

Table S1. Major element chemistry for ³⁶Cl samples

SAMPLE	SiO₂ %	TiO₂ %	Al₂O₃ %	Fe₂O₃ %	MnO %	MgO %	CaO %	Na₂O %	K₂O %	P₂O₅ %	Cr₂O₃ %	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 H₂O was assumed to account for the entire LOI signal

Table S2. Trace element chemistry for ³⁶Cl samples

SAMPLE	Cl (ppm)	B (ppm)	Sm (ppm)	Gd (ppm)	U (ppm)	Th (ppm)	Cr (ppm)	Li (ppm)
19SEAK-01	11.9	57.0	5.7	5.9	0.6	1.8	119.0	37.0
19SEAK-02	5.7	30.0	5.3	5.7	0.5	1.6	114.0	23.0
19SEAK-03	24.0	10.0	4.9	5.6	0.4	1.5	154.0	10.0
19SEAK-06	9.3	10.0	5.3	6.1	0.5	1.8	125.0	10.0

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

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

Table S3. Comparison of ^{36}Cl exposure ages computed with Lm scaling (Lal, 1991) in CRONUSEarth and CRONUScalc (Marrero et al., 2016)

Sample	CRONUSEarth exposure age (ka)	CRONUSEarth internal uncertainty (ka)	CRONUSEarth external uncertainty (ka)	CRONUScalc exposure age (ka)	CRONUScalc internal uncertainty (ka)	CRONUScalc external uncertainty (ka)
19SEAK-01	13.7	0.3	1.3	12.8	0.3	0.8
19SEAK-02	16.6	0.5	1.6	15.4	0.5	1.0
19SEAK-03	13.2	0.3	1.3	12.8	0.3	0.8
19SEAK-06	12.5	0.3	1.1	11.8	0.3	0.7