
**Cosmogenic nuclide insights on the
interaction between local ice caps and
Laurentide Ice in northern Labrador**

J. GOSSE^{1,2}, J. GRAY³, G. MARQUETTE³, L. STOCKLI²,
J. WILLENBRING¹, AND R. FINKEL⁴

*1. Department of Earth Sciences, Dalhousie University, Halifax, NS B3H 3J5,
Canada ¶ 2. Department of Geology, University of Kansas, Lawrence,
KS 66045, U.S.A. ¶ 3. Département de Géographie, Université de
Montréal, Montréal, QC H3C 3J7, Canada ¶ 4. CAMS, Lawrence
Livermore National Laboratory, Livermore, CA, U.S.A.*

Terrestrial cosmogenic nuclides (TCN) are produced in minerals exposed to cosmic radiation and are used to determine erosion rates, ages of landform surfaces, and burial histories. The TCN facility being constructed at Dalhousie will prepare samples for ¹⁰Be and ²⁶Al dating. We report TCN exposure data used to test a hypothesis suggesting that local thin ice caps played a significant role in the glaciation of the Ungava Peninsula and northern coastal Labrador. Glacial geomorphology, soils mineralogy and chemistry, and cosmogenic ¹⁰Be and ²⁶Al are combined to show that: (1) glacial erosion rates are extremely low on small plateaux and summits; (2) glacial erosion rates are high in areas documented by warm-based ice features; (3) the Labrador weathering zones designated in the type locality are likely a product of differential erosion due to variations in glacier basal thermal regime. Exposure ages ranging from 11 ± 1 to 250 ± 9 kyr characterize the bedrock tor-like features that have been sampled. Evidence for deglaciation from a Younger Dryas advance is apparent at multiple sites. There is growing evidence to suggest that the ice caps have controlled or even redirected concurrent Laurentide Ice Sheet (LIS) flow. Exposure ages on felsenmeer summits are consistent with higher abundances of gibbsite found in summit soils relative to soils in tills and valley floors. The field and isotope data lead us to envision a thinner, less extensive last-glacial-maximum-Labradorean LIS than is currently visualized.
