Reconstructing Climate and Vegetation to Understand Carbon Storage in Arctic Siberia

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The ability of arctic peatlands to store carbon makes them an important component of the process of climate change, and also a valuable record of this change over time. One of the largest stores of carbon on Earth is located in the peatlands of northern Russia. Because we do not know how these arctic carbon stores will react to present and future climate change, it is important to identify trends of carbon flux in the past to understand their potential implications for the future. To do this, we analyzed a peat core taken from the Pur-Taz region of western Siberia, located at 66"42' N, 79"44' E. The core was taken from a frozen exposure of peat along a lake in the area, and was subsampled into smaller 5 cm intervals. In hopes of understanding the dynamic role peatlands play in climate change, we attempted to examine the relationship between carbon, vegetation and climate in arctic Siberia, in order to reconstruct the vegetation and climate of the region, along with its carbon sequestration over time. There are a number of methods we used to reconstruct the vegetation and climate: macrofossil identification, LOI, leaf wax n-alkane extraction, and hydrogen isotope analysis. These methods allowed us to determine the carbon flux of the core along with corresponding trends in paleoclimate and vegetation. We found that the rate of carbon accumulation was the greatest during 7500-6500 years BP, during a warmer and drier climate. In addition, we saw that periods of high carbon accumulation typically corresponded with warmer and drier periods. During warmer periods, wetter species were less abundant, and δD of *Sphagnum* leaf wax was enriched due to a higher rate of evaporation.