Supplement of The Cryosphere, 19, 3681–3691, 2025
https://doi.org/10.5194/tc-19-3681-2025-supplement

The Cryosphere Open Access EGU

Supplement of

A thicker-than-present East Antarctic Ice Sheet plateau during the Last Glacial Maximum

Cari Rand et al.

Correspondence to: Cari Rand (cari.rand@monash.edu)

Table S1: ^{14}C-measurement data. All sample concentrations corrected by subtracting a 0.44 ± 0.11 x 10^5 atom blank. All uncertainties reported to 1 σ unless otherwise noted.

Sample number	TUCNL-	AMS ID	Quartz (g)	Carbon yield (μg)	Diluted carbon (μg)	$^{14}C/^{13}C$ (E-13)	$\delta^{13}C$* (‰)	$^{14}C/C_{total}$ (E-13)	Blank-corrected total ^{14}C (10^4 atoms)
GR01	761	OS-163393	0.6034	3.4 ± 0.04	115.3	19.8 ± 0.583	-2.69	0.190 ± 0.006	6.6 ± 1.183
GR03	762	OS-163394	5.0111	21.1 ± 0.3	115.0	23.3 ± 2.769	-4.17	2.529 ± 0.030	141.5 ± 2.789
GR04	763	OS-163397	5.3835	66.0 ± 0.8	116.6	465.0 ± 2.040	-5.04	5.081 ± 0.022	292.7 ± 4.179
GR06	764	OS-163398	5.1860	35.0 ± 0.4	115.6	517.0 ± 2.040	-5.56	5.646 ± 0.022	322.9 ± 4.531
GR07	723	OS-161685	1.1181	7.4 ± 0.1	113.6	156.0 ± 0.729	-4.58	1.683 ± 0.008	91.5 ± 1.782
GR12(BR)	724	OS-161686	2.4832	10.1 ± 0.1	115.0	56.4 ± 0.437	-4.28	0.591 ± 0.005	29.7 ± 1.240
GR13	765	OS-167939	5.2367	23.6 ± 0.3	114.4	144.0 ± 1.020	-3.92	1.551 ± 0.011	84.6 ± 1.724
GR15(BR)	735	OS-162192	5.0494	35.5 ± 0.5	116.0	23.2 ± 0.583	-6.00	0.227 ± 0.006	8.8 ± 1.189
GR18	725	OS-161687	5.1754	25.0 ± 0.3	115.7	456.0 ± 1.749	-4.60	4.977 ± 0.019	284.4 ± 4.023
GR21(BR)	741	OS-162198	5.2501	41.2 ± 0.5	116.0	651.0 ± 3.061	-4.88	7.124 ± 0.034	284.4 ± 4.023

***All $\delta^{13}C$ values have an associated correction of ± 0.5‰.**

Table S1: ^{14}C-measurement data (continued).

Sample number	[^{14}C] (10^5 atoms/g)	6% [^{14}C] uncertainty (10^4 atoms/g)	[^{14}C] uncertainty (%)
GR01	1.099 ± 0.1961	0.659	39.71
GR03	2.823 ± 0.0556	1.693	2.99
GR04	5.437 ± 0.0776	3.262	1.47
GR06	6.226 ± 0.0874	3.735	1.33
GR07	8.181 ± 0.1545	4.908	4.56
GR12(BR)	1.197 ± 0.0499	0.718	12.81
GR13	1.615 ± 0.0329	0.969	4.91
GR15(BR)	0.175 ± 0.0236	0.105	33.11
GR18	5.495 ± 0.0777	3.297	1.51
GR21(BR)	7.809 ± 0.1098	4.685	1.05

Table S2: ^{14}C blank data. All uncertainties reported to 1 σ unless otherwise noted. All process blanks measured at the National Ocean Sciences Accelerator Mass Spectrometry facility at the Woods Hole Oceanographic Institution.

Blank number	**TUCNL-**	**Carbon yield** (μg)	**Diluted carbon** (μg)	**$^{14}C/^{13}C$** (E-14)	**$^{14}C/C_{total}$** (E-16)	**Total ^{14}C** (10^4 atoms)
PB070921	730	2.3 ± 0.03	114.3 ± 1.464	103.5 ± 2.915	86.0 ± 2.422	4.927 ± 0.1525
PB071421_QA	733	1.9 ± 0.02	114.8 ± 1.470	118.7 ± 3.269	102.8 ± 2.830	5.914 ± 0.1796
PB072121	739	1.6 ± 0.02	113.7 ± 1.456	81.5 ± 2.915	61.8 ± 2.209	3.524 ± 0.1338
PB072721_QB	742	2.1 ± 0.03	114.4 ± 1.465	98.0 ± 2.692	79.9 ± 2.196	4.581 ± 0.1389
PB080221	748	0.6 ± 0.01	114.0 ± 1.460	65.6 ± 2.915	44.3 ± 1.968	2.530 ± 0.1171
PB081321	757	1.8 ± 0.02	114.3 ± 1.464	87.4 ± 2.915	68.3 ± 2.278	3.915 ± 0.1398
PB082621	766	1.6 ± 0.02	113.6 ± 1.455	121.0 ± 2.915	105.0 ± 2.532	5.892 ± 0.1633
Mean	-	1.7 ± 0.02	114.2 ± 1.462	96.5 ± 2.934	78.3 ± 2.348	4.366 ± 0.1454
Standard deviation	-	0.5 ± 0.01	0.4 ± 0.005	20.0 ± 0.170	22.0 ± 0.278	1.130 ± 0.0206

Table S3: CRONUS-A measurements used to calibrate ^{14}C production rates.

Extraction Date (dd/mm/yyyy)	**[^{14}C]** (10^5 atoms [g quartz]$^{-1}$)	**[^{14}C] uncertainty** (10^3 atoms [g quartz]$^{-1}$)
24/12/2015	6.33	8.17
22/12/2015	6.16	13.67
18/04/2016	5.48	7.90
20/04/2016	5.70	7.71
07/04/2016	6.17	8.33
27/07/2016	6.11	8.14
24/03/2017	5.93	8.20
04/04/2017	6.46	8.80
15/11/2017	5.64	8.12
05/07/2018	6.43	8.71
05/08/2018	5.64	7.69
24/05/2018	5.17	7.36
22/07/2018	5.18	7.14
12/06/2018	5.53	8.54
12/10/2018	5.01	7.36
19/03/2019	6.48	8.61
01/09/2020	5.97	8.08
15/01/2020	6.20	8.31
21/08/2020	6.69	8.95
03/12/2021	7.11	9.62
22/10/2021	6.65	9.12

Table S4: ^{10}Be-measurement data. All ^{10}Be data from Lilly (2008, Ph.D. thesis) and Lilly *et al*. (2010). All uncertainties reported to 1 σ.

Sample number	^{10}Be/^{9}Be ratio (10^{-15})	^{10}Be/^{9}Be-ratio uncertainty (%)	[^{10}Be] (10^{6} atoms [g quartz]$^{-1}$)	[^{10}Be] uncertainty (%)
GR01	1,585 ± 64	4	1.53 ± 0.07	4.5
GR03	16,303 ± 140	0.9	7.44 ± 0.16	2.2
GR04	12,062 ± 142	1.2	9.45 ± 0.22	2.3
GR06	2,812 ± 50	1.8	3.15 ± 0.08	2.7
GR07	25,652 ± 348	1.4	16.4 ± 0.50	2.4
GR12(BR)	7,650 ± 100	1.3	8.49 ± 0.20	2.4
GR13	1,681 ± 22	1.3	1.53 ± 0.04	2.4
GR15(BR)	8,746 ± 127	1.4	11.50 ± 0.30	2.5
GR18	9.037 ± 85	0.9	5.58 ± 0.12	2.2
GR21(BR)	21,477 ± 250	1.2	22.60 ± 0.50	2.3

Table S5: ^{26}Al-measurement dta. All ^{26}Al data from Lilly (2008, Ph.D. thesis) and Lilly *et al*. (2010). All uncertainties reported to 1 σ.

Sample number	^{26}Al/^{27}Al ratio (10^{-15})	^{26}Al/^{27}Al-ratio uncertainty (%)	[^{26}Al] (10^{6} atoms [g quartz]$^{-1}$)	[^{26}Al] uncertainty (%)
GR01	2,060 ± 84	4.1	7.2 ± 1.5	20
GR03	21,317 ± 382	1.8	49.8 ± 3.1	6.3
GR04	35,266 ± 431	1.2	50 ± 10	20
GR06	7,824 ± 199	2.5	15.4 ± 3.1	20
GR07	51,037 ± 593	1.2	96 ± 19	20
GR12(BR)	24,625 ± 496	2	39.5 ± 1.8	4.5
GR13	5,520 ± 267	4.8	10.1 ± 0.6	6.3
GR15(BR)	30,658 ± 401	1.3	54.0 ± 2.3	4.2
GR18	13,500 ± 398	3	57.8 ± 1.4	5.0
GR21(BR)	47,386 ± 561	1.2	107 ± 4	4.2

Table S6: ^{10}Be and ^{26}Al ages. Ages calculated from data in **Table S3**. "Internal" age uncertainties include only instrumental uncertainty. "External" age uncertainties include both instrumental and production-rate uncertainties. All ^{10}Be and ^{26}Al ages recalculated from Lilly (2008, Ph.D. thesis) and Lilly *et al*. (2010) using the dataset of Borchers *et al*. (2016) for production-rate calibration. All uncertainties reported to 1 σ.

Sample number	^{10}Be Age (ka)	Internal ^{10}Be-age uncertainty (ka)	External ^{10}Be-age uncertainty (ka)	^{26}Al Age (ka)	Internal ^{26}Al-age uncertainty (ka)	External ^{26}Al-age uncertainty (ka)
GR01	59.450	2.761	5.513	39.253	8.338	9.406
GR03	299.533	6.949	26.482	300.849	21.791	43.872
GR04	379.922	9.740	34.492	295.006	68.447	77.914
GR06	116.589	3.049	9.972	80.546	16.873	19.179
GR07	679.547	24.671	68.584	634.416	174.297	198.886
GR12(BR)	357.551	9.222	32.304	239.939	12.273	31.763
GR13	58.623	1.555	4.955	54.771	3.343	6.974
GR15(BR)	491.456	14.532	46.389	335.955	16.955	46.501
GR18	218.739	4.971	18.943	355.883	10.320	47.480
GR21(BR)	1033.856	29.947	111.154	759.074	42.171	129.748

References

Borchers, B., Marrero, S., Balco, G., Caffee, M., Goehring, B., Lifton, N., Nishiizumi, K., Phillips, F., Schaefer, J., and Stone, J.: Geological calibration of spallation production rates in the CRONUS-Earth project, Quaternary Geochronology, 31, 188-198, 2016.

Lilly, K.: Three million years of East Antarctic ice sheet history from in situ cosmogenic nuclides in the Lambert-Amery Basin, 2008. 2008.

Lilly, K., Fink, D., Fabel, D., and Lambeck, K.: Pleistocene dynamics of the interior East Antarctic ice sheet, Geology, 38, 703-706, 2010.