance of SOM and other components in the forest ecosystem and discuss the nitrogen cycling in black spruce forests with different growth rates.

Keywords: black spruce, soil organic matter, density fractionation