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Cosmogenic ages indicate no MIS 2 refugia in the Alexander Archipelago, Alaska

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Table S1. Major element chemistry for ^{36}Cl samples

Sample ID	SiO_2 %	TiO_2 %	Al_2O_3 %	Fe_2O_3 %	MnO %	MgO %	CaO %	Na_2O %	K_2O %	P_2O_5 %	Cr_2O_3 %	LOI[a]
19SEAK-01	47.81	2.34	17.19	12.42	0.16	5.48	10.38	3.27	0.54	0.12	<0.01	0.88
19SEAK-02	47.48	2.42	17.94	12.17	0.16	5.1	10.73	3.25	0.65	0.08	<0.01	0.45
19SEAK-03	46.44	2.32	17.26	12.2	0.17	5.89	11.62	3.2	0.61	0.07	<0.01	0.65
19SEAK-06	46.68	2.39	16.74	12.71	0.18	5.82	11.12	3.28	0.72	0.12	<0.01	0.61

All major elements and LOI are listed in weight percent; analyses were performed via X-ray fluorescence with 0.01% detection limit

[a] H_2O was assumed to account for the entire LOI signal

Table S2. Trace element chemistry for ^{36}Cl samples

Sample ID	Cl (ppm)	B (ppm)	Sm (ppm)	Gd (ppm)	U (ppm)	Th (ppm)	Cr (ppm)	Li (ppm)
19SEAK-01	12.9 ± 0.8	57.0	5.7	5.9	0.6	1.8	119.0	37.0
19SEAK-02	5.7 ± 0.1	30.0	5.3	5.7	0.5	1.6	114.0	23.0
19SEAK-03	24.0 ± 0.8	10.0	4.9	5.6	0.4	1.5	154.0	10.0
19SEAK-06	9.3 ± 0.6	10.0	5.3	6.1	0.5	1.8	125.0	10.0

Trace elements were analyzed by ICP-MS with the following detection limits (ppm): 10 for B, Cr, and Li; 0.1 for Sm and Th; 0.05 for Gd and U

[a] Cl concentration was calculated using isotope dilution based on AMS data and the methods of Faure (1983)

Table S3. Comparison of ^{36}Cl exposure ages computed with variable amounts of surface erosion and changes to nucleogenic 36Cl equilibrium. SSNP = steady state nucleogenic 36Cl production. Ages are presented at 1 σ internal uncertainty. External uncertainties are listed in parentheses.

Sample ID	^{36}Cl age with no surface erosion and SSNP (ka)	^{36}Cl age with no surface erosion and 20 ka rock formation age (non-SSNP; ka)	^{36}Cl age with 3 mm/kyr surface erosion and SSNP (ka)[a]	^{36}Cl age with 3 mm/kyr surface erosion and 20 ka rock formation age (non-SSNP; ka)[a]
19SEAK-01	13.5 ± 0.3 (1.3)	13.5 ± 0.3 (1.3)	13.6 ± 0.3 (1.4)	13.7 ± 0.3 (1.4)
19SEAK-02	16.4 ± 0.5 (1.5)	16.5 ± 0.5 (1.6)	16.7 ± 0.5 (1.6)	16.7 ± 0.5 (1.6)
19SEAK-03	13.1 ± 0.3 (1.3)	13.3 ± 0.3 (1.3)	13.2 ± 0.3 (1.3)	13.3 ± 0.3 (1.3)
19SEAK-06	12.4 ± 0.3 (1.1)	12.5 ± 0.2 (1.1)	12.5 ± 0.3 (1.2)	12.6 ± 0.3 (1.2)

[a] 3 mm/kyr erosion rate after Menounos et al. (2017).

Table S4. Comparison of ^{10}Be exposure ages computed with 3 mm/kyr of surface erosion. Ages are presented at 1 σ internal uncertainty. External uncertainties are listed in parentheses.

Sample ID	^{10}Be age with Arctic PR and no erosion (ka)	^{10}Be age with Arctic PR and 3 mm/kyr erosion (ka)[a]	^{10}Be age with Global PR and no erosion (ka)	^{10}Be age with Global PR and 3 mm/kyr erosion (ka)[a]
18JB005	15.3 ± 0.5 (0.8)	16.0 ± 0.5 (0.8)	14.7 ± 0.5 (1.2)	15.3 ± 0.5 (1.3)
18JB006	14.9 ± 0.6 (0.8)	15.5 ± 0.6 (0.8)	14.3 ± 0.5 (1.2)	14.8 ± 0.6 (1.3)
18JB007	15.4 ± 0.5 (0.8)	16.1 ± 0.6 (0.8)	14.8 ± 0.5 (1.1)	15.4 ± 0.6 (1.3)
18JB008	13.7 ± 0.5 (0.7)	14.2 ± 0.5 (0.7)	13.2 ± 0.4 (1.1)	13.6 ± 0.5 (1.2)
19SEAK-07	15.6 ± 0.7 (0.9)	16.2 ± 0.7 (1.0)	14.9 ± 0.6 (1.3)	15.5 ± 0.7 (1.4)
19SEAK-08	15.0 ± 1.1 (1.3)	15.6 ± 1.2 (1.4)	14.4 ± 1.1 (1.5)	14.9 ± 1.2 (1.7)
19SEAK-09	17.4 ± 1.2 (1.4)	18.2 ± 1.4 (1.5)	16.7 ± 1.2 (1.7)	17.4 ± 1.3 (1.9)
19SEAK-10	19.7 ± 1.2 (1.4)	20.7 ± 1.4 (1.6)	18.9 ± 1.2 (1.9)	19.9 ± 1.3 (2.0)
19SEAK-17	16.9 ± 0.8 (1.0)	17.8 ± 0.9 (1.1)	16.3 ± 0.8 (1.5)	17.0 ± 0.9 (1.6)
19SEAK-18	21.7 ± 0.9 (1.2)	23.0 ± 1.0 (1.4)	20.8 ± 0.9 (1.8)	22.0 ± 1.0 (2.0)
19SEAK-19	28.0 ± 1.1 (1.5)	30.2 ± 1.3 (1.8)	26.9 ± 1 (2.3)	28.8 ± 1.2 (2.6)
19SEAK-20	14.4 ± 0.7 (0.9)	14.9 ± 0.8 (1.0)	13.8 ± 0.7 (1.3)	14.3 ± 0.8 (1.3)
19SEAK-21	14.4 ± 0.7 (0.9)	15.0 ± 0.7 (0.9)	13.8 ± 0.6 (1.2)	14.3 ± 0.7 (1.3)
19SEAK-22	14.4 ± 0.6 (0.8)	15.0 ± 0.6 (0.8)	13.8 ± 0.5 (1.2)	14.3 ± 0.6 (1.3)
19SEAK-23	15.1 ± 0.6 (0.8)	15.7 ± 0.6 (0.9)	14.5 ± 0.6 (1.2)	15.0 ± 0.6 (1.3)
19SEAK-24	16.3 ± 0.5 (0.8)	16.9 ± 0.6 (0.9)	15.6 ± 0.5 (1.3)	16.2 ± 0.6 (1.4)
19SEAK-25	15.7 ± 0.6 (0.8)	16.4 ± 0.6 (0.9)	15.1 ± 0.5 (1.3)	15.7 ± 0.6 (1.4)
19SEAK-26	18.2 ± 0.7 (1.0)	19.0 ± 0.8 (1.1)	17.4 ± 0.7 (1.5)	18.2 ± 0.8 (1.6)
19SEAK-27	20.2 ± 0.8 (1.1)	21.1 ± 0.9 (1.2)	19.3 ± 0.7 (1.6)	20.3 ± 0.8 (1.8)
20SEAK-7	14.9 ± 0.8 (1.0)	15.4 ± 0.9 (1.0)	14.3 ± 0.8 (1.3)	14.8 ± 0.8 (1.4)
20SEAK-10	13.4 ± 1.0 (1.1)	13.9 ± 1.0 (1.1)	12.9 ± 0.9 (1.3)	13.3 ± 1.0 (1.4)
20SEAK-12	14.9 ± 0.7 (0.9)	15.4 ± 0.7 (0.9)	14.3 ± 0.6 (1.3)	14.8 ± 0.7 (1.3)
20SEAK-13	14.6 ± 0.8 (1.0)	15.2 ± 0.9 (1.0)	14.1 ± 0.8 (1.3)	14.6 ± 0.8 (1.4)
20SEAK-14	15.3 ± 0.7 (0.9)	15.9 ± 0.8 (1.0)	14.6 ± 0.7 (1.3)	15.2 ± 0.8 (1.4)
20SEAK-15	12.7 ± 0.7 (0.8)	13.1 ± 0.7 (0.9)	12.2 ± 0.7 (1.1)	12.6 ± 0.7 (1.2)
20SEAK-16	9.0 ± 0.6 (0.7)	9.2 ± 0.6 (0.7)	8.6 ± 0.6 (0.9)	8.8 ± 0.6 (0.9)
20SEAK-18	12.4 ± 0.9 (1.0)	12.8 ± 1.0 (1.1)	11.8 ± 0.9 (1.2)	12.2 ± 0.9 (1.3)
20SEAK-19	14.1 ± 0.7 (0.8)	14.6 ± 0.7 (0.9)	13.5 ± 0.6 (1.2)	14.0 ± 0.7 (1.3)
20SEAK-22	17.7 ± 0.8 (1.0)	18.5 ± 0.8 (1.1)	17.0 ± 0.7 (1.5)	17.7 ± 0.8 (1.6)

[a] 3 mm/kyr erosion rate after Menounos et al. (2017).