Isotopic Signatures of Soil Organic Carbon in a Successional Glacier Foreland in Ny-Alesund, Svalbard

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High-latitude soil organic carbon (SOC) stocks are of particular interest because warming is expected to be greatest at high latitudes and induce acceleration of SOC decomposition. In the deglaciated areas in the high Arctic, accumulation in soil carbon take place very slowly and the organic layer is very thin. If this thin organic layer decreases as a result of climate change, it would profoundly affect the structure and function of whole ecosystems. Thus, improving our knowledge about the dynamics of the soil organic layer is essential to predict how high Arctic terrestrial ecosystems will respond to climate change. Our objects in this study were to obtain elemental and isotopic signatures of SOC in a successional glacier foreland sites in Ny-Alesund, Svalbard, and examine its relation to vegetation. Soil organic carbon content, nitrogen content, stable-carbon composition (delta $_{13}$C and radiocarbon age for soil profiles were measured along a primary successional series of the deglaciated area. The C and N contents of SOC at soil surface tended to increase and its delta $_{13}$C values gradually decreased with the progress of succession. On the other hand, no clear trend was found at deep soils. Regardless of vegetation types, delta $_{13}$C values was significantly correlated with C and N contents, suggesting relatively high contribution of carbon input from biomass at surface soil. However, it is difficult to explain the correlation only with productivity of vegetation. In this site, soil carbon storage may be related to SOC decomposition.