Hall, R.I., Wolfe, B.B., Edwards, T.W.D., Johnston, J.W., Sinnatamby, R.N., Karst-Riddoch, T.L., Sokal, M., Asada, T., Clogg-Wright, K., Yi, Y., 2005, **Lake Athabasca and the Little Ice Age: sustained high-water stand driven by snowmelt-enhanced Athabasca River discharge?**, *Canadian Quaternary Association Conference*, June 5-8, Winnipeg, Manitoba, Abstracts with Program.

As part of ongoing efforts aimed at improving knowledge of past hydrology, ecology and climate of the Peace-Athabasca Delta (PAD), northern Alberta (see Wolfe et al., this volume), paleoenvironmental studies have revealed evidence for profound changes in the western shoreline of Lake Athabasca over the past six centuries. Archival maps depict an expansive western embayment dating to AD 1827, followed by receding water levels in the early part of the 20th century evolving to the present landscape consisting of a large open wetland that is frequently flooded. Multi-proxy paleolimnological analyses of sediment cores retrieved from a closed-drainage basin in this former embayment of Lake Athabasca are strongly consistent with the paleohydrologic changes depicted on historical maps. Importantly, our analyses have revealed that high relative abundance of open-drainage indicator diatom taxa persists during the Little Ice Age (~AD 1600 to ~AD 1900), but the site existed as an isolated closed-drainage basin during the Medieval Warm Period (~AD 900-1600) and during most of the past century (since ~1910). A sustained multi-centennial high-water stand of Lake Athabasca may be responsible for the diatom stratigraphy during the Little Ice Age, as well as open-drainage conditions documented at this time in the sediment histories of other centrally-located, low-lying basins in the delta that are susceptible to a rise in Lake Athabasca water level. While an increase in river flood frequency could explain these stratigraphic records, this is inconsistent with low flood frequency during the 1700s reconstructed from the sediments of an oxbow lake near the Peace River or extremely dry conditions inferred from multi-proxy paleolimnological records from an elevated perched basin in the northern Peace sector (see Wolfe et al., this volume). We hypothesize that snowmelt-dominated runoff in the eastern Rockies sustained greater summer discharge in the Peace and Athabasca rivers and higher levels in Lake Athabasca during the Little Ice Age, except at times of rapid glacier advance.

To test this hypothesis, we obtained a sediment core from a shallow pond located in a barrier island complex in the western part of Lake Athabasca. Sediments from the pond are mainly organic with several distinct sandy laminations and beds. The close proximity of the coring site to a washover fan suggests that the sand was derived from the barrier and transported by waves overtopping the barrier and, thus, may provide direct evidence of former high-water stands of Lake Athabasca.