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Recent Climate Change in the Red River Basin, Manitoba, Canada

Bill Buhay
Canada (b.buhay@uwinnipeg.ca)

Combined stable isotope techniques with the more traditional tree-ring techniques to examine recent climate change in the Red River basin. At present, the regional tree-ring record extends from AD 1999 to AD 1460, with an additional 311-year 'floating' chronology obtained from samples recovered from the Assiniboine River. Isotopic data has been extracted from three trees from Winnipeg to generate an annual record of fluctuations in oxygen and carbon isotopes from 1802 to 1990. These preliminary results suggest that the isotopic variations in the trees are closely linked to past variations in regional hydroclimate and growing season temperature. The earliest part of the isotope tree-ring record from Kildonan Park reveals depleted oxygen-18 isotope values centred on the historical 1811 and 1826 floods and enriched oxygen-18 values in association with historical droughts (1803-1805; 1816-1820, 1862-1864) and excessively dry periods (1840). Samples from Kildonan Park and St. Vital Park contain intervals of depleted oxygen-18 compositions that correspond with Red River floods in 1852 and 1861 and near-flood conditions in 1882 and 1896. When compared with Winnipeg instrumental records, preliminary [U+F064]13Ccellulose values from both trees show a positive relationship with recorded growing season temperature variations (average monthly daytime temperatures from June to September) between 1874 and 1953, a period characterized by increasing growing season temperatures mimicked by progressive [U+F064]13Ccellulose enrichment.