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THE EFFECTS OF CLIMATE MANIPULATION ON SOIL ORGANIC CARBON CHARACTERISTICS IN NORTHEAST GREENLAND

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Many climate models predict that climate change will be more marked in the Arctic than any other regions. Climate change can affect the quantity and quality of soil organic carbon (SOC) by inducing changes in input and output parameters such as mass and/or chemical compositions of litter, microbial decomposition, etc. Therefore, we aimed to understand the characteristics of SOC and soil responses to climate manipulation under two dwarf shrubs (*Cassiope tetragona* and *Salix arctica*) in the high Arctic. We hypothesized that warming and shortening growing season length would have influence on the amount and chemical structure of SOC. The study site was in the long-term (8-9 years) climate manipulation plots in Zackenberg, Greenland. Climate manipulation plots were composed of one control (C), warming (T), shading (S), short growing season (SG), and long growing season (LG). In one plot, three soil cores (15 cm length in 5 cm diameter) were taken and were pooled together by depth (litter layer, 0-5, 5-10, and 10-15 cm). Several soil physical and chemical properties were measured: texture, moisture content, pH, SOC and total nitrogen contents, etc. Furthermore, SOC fractionation was conducted by using sodium polytungstate (density 1.55 g cm^{-3}) to separate SOC as free light fraction (FLF), occluded light fraction (OLF), and heavy fraction (HF). Soil temperature in the T plot was 1.2-1.5 °C higher than other plots, but most of soil parameters did not affected by climate manipulation. Although the SOC content was not different among treatments, the ratio of FLF content in the T and SG plots were higher than the others under the *Cassiope tetragona*. In *Salix arctica*, there were no statistical differences in SOC fractionation. Preliminary results showed that when one replicate of FLF samples from *Cassiope tetragona* were analyzed by ^{13}C Nuclear magnetic resonance (NMR) spectroscopy, the ratio of the O/N-alkyl C and that of alkyl C was higher and lower in the T plot than the other plots, respectively. Currently, more characterization of SOC is ongoing with more samples and FLF from *Salix arctica* plots.