The potential for developing a 500 year tree-ring time series for Moosehead Lake, Maine using dendrochronological techniques

Abstract

Tree-ring chronologies represent the most powerful and valuable natural archives to reconstruct past climatic conditions at the local and global scale. They provide information over multi-century to millennial time periods and are very useful due to their annual resolution, precise dating, replication, and sensitivity to changing climate variables. Due to several factors contributing to the low number of dendroclimatic reconstructions, little is known of past temperature and precipitation in the New England region. Most of the available tree-ring time series sampled from live New England trees are shorter than 300 years. Without longer tree-ring proxies used to reconstruct climate at local and regional scales for periods of 500 years and longer, climate models will remain incomplete. This research was conducted to develop and make available the <u>first</u>, long-term (~500 years) tree-ring chronology for northern New England. To accomplish this objective, sixteen logs were pulled off the bottom of Moosehead Lake in northern Maine and cross sections made. In the summer of 2011, the cross sections were processed using standard dendrochronological techniques (Fritts, 1976), which included sanding, developing skeleton plots, and measuring the rings, to develop 16 "floating dead" chronologies. Based on wood samples examined under a microscope, three tree species were identified, including sugar maple (*Acer saccharum*; range: 73-205 years), yellow birch (*Betula alleghaniensis*; range: 100-278 years), and eastern hemlock (*Tsuga canadensis*; range: 113-272 years) (personal communication, Professor Emeritus R. Whitmore, UVM, 2011). Future analysis will consist of crossdating these "floating dead" chronologies with live chronologies of the same tree species from northwestern Maine, as well as determining correlations with past climate variables such as temperature and precipitation in the region.