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No 7842

STAGE II "BIG ICE" ON BAFFIN ISLAND

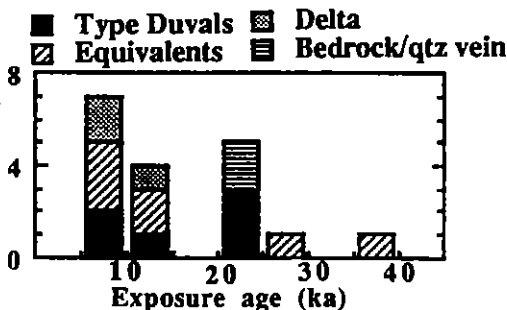
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The Duval moraines are the most extensive and well-defined moraines in the Pangnirtung area of southern Cumberland Peninsula. We have dated the Duval moraines directly using the *in situ* produced cosmogenic isotopes ^{10}Be and ^{26}Al . We collected 6 boulders from the type locality of the Duval moraines and 7 boulders from Duval equivalent moraines on both sides of the fjord. "Duval" age moraines were determined by air photo analysis based on their altitudinal and stratigraphic position as related to the type locality.

Twenty-six exposure ages indicate that the Duval moraine system is late Wisconsinan (Stage 2) in age. However, there is a distinct bi-modal distribution of ages, with 6 boulders between 8 and 10 ka (avg. 9.5) and 5 boulders between 20 and 25 ka (avg. 22.6), which may indicate a complex history of retreats and advances during the late Wisconsinan. This bi-modality includes pairs of boulders only a few meters apart along a single moraine segment, but is not restricted to any one segment.

Over 50 other pairs of exposure ages have been calculated for boulders and bedrock in the Pangnirtung Fjord area; of these, at least 6 have a direct bearing on the age of the Duval moraine system. Perched boulders on and above a glaciomarine delta were collected, along with two samples from bedrock ridges adjacent to the delta. This delta is interpreted to have formed when ice stood at the Duval moraine position. The average exposure age of the bedrock samples is 9.6 ka and the age of one of the boulders above the delta is 10.8 ka, constraining the age of the delta to the late Wisconsinan. In addition, a molded bedrock outcrop located just west of the abrupt terminus of the type Duval moraines was sampled along with a prominent, striated quartz vein in that outcrop. The outcrop sample yielded an exposure age of 24.6 ka and the quartz vein, 25.2 ka, further constraining the Duval moraines to the late Wisconsinan. All ages were determined using production rates of Nishiizumi *et al* (1989). The uncertainty of our AMS measurements are $\leq 5\%$ and the ^{10}Be and ^{26}Al ages are well correlated ($r^2=0.98$, $n=100$).

The previously proposed age of the Duval moraines (60-80 ka; Dyke, 1979) contributed to the notion that the most extensive glacial limits occurred during the early Wisconsinan glaciation (Stage 4), followed by less extensive ice advances. Stage 2 ice margins were previously mapped roughly parallel to the fjord heads on the east coast of Baffin Island, contributing to a "small ice" model for the late Wisconsinan configuration of the Laurentide ice sheet. However, the exposure ages of the Duval moraines indicate that these features were formed during the late Wisconsinan and that during Stage 2 the "big ice" model is more accurate for the Pangnirtung Fjord area.



^{10}Be , ^{26}Al , Baffin Island, glaciation, moraines

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