Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01417, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01417
EGU General Assembly 2008

Observations of northern latitude ground-surfaceand surface-air temperatures

Allan D. Woodbury(1), AKM H. Bhuiyan(2), John Hanesiak(2) and Grant Ferguson(3)

(1)Department of Civil Engineering, University of Manitoba, Winnipeg, Manitoba, R3T5V6, Canada.(2) Center for Earth Observation and Science (CEOS), Faculty of Environment, Earth,and Resources, University of Manitoba, Winnipeg, Manitoba, R3T 2N2, Canada(3) Department of Earth Sciences, St. Francis Xavier University,Antigonish, Nova Scotia, Canada.

Since Lachenbruch and Marshall's classic study of subsurface temperatures in Alaska, there has been a great deal of interest in studying climate change through reconstructing ground surface temperatures (GST) from borehole measurements(BHT). Note that the magnitude of temperature increases reconstructed from BHT records seems to contrast however, with some proxy based reconstructions of surface air temperature (SAT) that indicate lower amounts of warming over the same period.

We present data suggesting that seasonal snow cover may bias climate reconstructions based on BHT in portions of the Canadian northwest. Eight sites west of the Canadian cordillera, were examined for long-term SAT and GST changes. At seven of these sites precise borehole temperature profiles are used for the first time since the 1960s, thereby exploring the linkage between GST and SAT. New readings were made at four of these locations. All sites showed significant increasing SAT trends, in terms of annual mean minimum and maximum temperatures. Over a 54 year period, the minimum temperatures increased between 1.1 C and 1.5 C while the maximum increased between 0.8 C and 1.5 C, among those eight stations. Observations of GST at those sites, however, showed no obvious climate induced perturbations. We believe this disconnect between SAT and GST is attributable to an increase in snow cover in early winter, followed by an increasing trend toward earlier snow melt in the region. Such seasonal bias has important implications for GST reconstructions based on borehole

temperatures. These results support Mann and Schmidt's conjecture about a seasonal bias in the GST reconstructions from borehole surveys and counter assertions of lower historic earth temperatures.