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Supplement of

Scientific history, sampling approach, and physical characterization of the Camp Century subglacial material, a rare archive from beneath the Greenland Ice Sheet

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TABLE S1: Sample depths and frozen sample masses

Segment	Depth below ice-sediment interface (cm)			Core height (cm)	Sample frozen mass (g)	Sub-sample frozen mass (g)									
	Top	Bottom	Midpoint			a	b	c	d	e	f1	f2	extra pieces	g	Residuals	Archive half
1059-4[a]	0	10	5	10	-											
1059-5	10	20	15	10	1775	135.9	285.5	10.8	22.2	48.1	2	4.6	40.8	52.9	0	651.8
1059-6	20	29.5	24.75	9.5	1789	314.2	370.4	16.7	21.8	53.8	11.4	35.3		60.1	0	562.7
1059-7	29.5	34	31.75	4.5	745	136.9	95.6	6.8	15.7	14.1	4.7	0.8		18	87.9	213.4
1060-A1	34	44.5	39.25	10.5	1970	447.2	317.9	12	20.5	44.7	3.6	27.8		66.4	65.4	668.2
1060-A2	44.5	55.5	50	11	1950	298.9	247.1	11.5	25.4	50.8	4.5	32.1		30.9	126	682.9
1060-B[b]	55.5	78.5	67	23	-	420				120.6	not taken	175.7		195.7	126	801.3
1060-C1	78.5	88.5	83.5	10	1755	400.8	248.2	18.5	24.5	54	5	29.3		50.7	76.6	549.7
1060-C2	88.5	98.5	93.5	10	1100	201.2	299.1	17.8	13.7	41.7	3.7	17.4		40.6	65.9	270.6
1060-C3	98.5	108.5	103.5	10	1285	271.2	289.7	13.9	10.1	50.7	2.9	28.7		51.1	34.8	206
1060-C4	108.5	118	113.25	9.5	1067	125.1	258.7	18.1	13.6	45.4	1.9	17.4		43.3	27.6	144.4
1060-C5	118	129	123.5	11	956	193.4	101.3	6.4	7	21.6	5.3	12.9		16.3	0	164.8
1061-A	129	137	133	8	543	136.2	85.2	5.2	8.4	17.8	2.3	9.7		11.6	55.8	357.9
1061-B[b]	137	159	148	22	-					28.6	20.4			39	51.5	327.5
1061-C	159	171	165	12	1155	269.1	177.4	4.2	10.1	21.4		21.4		21.8	0	586.9
1061-D1	171	181	176	10	739.9	158.6	127.8	8.2	10.4	20	2.4	9.9		18.8	0	332
1061-D2	181	191	186	10	820	163.5	161.1	6.1	8.7	25.8	3.4	15.7		25.5	57.8	384.5
1061-D3	191	201	196	10	840	168.6	145.4	7.2	10.9	26.2	3.3	16.8		23.7	57	414.3
1061-D4[c]	201	215	208	14												
1061-D5	215	223	219	8	976	143.1	91.1	5.9	8.8	17.1	3.6	23	224.6	9.5	?	N/A
1062-1	223	231	227	8	1320	244.2	226.1	7	13.1	35.9	6.1	14.7		35.7	39.1	674.1
1062-2	231	238	234.5	7	1050	70.8	181.6	12	20.3	26.8	5.6	36.2		30.3	42.1	532
1062-3	238	250	244	12	1940	257.1	433.4	16.7	25.8	69.2	8.2	39.5	65.4	73.4	190.3	624.6
1062-4	250	263	256.5	13	2410	458.6	474.9	26.2	24.6	88.6	5.3	88.9		75.3	1036.1	1036.1
1063-1	263	273	268	10	-	332	166.9	20.7	10.6	24.5	3.5	29.9		71.8	103.4	690
1063-2	273	283	278	10	1770	347.4	315.4	19.5	22.8	26.8	5.6	36.2		30.3	37.8	838.5
1063-3[c]	283	294.5	288.75	11.5												
1063-4	294.5	305.5	300	11	2135	833	0	17	14	66.1	5	40		43.1	61.2	954
1063-5	305.5	317	311.25	11.5	1755	368	263.3	14.7	17.5	66	8.4	33.5		40.1	148.7	706
1063-6	317	327	322	10	1645	359.4	285.1	20.7	28.1	40.8	11.1	30		46	52.9	716.2
1063-7[a]	327	340	333.5	13	2220											
1063-8	340	344	342	4	504	208.4	0	6.8	2	47.5	4.8	14		0	?	N/A

[a] Pilot sample; no measurement

[b] Segment was previously thawed and refrozen; segment was not cut, sub-sampled, and massed the same as other samples.

[c] Segment is missing from the archive; segment height and depths were reconstructed from logs and dimensions of other samples. No mass measurements possible

Table S2: Soil color

Segment	Exterior Photo					Interior Cutface Photo				
	Average			Equivalent HEX code	Best fit Munsell soil color	Average			Equivalent HEX code	Best fit Munsell soil color
	R	G	B			R	G	B		
1059-4	116	107	94	746B5E	5Y 4/2	146	148	147	929493	7.5G 6/2
1059-5	127	121	113	7F7971	5Y 5/2	94	90	80	5E5A50	7.5Y 4/2
1059-6	115	106	90	736A5A	5Y 4/2	105	93	81	695D51	2.5Y 4/2
1059-7	127	118	106	7F766A	5Y 5/2	105	93	81	695D51	2.5Y 4/2
1060-A1	72	61	40	483D28	5Y 3/2	81	72	59	51483B	5Y 3/2
1060-A2	136	131	119	888377	10Y 5/2	94	85	73	5E5549	7.5Y 4/2
1060-B[a]										
1060-C1	126	126	120	7E7E78	2.5 GY 5/2	94	92	85	5E5C55	2.5GY 4/2
1060-C2	123	118	107	7B766B	10Y 5/2	90	85	65	5A5541	10Y 3/2
1060-C3	106	96	81	6A6051	5Y 4/2	90	85	65	5A5541	10Y 3/2
1060-C4	114	96	73	726049	2.5Y 4/2	87	73	49	574931	5Y 3/2
1060-C5	120	91	61	785B3D	10YR 4/4	118	86	51	765633	10YR 4/4
1061-A	127	119	100	7F7764	7.5Y 5/2	134	99	46	86632E	10Y 3/2
1061-B[b]										
1061-C	108	104	93	6C685D	2.5GY 4/2	135	119	78	87774E	7.5Y 5/4
1061-D1	160	150	128	A09680	7.5Y 6/2	131	115	68	837344	7.5Y 5/4
1061-D2	113	100	71	716447	5Y 4/2	98	88	54	625836	7.5Y 4/4
1061-D3	88	80	65	585041	7.5Y 3/2	101	88	47	65582F	7.5Y 4/4
1061-D4[c]										
1061-D5	114	114	108	72726C	2.5GY 5/2	128	110	72	806E48	5Y 5/4
1062-1	104	96	71	686047	7.5Y 4/2	115	113	108	73716C	2.5GY 5/2
1062-2	125	112	92	7D705C	5Y 5/2	109	109	106	6D6D6A	2.5GY 4/2
1062-3	114	100	75	72644B	5Y 4/2	143	131	115	8F8373	5Y 5/2
1062-4	117	101	78	75654E	5Y 4/2	140	139	127	8C8B7F	2.5GY 6/2
1063-1	148	135	102	948766	5Y 6/4	117	101	78	75654E	5Y 4/2
1063-2	91	84	75	5B544B	5Y 3/2	89	85	76	59554C	7.5Y 3/2
1063-3[c]										
1063-4	132	124	107	847C6B	7.5Y 5/2	105	99	89	696359	7.5Y 4/2
1063-5	136	129	117	888175	7.5Y 5/2	106	103	90	6A675A	2.5GY 4/2
1063-6	109	105	92	6D695C	10Y 4/2	80	79	78	504F4E	2.5GY 3/2
1063-7	111	108	96	6F6C60	2.5GY 4/2	122	124	122	7A7C7A	7.5 GY 5/2
1063-8[d]						117	94	52	755E34	5Y 4/4

R: red; G: Green; B: Blue; HEX

[a] Segment was previously thawed and dried; no intact soil color picture possible

[b] Segment was previously thawed and refrozen; sample color no longer reflective of original co

[c] Segment is missing from the archive

[d] No pictures taken of this sample prior to cutting

Table S3: Frozen bulk density

Segment	Depth below ice-sediment			Core segment height (cm)	Volume (cm^3)[a]	Frozen mass (g)	Bulk density (g/cm^3)	Estimated ice fraction (%)[b]	Estimated sediment fraction (%)[b]
	top	bottom	midpoint						
1059-4[c]	0	10	5	10					
1059-5	10	20	15	10	785.4	1775.0	2.26	24	76
1059-6	20	29.5	24.75	9.5	746.1	1789.0	2.40	17	83
1059-7	29.5	34	31.75	4.5	353.4	745.0	2.11	33	67
1060-A1	34	44.5	39.25	10.5	824.7	1970.0	2.39	17	83
1060-A2	44.5	55.5	50	11	863.9	1950.0	2.26	25	75
1060-B[d]	55.5	78.5	67	23					
1060-C1	78.5	88.5	83.5	10	785.4	1755.0	2.23	26	74
1060-C2	88.5	98.5	93.5	10	706.9	1100.0	1.56	64	36
1060-C3	98.5	108.5	103.5	10	785.4	1285.0	1.64	59	41
1060-C4	108.5	118	113.25	9.5	746.1	1067.0	1.43	71	29
1060-C5	118	129	123.5	11	863.9	956.0	1.11	89	11
1061-A	129	137	133	8	589.0	543.0	0.92	99	1
1061-B[d]	137	159	148	22					
1061-C	159	171	165	12	1140.4	1155.0	1.01	94	6
1061-D1	171	181	176	10	785.4	739.9	0.94	98	2
1061-D2	181	191	186	10	785.4	820.0	1.04	92	8
1061-D3	191	201	196	10	785.4	840.0	1.07	91	9
1061-D4[e]	201	215	208	14					
1061-D5	215	223	219	8	628.3	976.0	1.55	64	36
1062-1	223	231	227	8	628.3	1320.0	2.10	33	67
1062-2	231	238	234.5	7	445.3	1050.0	2.36	19	81
1062-3	238	250	244	12	942.5	1940.0	2.06	36	64
1062-4	250	263	256.5	13	1021.0	2410.0	2.36	19	81
1063-1[c]	263	273	268	10					
1063-2	273	283	278	10	785.4	1770.0	2.25	25	75
1063-3[e]	283	294.5	288.75	11.5					
1063-4	294.5	305.5	300	11	863.9	2135.0	2.47	13	87
1063-5	305.5	317	311.25	11.5	903.2	1755.0	1.94	42	58
1063-6	317	327	322	10	785.4	1645.0	2.09	34	66
1063-7	327	340	333.5	13	1021.0	2220.0	2.17	29	71
1063-8	340	344	342	4	252.0	504.0	2.00	39	61

[a] Volume calculated assuming segments were cylinders with a radius of 5 cm and the measured height

[b] Ice and sediment fractions calculated using the bulk density, assuming two endmember mixing of ice and sediment with densities of 0.9 g/cm^3 and 2.7 g/cm^3, respectively

[c] Not measured due to non-cylindrical shape of sample

[d] Segment was previously thawed and refrozen.

[e] Segment missing from archive; no measurement

Table S4: Magnetic susceptibility

Segment	Depth below ice-sediment interface (cm)[a]	Mass (g)	Magnetic susceptibility (m^3/kg)		
			χ976Hz	χ3904Hz	$\%\chi_{fd}$[h]
1059-4[b]					
1059-5	12	4.6	7.60E-07	7.58E-07	0.28
1059-6	22	8.4	9.30E-07	9.27E-07	0.39
1059-7	31	4.7	1.33E-06	1.33E-06	0.22
1060-A1	36	3.6	1.50E-06	1.49E-06	0.51
1060-A2	46.5	4.5	8.24E-07	8.21E-07	0.44
1060-B[c]	67	2.3	8.14E-07	8.08E-07	0.68
1060-C1	80.5	5	1.55E-06	1.54E-06	0.70
1060-C2	90.5	3.7	6.00E-07	5.97E-07	0.44
1060-C3[d]	106.5	2.8	1.68E-06	1.67E-06	0.32
1060-C4	110.5	1.9	3.83E-07	3.82E-07	0.36
1060-C5	120	2.3	5.27E-08	5.29E-08	0.00
1061-A	131	2.3	1.20E-08	1.31E-08	0.00
1061-B[e]					
1061-C	161	2.3	1.94E-07	1.91E-07	1.33
1061-D1	173	2.4	4.57E-08	4.65E-08	0.00
1061-D2	183	3.4	1.21E-07	1.21E-07	0.23
1061-D3[d]	193	3.3	2.94E-07	2.90E-07	1.40
1061-D4[f]					
1061-D5	222.5	3.6	1.98E-06	1.95E-06	1.44
1062-1	225	6.1	1.74E-06	1.73E-06	0.40
1062-2[d]	236	5.6	2.16E-06	2.15E-06	0.43
1062-3[d]	248	8.2	1.74E-06	1.74E-06	0.51
1062-4	252	5.3	2.08E-06	2.08E-06	0.12
1063-1	272.5	3.5	2.23E-06	2.22E-06	0.36
1063-2[g]	275	7.8	2.08E-06	2.07E-06	0.35
1063-3[f]					
1063-4[g]	305	5	1.60E-06	1.59E-06	0.68
1063-5	307.5	8.4	1.88E-06	1.88E-06	0.42
1063-6	319	11.1	2.07E-06	2.06E-06	0.37
1063-7[a]					
1063-8	343	4.8	1.64E-06	1.64E-06	0.07

[a] Reported depths are the midpoint depths of 2 cm-tall plastic cubes.

[b] Pilot sample; no measurement

[c] Segment was previously thawed, dried, loose sediment. Orientation not preserved. Measurement is on bulk sediment. Depth is median of segment.

[d] Segment was stored stratigraphically upside down. This has no impact on susceptil

[e] Segment was previously thawed and re-frozen. No measurement

[f] Segment is missing from the archive; no measurement

[g] Sub-sample stabilized in pmag cube with plastic wrap.

[h] $\%\chi fd$ is calculated as $100*(\chi_{976Hz} - \chi_{3904Hz})/(\chi_{976Hz})$

Table S5 Natural Remanent Magnetization

Segment	Depth below ice-sediment interface (cm)[a]	Mass (g)	0 mT AF Demagnetization Level			10 mT AF Demagnetization Level			20 mT AF Demagnetization Level		
			DEC0 (deg)	INC0 (deg)	INT0 (Am^2/kg)	DEC10 (deg)	INC10 (deg)	INT10 (Am^2/kg)	DEC20 (deg)	INC20 (deg)	INT20 (Am^2/kg)
1059-4[b]											
1059-5	12	4.6	89.0	3.0	1.32E-05	60.0	26.0	1.18E-05	21.0	56.0	1.11E-05
1059-6	22	8.4	42.0	28.0	1.10E-05	44.0	33.0	1.15E-05	39.0	10.0	9.90E-06
1059-7	31	4.7	9.0	54.0	1.10E-05	14.0	37.0	5.18E-06	13.0	31.0	7.46E-06
1060-A1	36	3.6	68.0	60.0	3.30E-05	68.0	58.0	3.53E-05	55.0	51.0	3.02E-05
1060-A2	46.5	4.5	9.0	17.0	3.29E-05	9.0	19.0	3.27E-05	11.0	19.0	2.82E-05
1060-B[c]	67	2.3									
1060-C1	80.5	5	1.0	3.0	6.22E-05	355.0	4.0	5.64E-05	354.0	4.0	4.75E-05
1060-C2	90.5	3.7	255.0	78.0	8.90E-06	13.0	-10.0	6.70E-06	30.0	31.0	7.31E-06
1060-C3[d]	106.5	2.8	317.5	45.7	1.45E-05	7.2	63.8	1.72E-05	357.5	57.6	1.66E-05
1060-C4	110.5	1.9	171.0	42.0	8.01E-06	83.0	38.0	1.90E-05	46.0	14.0	7.82E-06
1060-C5	120	2.3	12.0	30.0	1.96E-06	203.0	-62.0	1.03E-06	24.0	44.0	8.27E-07
1061-A	131	2.3	43.0	-18.0	4.86E-07	12.0	-21.0	6.75E-07	8.0	6.0	9.77E-07
1061-B[e]											
1061-C	161	2.3	97.0	26.0	1.68E-05	3.0	23.0	1.04E-05	23.0	4.0	1.16E-05
1061-D1	173	2.4	303.0	84.0	1.17E-06	285.0	-23.0	3.89E-06	323.0	-35.0	3.04E-06
1061-D2	183	3.4	135.0	3.0	6.97E-06	37.0	40.0	4.64E-06	33.0	11.0	6.51E-06
1061-D3[d]	193	3.3	177.4	-17.5	4.59E-06	338.1	-53.0	2.49E-06	326.3	-39.8	9.78E-07
1061-D4[f]											
1061-D5	222.5	3.6	91.0	75.0	1.56E-04	68.0	80.0	1.34E-04	324.0	-44.0	1.39E-06
1062-1	225	6.1	284.0	87.0	2.04E-05	270.0	77.0	1.29E-05	325.0	20.0	4.13E-06
1062-2[d]	236	5.6	281.1	-31.7	4.90E-05	308.8	-10.9	2.77E-05	39.3	13.4	9.90E-05
1062-3[d]	248	8.2	266.4	10.2	2.42E-05	109.5	-4.6	1.69E-05	325.6	-33.2	2.63E-05
1062-4	252	5.3	41.0	18.0	6.67E-06	30.0	-17.0	1.17E-05	360.0	20.0	1.33E-05
1063-1	272.5	3.5	152.0	21.0	3.82E-05	153.0	20.0	2.31E-05	32.0	9.0	2.90E-05
1063-2[g]	275	7.8	66.0	61.0	3.90E-05	63.0	66.0	3.43E-05	71.0	66.0	3.51E-05
1063-3[f]											
1063-4[g]	305	5	311.0	-36.5	3.41E-05	339.3	-36.1	4.50E-05	350.0	-6.5	6.31E-05
1063-5	307.5	8.4	115.0	71.0	4.99E-05	95.0	81.0	4.10E-05	22.0	58.0	3.44E-05
1063-6	319	11.1	93.0	72.0	9.40E-05	64.0	71.0	8.53E-05	58.0	65.0	6.45E-05
1063-7[a]											
1063-8	343	4.8	308.0	38.0	1.19E-05	353.0	42.0	4.31E-05	342.0	-2.0	1.00E-04

DEC: declination; INC: inclination; INT: intensity of remnance

[a] Reported depths are the midpoint depths of 2 cm-tall plastic cubes.

[b] Pilot sample; no measurement

[c] Segment was previously thawed, dried, loose sediment. Orientation not preserved. Measurement is on bulk sediment. Depth is median of segment.

[d] Segment was stored stratigraphically upside down. INC and DEC reported here are corrected.

[e] Segment was previously thawed and re-frozen. No measurement

[f] Segment is missing from the archive; no measurement

[g] Sub-sample stabilized in pmag cube with plastic wrap

Table S6: Pore ice pH and conductivity

Segment	Depth (cm below ice-sediment interface (cm)			pH	Conductivity (µS)
	Top	Bottom	Midpoint		
1059-4[a]	0.0	10.0	5.0		
1059-5	10.0	20.0	15.0	7.12	129
1059-6	20.0	29.5	24.8	7.26	252
1059-7[b]	29.5	34.0	31.8		
1060-A1	34.0	44.5	39.3	7.15	151
1060-A2	44.5	55.5	50.0	7.21	118
1060-B[c]	55.5	78.5	67.0		
1060-C1	78.5	88.5	83.5	6.94	219
1060-C2	88.5	98.5	93.5	7.17	168
1060-C3	98.5	108.5	103.5	7.13	334
1060-C4sediment	108.5	112.5	110.5	7.18	502
1060-C4ice	112.5	118.0	115.3	6.98	157
1060-C5	118.0	129.0	123.5	7.18	59
1061-A	129.0	137.0	133.0	7.13	172
1061-B[d]	137.0	159.0	148.0	7.85	171
1061-C	159.0	171.0	165.0	7.58	54
1061-D1	171.0	181.0	176.0	7.85	52
1061-D2	181.0	191.0	186.0	7.65	75
1061-D3	191.0	201.0	196.0	7.23	95
1061-D4[e]	201.0	215.0	207.0		
1061-D5	215.0	223.0	219.0	6.84	330
1062-1	223.0	231.0	227.0	6.97	692
1062-2	231.0	238.0	234.5	6.90	809
1062-3	238.0	250.0	244.0	7.04	693
1062-4	250.0	263.0	256.5	6.90	1066
1063-1	263.0	273.0	268.0	6.95	723
1063-2	273.0	283.0	278.0	6.95	679
1063-3[e]	283.0	294.5	288.8		
1063-4	294.5	305.5	300.0	7.09	385
1063-5	305.5	317.0	311.3	6.87	178
1063-6[f]	317.0	327.0	322.0	n/a	n/a
1063-7[a]	327.0	340.0	333.5	n/a	n/a
1063-8[a,f]	340.0	344.0	342.0	n/a	n/a

[a] Pilot sample; no measuremen

[b] Insufficient water extracted to measure pH and conductivity

[c] Segment was previously thawed, no ice preserved

[d] Segment was previously thawed and re-frozen. Measurement may be erroneous

[e] Segment is missing from the archive

[f] Water could not be extracted from this sub-sample.

Table S7: Sediment and ice content by mass

Segment	Depth below ice-sediment interface (cm)			Total ice mass (g)	Total sediment mass (g)	% Ice by mass	% Sediment by mass
	Top	Bottom	Midpoint				
1059-4	0.0	10.0	5.0	45.0	237.2	16	84
1059-5	10.0	20.0	15.0	39.1	233.7	14	86
1059-6	20.0	29.5	24.8	95.7	579.3	14	86
1059-7	29.5	34.0	31.8	33.3	197.4	14	86
1060-A1	34.0	44.5	39.3	122.3	617.7	17	83
1060-A2	44.5	55.5	50.0	85.4	450.1	16	84
1060-B[a]	55.5	78.5	67.0				
1060-C1	78.5	88.5	83.5	139.8	501.9	22	78
1060-C2	88.5	98.5	93.5	241.8	254.5	49	51
1060-C3	98.5	108.5	103.5	223.3	327.5	41	59
1060-C4sediment	108.5	112.5	110.5	38.4	125.7	23	77
1060-C4ice	112.5	118.0	115.3	79.8	8.7	90	10
1060-C5	118.0	129.0	123.5	86.3	5.3	94	6
1061-A	129.0	137.0	133.0	80.9	3.0	96	4
1061-B[a]	137.0	159.0	148.0	96.7	23.2	81	19
1061-C	159.0	171.0	165.0	152.1	16.8	90	10
1061-D1	171.0	181.0	176.0	108.3	11.1	91	9
1061-D2	181.0	191.0	186.0	126.8	27.1	82	18
1061-D3	191.0	201.0	196.0	120.7	27.4	82	18
1061-D4[b]	201.0	215.0	208.0				
1061-D5	215.0	223.0	219.0	364.8	594.5	38	62
1062-1	223.0	231.0	227.0	60.9	395.3	13	87
1062-2	231.0	238.0	234.5	28.8	219.3	12	88
1062-3	238.0	250.0	244.0	76.8	590.3	12	88
1062-4	250.0	263.0	256.5	87.0	806.9	10	90
1063-1	263.0	273.0	268.0	38.7	464.5	8	92
1063-2	273.0	283.0	278.0	62.6	560.4	10	90
1063-3[b]	283.0	294.5	288.8				
1063-4	294.5	305.5	300.0	32.0	790.3	4	96
1063-5	305.5	317.0	311.3	79.9	545.5	13	87
1063-6	317.0	327.0	322.0	46.6	571.9	8	92
1063-7	327.0	340.0	333.5	57.9	220.9	21	79
1063-8	340.0	344.0	342.0	28.0	172.3	14	86

Note sediment and ice masses reflect those measured from sub-samples (a) and (b). The total ice mass was calculated by adding the pore ice meltwater extracted from each sample and the estimated mass of water in the remaining bulk sediment, which is based on the %water lost from the bulk geological aliquot.

[a] Segment was previously thawed and refrozen. Grain size distribution may be erroneous

[b] Segment missing from archive; no measurement

Table S8: Grain size distribution

	Depth below ice-sediment			Grain size (μm) distribution						
Sample	**Top**	**Bottom**	**Midpoint**	**>2000**	**850-2000**	**500-850**	**250-500**	**125-250**	**63-125**	**<63**
1059-4[a]	0	10	5	12.0%	19.5%	23.8%	21.3%	9.7%	13.7%	
1059-5	10	20	15	0.7%	8.8%	19.6%	38.6%	21.0%	4.8%	6.5%
1059-6	20	29.5	24.75	0.4%	5.2%	14.5%	42.1%	22.1%	9.6%	6.0%
1059-7	29.5	34	31.75	0.2%	1.8%	4.5%	22.3%	26.6%	19.7%	24.8%
1060-A1	34	44.5	39.25	0.0%	0.2%	3.1%	52.4%	19.9%	11.3%	13.1%
1060-A2	44.5	55.5	50	1.8%	7.4%	25.0%	43.3%	14.6%	2.4%	5.6%
1060-B[a]	55.5	78.5	67	0.1%	0.3%	0.5%	5.0%	42.9%	24.6%	26.6%
1060-C1	78.5	88.5	83.5	0.0%	0.1%	0.3%	7.0%	53.3%	21.0%	18.3%
1060-C2	88.5	98.5	93.5	10.4%	0.1%	0.1%	0.8%	26.1%	34.9%	27.6%
1060-C3	98.5	108.5	103.5	30.0%	5.0%	6.4%	18.5%	13.8%	9.5%	16.8%
1060-C4sediment	108.5	112.5	110.5	76.6%	1.7%	2.9%	5.3%	5.4%	3.4%	4.7%
1060-C4ice	112.5	118	115.25	1.5%	1.3%	1.3%	3.7%	3.9%	3.1%	85.2%
1060-C5	118	129	123.5	4.3%	0.5%	1.4%	4.8%	3.8%	0.5%	84.7%
1061-A	129	137	133	0.4%	3.3%	1.2%	5.4%	5.0%	1.7%	83.0%
1061-B[a]	137	159	148	0.0%	0.4%	0.8%	1.7%	4.9%	5.7%	86.5%
1061-C	159	171	165	2.4%	1.5%	1.8%	4.9%	5.7%	6.0%	77.8%
1061-D1	171	181	176	0.1%	1.5%	2.3%	6.5%	9.6%	7.1%	72.8%
1061-D2	181	191	186	0.6%	2.3%	4.5%	9.3%	9.4%	11.2%	62.8%
1061-D3	191	201	196	1.7%	1.3%	3.4%	6.7%	6.9%	6.0%	74.2%
1061-D4[b]	201	215	207							
1061-D5	215	223	219	74.8%	0.4%	0.7%	1.8%	1.8%	1.3%	19.2%
1062-1	223	231	227	26.8%	5.3%	7.0%	13.7%	12.8%	8.1%	26.2%
1062-2	231	238	234.5	8.7%	7.3%	11.1%	14.2%	14.8%	9.5%	34.5%
1062-3	238	250	244	25.2%	7.2%	13.1%	15.9%	14.9%	7.0%	16.7%
1062-4	250	263	256.5	20.9%	6.1%	13.0%	12.9%	10.3%	9.8%	27.0%
1063-1	263	273	268	17.9%	6.2%	12.2%	14.1%	12.4%	6.6%	30.5%
1063-2	273	283	278	18.2%	7.1%	11.9%	15.4%	10.5%	7.7%	29.1%
1063-3[b]	283	294.5	288.75							
1063-4	294.5	305.5	300	46.2%	4.4%	7.3%	9.1%	7.4%	4.6%	21.0%
1063-5	305.5	317	311.25	14.5%	8.7%	19.8%	17.4%	9.0%	5.6%	24.9%
1063-6	317	327	322	9.8%	6.7%	10.4%	17.8%	12.9%	9.1%	33.2%
1063-7[a]	327	340	333.5	12.4%	5.9%	8.2%	13.9%	11.7%	47.8%	
1063-8	340	344	342	66.0%	3.1%	4.4%	6.5%	6.9%	4.9%	8.2%

[a] Pilot sample was not seived at finer sizes less than the 125 μm fraction. The value reported for 63-125 μm represents all material <125 μm

[b] Segment was previously thawed and refrozen. Grain size distribution may be erroneous

[c] Segment is missing from archive; no measurement

Table S9: Evidence of segment alteration during storage

Sample	*Flat icy backside visible in 3D model and sample pictures (implication: partial thawing while core tube was stored horizontally prior to cutting in 1972)*	*Diameter of the top is less than the bottom of the segment (implication: downward deformation from vertical storage between 1972-2021)*
1059-4	Yes	Unknown. Could not measure dimensions as it was cut during pilot study
1059-5	Yes	Yes
1059-6	Yes	Yes
1059-7	Yes	No
1060-A1	Unclear	No
1060-A2	Unclear	Yes
1060-B[a]	Unknown; thawed sediment	Unknown; thawed sediment
1060-C1	Yes	Yes
1060-C2	Yes; note: 3D model failed for this sample but this can be seen in the sample photos	No
1060-C3	Yes	Yes
1060-C4	Yes	Yes. Sample was stored upside down vertical so deformation was from base to top
1060-C5	Yes	no
1061-A	Yes	Yes, but this could be because it is the top of the core tube and had smaller dimensions
1061-B[b]	Unknown; sample was thawed and refrozen	Unknown; thawed and refrozen ice
1061-C	Unknown; sample fractured horizontally in storage making it difficult to see a flat surface	Yes
1061-D1	Yes	No
1061-D2	Yes	Yes
1061-D3	Yes	Yes. Sample was stored upside down vertical so deformation was from base to top
1061-D4[c]	Unknown; missing sample	Unknown; missing sample
1061-D5	Unknown; fragile sample with non-cylindrical geometry	Unclear; fragile sample with non-cylindrical geometry that was difficult to measure
1062-1	No	No
1062-2	No	Unclear; sample has non-cylindrical geometry (missing clast). Sample was stored upside-down
1062-3	No	Yes; sample store upside down
1062-4	No	No
1063-1	Unclear; fragile sample with non-cylindrical geometry made it impossible to construct a 3D model.	Unclear; fragile sample with non-cylindrical geometry that was difficult to measure
1063-2	No	Yes
1063-3[c]	Unknown; missing sample	Unknown; missing sample
1063-4	No	No; sample stored upside down.
1063-5	No	No
1063-6	No	No
1063-7	No	Unknown. Could not measure dimensions as it was cut during pilot study
1063-8[d]	Unknown; fragile sample with non-cylindrical geometry and 3D model not available.	Unknown; fragile sample with non-cylindrical geometry that was difficult to measure

[a] Segment was previously thawed and dried;

[b] Segment was previously thawed and refrozen;

[c] Segment is missing from the archive

[d] No pictures taken of this sample prior to cutting

Table S10. Ice content data used for Figure S1

Segment	Measured % Ice by	Segment	Estimated ice fraction
1059-4	16	1059-4[c]	
1059-5	14	1059-5	24
1059-6	14	1059-6	17
1059-7	14	1059-7	33
1060-A1	17	1060-A1	17
1060-A2	16	1060-A2	25
1060-B[a]		1060-B[d]	
1060-C1	22	1060-C1	26
1060-C2	49	1060-C2	64
1060-C3	41	1060-C3	59
1060-C4	47	1060-C4	71
1060-C5	94	1060-C5	89
1061-A	96	1061-A	99
1061-B[a]	81	1061-B[d]	
1061-C	90	1061-C	94
1061-D1	91	1061-D1	98
1061-D2	82	1061-D2	92
1061-D3	82	1061-D3	91
1061-D4[b]		1061-D4[e]	
1061-D5	38	1061-D5	64
1062-1	13	1062-1	33
1062-2	12	1062-2	19
1062-3	12	1062-3	36
1062-4	10	1062-4	19
1063-1	8	1063-1[c]	
1063-2	10	1063-2	25
1063-3[b]		1063-3[e]	
1063-4	4	1063-4	13
1063-5	13	1063-5	42
1063-6	8	1063-6	34
1063-7	21	1063-7	29
1063-8	14	1063-8	39

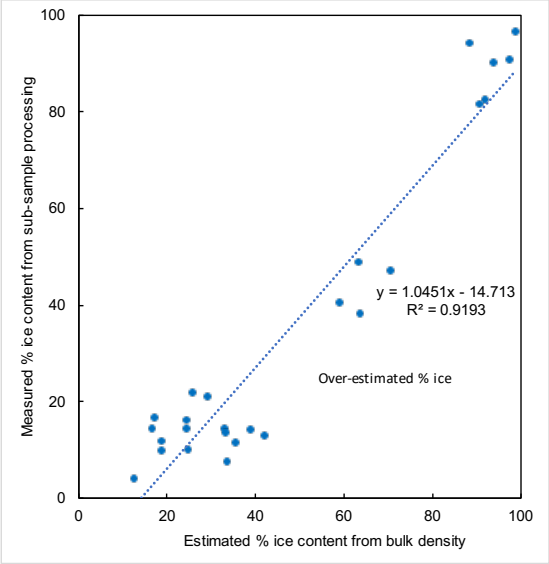

Figure S1. Comparison of ice content measured during sample processing and estimated from bulk density.