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№ 17038

DEGLACIAL DYNAMICS OF BAFFIN ISLAND BY COSMOGENIC EXPOSURE DATING

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For the past three decades, the timing of glaciation and the extent of ice margins in the eastern Canadian arctic have remained unresolved. Over 60 pairs of ^{10}Be and ^{26}Al analyses suggest that a late Wisconsinan (Stage 2) age for the type Duval moraines is consistent with 1) "old" (Stage 4 or 6 or earlier) tors and boulders from the upper weathering zone, 2) ^{14}C ages from basal sediments in lakes in tributary valleys to Pangnirtung Fjord, 3) ^{14}C ages on mollusks from a raised marine feature along Pangnirtung Fjord, and 4) ^{14}C ages on mollusks and forams from ice-proximal facies of till on the floor of Cumberland Sound.

Two bedrock tors at about 1000 m a.s.l. in the highest weathering zone above Kolik valley yield minimum ^{10}Be ages of 59.6 and 121.5 ka and ^{26}Al ages of 42.2 and 90.3 ka, respectively. The disparity of ^{10}Be and ^{26}Al ages suggest that these high areas have a long and complex burial and exposure history of non-erosive, cold-based ice or snow cover.

Basal sediments from two tarns between about 600 and 850 m a.s.l. yield ^{14}C ages of 18-20 ka (Wolfe, 1994, 1995). The glacially molded bedrock lip adjacent to the tarn from one of the cirques yields ^{10}Be ages of 9.1 and 10.0 ka and ^{26}Al ages of 10.9 and 11.2 ka, but one nearby boulder has exposure ages of 19.1 and 21.3 ka for ^{10}Be and ^{26}Al, respectively.

Basal sediments from a large lake on the floor of Kolik valley at about 300 m a.s.l. yield a minimum limiting ^{14}C age of about 8 ka (Lemmen *et al.*, 1988). Five bedrock and boulder samples from the floor of Kolik valley yield an average ^{10}Be age of 10.9 ka and an average ^{26}Al age of 10.8 ka. A 10-km long esker feeds a glaciolacustrine delta in Kolik valley. The former lake required ponding by glacial ice in Pangnirtung Fjord, with a margin marked by the Duval moraines. Boulders on the Duval moraines yield a bimodal distribution of ^{10}Be and ^{26}Al ages that center about 20-24 ka and 8-10 ka. The cosmogenic ages for deglaciation of Kolik valley favor the latter of these two ages for last ice recession from the Duval moraines. Preliminary analyses on ice-molded bedrock along Pangnirtung Fjord reveal no ^{10}Be or ^{26}Al exposure ages greater than 7 ka. None of these data are inconsistent with radiocarbon ages of about 9 ka from a raised marine deposit along Pangnirtung Fjord.

A late Stage 2 deglaciation of Kolik valley and Pangnirtung Fjord is consistent with glacial ice filling nearby Cumberland Sound at 10 ka (Jennings, 1993, 1996), but is inconsistent with a Stage 4 age for the Duval moraines (Dyke, 1979). All isotope data reported here use production rates of Nishiizumi *et al.* (1989), but are not yet corrected for shielding, exposure geometry, or precise altitudes of sample sites; such corrections and use of other production rate estimates would change our ages by <20%.

Key words: Baffin Island, glacial history, moraines, cosmogenic isotopes

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1635