Geophysical Research Abstracts, Vol. 9, 00883, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00883

Limnological and environmental Changes inferred from Microcrustaceans (Anemopoda and Ostracoda) in a shrub-tundra Lake in Arctic Québec, Canada

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Earth's climate is changing rapidly, with the global temperature now rising at a rate unprecedented in the context of modern human society. While some historical changes in climate have resulted from natural causes and variations, the magnitude of the trends and the patterns of change that have emerged in recent decades clearly point to human-induced shifts, resulting primarily from increased greenhouse gas emissions (ACIA, 2005). To better understand past aquatic ecosystems and their postglacial variability in northeastern Canada, a 99-cm sediment core was extracted from a shrub-tundra lake in northern Québec. An earlier multi-proxy study of this core combining fossil chironomids, diatoms, and pollen has resulted in reconstructions of lake water conditions (summer surface water temperature, dissolved organic carbon (DOC), alkalinity, and water colour) for the last 6700 cal. yr. BP (Fallu et al. 2005). Here, we present the results of our complementary microcrustacean analyses (Anemopoda and Ostracoda) at 1.0-cm intervals. Due to the low alkalinity of freshwaters situated within the granitic bedrock of the Precambrian Canadian Shield, the calcareous remains of these microcrustaceans usually dissolve quickly or do not preserve well in the sedimentary record. As a consequence, we used mainly mandibles and other sclerotic remains ($>$ 37μm) to identify and enumerated the fossil anemopod and ostracod fauna. The quantitative interpretation of the changes observed in the microcrustacean assemblages is based on a new calibration data set that is currently being developed for central and northeastern Canada (Churchill 58°N, Southampton Island 64°N, Bylot Island 80°N; Σ=30 lakes). The results confirm that alkalinity was higher during the lake's early history and then decreased throughout its postglacial development. Concurrently, all aquatic organisms identified in our core revealed a direct influence

by temperature and responded most rapidly to climatic changes, whereas terrestrial vegetation (as inferred by pollen) yielded a slight lag.

References:

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