GSA Data Repository Item 2002080, Table DR1, Sample location information and cosmogenic exposure ages, and Table DR2, Weighted mean moraine stabilization ages

Table DR2. Weighted mean moraine stabilization ages. Because the cosmic-ray flux is attenuated by the atmosphere, local atmospheric pressure anomalies may alter local production rates (Stone, 2000). Due to the proximity of the Ahklun Mountains to the Aleutian Low pressure system, the local production rate may have at times been as much as 5% higher (Table 2).

Factors that control sample exposure history, including paleo-snow cover and post-glacial boulder surface erosion, must also be considered. Both of these factors are difficult to quantify for the Ahklun Mountains because there are no nearby climate stations to provide snow data and because quantifying bedrock erosion has not been attempted in this region. Fortunately, Mt. Waskey moraine boulders are high enough to be mostly windswept and probably only minimally covered by snow for a few months per winter. The nearest snow data are from Dillingham (at sea level ~90 km away; Fig. 1), where the historic average snow depth is ~25 cm for six months per year. Because all sampled boulders are situated on moraine crests and are themselves 1-3 m high, we chose to model 1 m of snow (0.2 g cm^{-3}) covering the sampled boulders for four months per year as a maximum estimate. As an extreme, denser (0.3 g cm^{-3}) and thicker snow (2 m thick atop sampled boulders) could increase the ages by 11%.

Bierman et al. (1999) estimated a maximum erosion rate of 1.1 mm $k.y.^{-1}$ for the eastern Canadian Arctic, and Gosse et al. (1995) reported a similar value of 1.3 mm $k.y.^{-1}$ for western North America. Other studies have yielded rates as high as ~10 mm $k.y.^{-1}$ for mid-latitude mountain summits (e.g., Small and Anderson, 1998). The boulders on moraines of the Mt. Waskey advance lack striae, but are generally smooth and show little grain-to-grain relief.

Because of the lack of advanced weathering features, we have modeled the exposure ages with 3 mm k.y.$^{-1}$ of erosion, and as with our model of snow cover, we believe that these estimates result in a reasonable maximum effect on the ages (an extreme value of 1 cm k.y.-1 would increase the ages by 9.5%).

In addition, all samples were corrected for topographic shielding and sample thickness (maximum corrections of 1% and 4%, respectively).

REFERENCES CITED (GSA Data Repository Item 2002080)

Bierman, P.R., Marsella, K.A., Patterson, C., Davis, P.T., and Caffee, M., 1999, Mid-Pleistocene cosmogenic minimum-age limits for pre-Wisconsinan glacial surfaces in southwestern Minnesota and southern Baffin Island: A multiple nuclide approach: Geomorphology, v. 27, p. 25-39.

Gosse, J.C., Evenson, E.B., Klein, J., Lawn, B., and Middleton, R., 1995, Precise cosmogenic ^{10}Be measurements in western North America: Support for a global Younger Dryas cooling event: Geology, v. 23, p. 877-880.

Small, E.E., and Anderson, R.S., 1998, Pleistocene relief production in the Laramide mountain ranges, western United States: Geology, v. 26, p. 123-126.

TABLE DR1. SAMPLE LOCATION INFORMATION AND COSMOGENIC EXPOSURE AGES

Sample	Lat. (N)	Long. (W)	Elevation (m asl)	^{10}Be (10^5 atoms g^{-1})	^{26}Al (10^5 atoms g^{-1})	^{10}Be age* (ka)	^{26}Al age† (ka)
MB1-99-1	56° 52' 12"	159° 13' 20"	240	0.70 ± 0.12		11.2 ± 2.0	
MB1-99-2	56° 52' 14"	159° 13' 25"	236	0.96 ± 0.10	5.32 ± 0.83	15.6 ± 1.6	14.1 ± 2.2
MB1-99-3	56° 52' 23"	159° 13' 38"	200	0.97 ± 0.13	6.06 ± 0.83	16.1 ± 2.1	16.2 ± 2.2
MB1-00-4	56° 52' 03"	159° 13' 11"	276	0.71 ± 0.04		11.0 ± 0.6	
MB4-00-1	56° 52' 10"	159° 16' 34"	274		4.59 ± 0.45		11.7± 1.2
MB4-00-2	56° 52' 10"	159° 16' 35"	273		3.72 ± 0.60		9.4 ± 1.5
MB4-00-3	56° 52' 13"	159° 16' 14"	274	0.65 ± 0.05		10.1 ± 0.8	
MB6-00-1	56° 52' 04"	159° 13' 00"	270	0.63 ± 0.04		9.8 ± 0.7	
MB6-00-2	56° 52' 06"	159° 13' 06"	273	0.72 ± 0.03		11.2 ± 0.5	

NOTE: The ages reported here do not account for erosion or paleo-snow cover.

*^{10}Be ages include isotope ratio measurement uncertainty (1 S.D.).

†^{26}Al ages include both isotopic ratio and total Al measurement uncertainties (1 S.D.).

TABLE DR2. WEIGHTED MEAN MORAINE STABILIZATION AGES

Sample groups	No corrections	Corrections		
		Erosion*	Snow†	Erosion and snow
No correction for atm pressure anomaly (^{10}Be P=5.1;^{26}Al P=31.1)				
all ages	10.9 ± 2.3	11.2 ± 2.4	11.3 ± 2.4	11.6 ± 2.5
excluding outliers§	10.7 ± 0.8	11.0 ± 0.9	11.2 ± 0.9	11.5 ± 0.9
Correction for atm pressure anomaly (^{10}Be P=5.4;^{26}Al P=32.7)#				
all ages	10.4 ± 2.2	10.6 ± 2.3	10.8 ± 2.3	11.1 ± 2.4
excluding outliers§	10.2 ± 0.8	10.5 ± 0.8	10.6 ± 0.8	10.9 ± 0.9

NOTE: Includes the average ^{10}Be and ^{26}Al age for samples MB1-99-2 and MB1-99-3.

*3 mm k.y.-1 (see text).

†4 months of 1 m of snow cover (0.2 g cm^{3}).

§Excludes MB1-99-2 and MB1-99-3 (see text).

#Production rates increase by ~5% for local atmospheric pressure anomaly (Stone, 2000).