Using Black Spruce $\delta^{13}C$ and $\delta^{18}O$ to Characterize Climates of Northern Canada

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Accurate projections of future climate are needed to guide sound policy decisions in northern Canada, which is presently experiencing rapid climate and environmental changes compared to lower latitudes. Confidence in climate models is established by direct comparison of model outputs with instrumental climate observations, which are generally limited spatially and temporally in northern regions. Similarly, paleo-climate reconstructions from natural proxy records provide a viable alternative. The analysis of the stable isotope ratios of carbon ($\delta^{13}C$) and oxygen ($\delta^{18}O$) in tree-rings represents a powerful approach to informing these reconstructions given the annual resolution of tree-rings, the high climatic sensitivity of tree-ring stable isotopes, and the well understood mechanistics of tree-ring isotope systems. As environmental research through isotopic analyses is an expanding field of study, Northern Canada has not yet been fully explored, allowing us the opportunity to test new means of gathering the requisite data needed to reconstruct past environments. This project examines the composite $\delta^{13}C$ and $\delta^{18}O$ signatures from alpha-cellulose of 5 black spruce (*Picea mariana*) trees – from a peatland site along the Dempster Highway in central Yukon. Each tree-ring year from 1948-2012 will be analysed. A correlation analysis between local climate variables (i.e., relative humidity, temperature and precipitation) and both isotopic records will be used to quantify the most important climate-isotope relations, and determine the potential to use black spruce tree-ring isotopes from this region as climate proxies beyond the short instrumental record.