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Supplement of

**SUSTAIN drilling at Surtsey volcano, Iceland, tracks hydrothermal and
microbiological interactions in basalt 50 years after eruption**

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Table S1. Density and water absorption measurements, SE-02b and SE-03 samples and reference samples.

Reference Number	Specimen ID	Specimen Length (cm)	Approximate Vertical Depth (m)	Dry Density (g/cm ³)	Wet Density (g/cm ³)	Water Absorption
<i>SE-02B (Hole C)</i>						
RS-1	5059-1-C-4-2, 53-85	32	22.66	1.64	1.96	0.16
RS-2	5059-1-C-9-2, 58-88	30	34.56	1.54	1.86	0.17
RS-3	5059-1-C-13-2, 39-69	30	44.44	1.62	1.9	0.15
RS-4	5059-1-C-17-2, 68-98	30	55.72	1.59	1.88	0.15
RS-5	5059-1-C-22-2, 57-87	30	65.11	1.67	1.94	0.14
RS-6	5059-1-C-27-3, 51-81	30	77.93	1.71	2.02	0.15
RS-7	5059-1-C-30-2, 38-68	30	86.20	1.85	2.11	0.12
RS-8	5059-1-C-33-2, 61-91	30	92.34	1.55	1.89	0.18
RS-9	5059-1-C-36-2, 44-74	30	100.84	1.49	1.83	0.18
RS-10	5059-1-C-39-2, 68-98	30	110.71	1.88	2.14	0.12
RS-11	5059-1-C-42-3, 35-65	30	120.33	1.75	2	0.13
RS-12	5059-1-C-45-1, 38-68	30	127.83	1.73	2.06	0.16
RS-13	5059-1-C-49-3, 18-48	30	138.17	1.67	2.03	0.18
RS-14	5059-1-C-52-3, 60-89	29	148.44	1.94	2.13	0.09
RS-15	5059-1-C-55-3, 30-58	28	157.01	1.80	2.07	0.13
RS-16	5059-1-C-59-2, 35-65	30	165.40	1.78	2.07	0.14
RS-17	5059-1-C-62-3, 60-93	33	175.98	1.93	2.18	0.12
RS-18	5059-1-C-65-2, 32-64	32	180.65	1.22	1.43	0.14
<i>SE-03 (Hole D)</i>						
RS-19	5059-1-D-73-3, 34-68	34	180.47	2.08	2.27	0.09
RS-20	5059-1-D-74-2, 30-67	37	181.07	2.06	2.26	0.10
RS-21	5059-1-D-76-3, 20-55	35	187.49	2.13	2.35	0.09
RS-22	5059-1-D-82-4, 58-93	35	198.73	1.53	1.83	0.16
RS-23	5059-1-D-85-3, 50-81	31	205.91	1.9	2.19	0.13
RS-24	5059-1-D-88-2, 37-75	38	212.03	1.55	1.91	0.19
RS-25	5059-1-D-91-1, 6-42	36	218.86	1.6	2.02	0.21
RS-26	5059-1-D-94-4, 35-70	35	228.62	1.44	1.79	0.19
RS-27	5059-1-D-97-2, 63-98	35	235.11	2.19	2.38	0.08
RS-28	5059-1-D-100-4, 30-65	35	243.41	2.13	2.35	0.09
RS-29	5059-1-D-103-1, 5-41	36	248.81	1.91	2.21	0.14
RS-30	5059-1-D-106-4, 3-40	37	258.47	1.69	2.01	0.16
RS-31	5059-1-D-109-3, 37-76	39	265.37	1.63	1.95	0.16
RS-32	5059-1-D-112-2, 0-37	37	271.92	2.05	2.33	0.12
RS-33	5059-1-D-116-3, 30-64	34	282.12	2.48	2.38	0.04
<i>Other SE-02b and SE-03 samples</i>						
SG-24	5059-1C-54Z-2, 77-79	2	153.23	2.23	1.98	0.11
SG-34	5059-1D-74Z-2, 78-82.5	3.5	201.11	2.24	2.04	0.09
SG-35	5059-1D-76Z-3, 13-16	5	206.85	2.26	2.05	0.09
SG-37	5059-1D-88Z-2, 33-37	4	233.89	1.94	1.55	0.20
SG-38	5059-1D-91Z-1, 41.5-45	3.5	241.78	2.02	1.62	0.20
SG-39	5059-1D-97Z-2, 60.5-64	3.5	259.36	2.36	2.18	0.08

Measurements follow ASTM C97-18, with volume computed from half- or whole-round core dimensions.

Measured by J. Fisher and M. D. Jackson

Table S2. Bulk magnetic measurements, SE-02b and SE-03 reference samples

Reference Number	Specimen ID	Specimen Length (cm)	Approx. Depth * (m)	Mass (g)	NRM (A/m)	X _{bulk} (X _{LF}) (x10 ⁻⁶ SI)	X _{HF} (x10 ⁻⁶ SI)	X _{FD} (x10 ⁻⁶ SI)	X _{FD} (%)
<i>SE-02B (Hole C)</i>									
RS-1	5059-1-C-4-2, 53-85	32	22.66	17.576	0.20	666.8	633.5	33.3	4.99
RS-2	5059-1-C-9-2, 58-88	30	34.56	16.345	0.25	850.6	797.6	53.0	6.23
RS-3	5059-1-C-13-2, 39-69	30	44.44	17.781	0.38	1084.0	1037.0	47.0	4.34
RS-4	5059-1-C-17-2, 68-98	30	55.72	15.999	0.16	616.8	580.5	36.3	5.89
RS-5	5059-1-C-22-2, 57-87	30	65.11	17.004	0.15	642.8	614.1	28.7	4.46
RS-6	5059-1-C-27-3, 51-81	30	77.93	18.113	0.42	935.6	899.8	35.8	3.83
RS-7	5059-1-C-30-2, 38-68	30	86.20	15.425	0.43	791.4	757.8	33.6	4.25
RS-8	5059-1-C-33-2, 61-91	30	92.34	16.228	0.33	702.7	670.4	32.3	4.60
RS-9	5059-1-C-36-2, 44-74	30	100.84	16.728	0.36	674.2	649.7	24.5	3.63
RS-10	5059-1-C-39-2, 68-98	30	110.71	19.541	1.07	1296.0	1246.0	50.0	3.86
RS-11	5059-1-C-42-3, 35-65	30	120.33	20.236	1.22	1572.0	1502.0	70.0	4.45
RS-12	5059-1-C-45-1, 38-68	30	127.83	19.901	1.31	1528.0	1496.0	32.0	2.09
RS-13	5059-1-C-49-3, 18-48	30	138.17	17.178	0.86	1070.0	1026.0	44.0	4.11
RS-14	5059-1-C-52-3, 60-89	29	148.44	18.532	0.42	777.9	734.3	43.6	5.60
RS-15	5059-1-C-55-3, 30-58	28	157.01	18.810	2.99	1068.0	1020.0	48.0	4.49
RS-16	5059-1-C-59-2, 35-65	30	165.40	19.682	1.85	1093.0	1052.0	41.0	3.75
RS-17	5059-1-C-62-3, 60-93	33	175.98	17.843	1.55	1015.0	980.4	34.6	3.41
RS-18	5059-1-C-65-2, 32-64	32	180.65	16.531	0.57	668.8	634.2	34.6	5.17
<i>SE-03 (Hole D)</i>									
RS-19	5059-1-D-73-3, 34-68	34	180.47	19.008	2.04	2265.0	2204.0	61.0	2.69
RS-20	5059-1-D-74-2, 30-67	37	181.07	18.638	1.49	1321.0	1274.0	47.0	3.56
RS-21	5059-1-D-76-3, 20-55	35	187.49	19.013	1.68	1486.0	1428.0	58.0	3.90
RS-22	5059-1-D-82-4, 58-93	35	198.73	18.262	1.06	1120.0	1076.0	44.0	3.93
RS-23	5059-1-D-85-3, 50-81	31	205.91	17.222	1.70	1440.0	1392.0	48.0	3.33
RS-24	5059-1-D-88-2, 37-75	38	212.03	15.126	1.29	990.8	958.3	32.5	3.28
RS-25	5059-1-D-91-1, 6-42	36	218.86	17.359	1.19	1221.0	1169.0	52.0	4.26
RS-26	5059-1-D-94-4, 35-70	35	228.62	14.879	0.80	855.5	822.6	32.9	3.85
RS-27	5059-1-D-97-2, 63-98	35	235.11	21.733	3.22	2260.0	2116.0	144.0	6.37
RS-28	5059-1-D-100-4, 30-65	35	243.41	20.421	1.96	1557.0	1491.0	66.0	4.24
RS-29	5059-1-D-103-1, 5-41	36	248.81	19.231	1.29	1145.0	1100.0	45.0	3.93
RS-30	5059-1-D-106-4, 3-40	37	258.47	18.170	1.46	1299.0	1235.0	64.0	4.93
RS-31	5059-1-D-109-3, 37-76	39	265.37	17.422	1.54	1200.0	1166.0	34.0	2.83
RS-32	5059-1-D-112-2, 0-37	37	271.92	19.723	3.04	1859.0	1801.0	58.0	3.12
RS-33	5059-1-D-116-3, 30-64	34	282.12	22.938	19.50	11590.0	10870.0	720.0	6.21
	2016-1, Outcrop			13.506	0.17	601.4	569.5	31.9	5.30
	2016-2, Outcrop			13.709	0.18	633.8	601.0	32.8	5.18
<p>X_{LF}, low-frequency magnetic susceptibility (measured in a 200 A/m field at 976 Hz); X_{HF}, high-frequency magnetic susceptibility (measured in a 200 A/m field at 15,616 Hz); X_{FD}, frequency-dependent magnetic susceptibility (X_{LF}-X_{HF} or 100*(X_{FD}/X_{LF}) for %). All reported magnetic susceptibilities are the mean of triplicate measurements of 7 cc sample cubes of known mass made using an AGICO MFK1 kappabridge.</p> <p>* Top of sample</p>									

Measured by J. M. Marquardt and P. C. Lippert

Table S3. XRF Major Element Analyses of Surtsey Drill Core Samples

Sample	IINH ID	ICDP Box Number	Section Number	Interval (cm)	Approx. Depth (m)	Rock Type	SiO2 wt %	TiO2 wt %
Surface Samples								
16-01					0.0	Tuff	46.98	2.30
16-02					0.0	Tuff	47.14	2.32
16-03					0.0	Lava Flow	46.62	2.16
1979 Core (SE-01)								
SA 14.2	NI 30137				14.2	Tuff	46.53	2.33
SA 25.4	NI 30138				25.4	Tuff	46.46	2.37
SA 37.3	NI 30139				37.3	Tuff	46.76	2.35
SA 65.6	NI 30140				65.6	Tuff	46.52	2.28
SA 70.7	NI 30141				70.7	Tuff	46.44	2.29
SA 125.5	NI 30142				125.5	Tuff	45.96	2.33
SA 145	NI 30143				145	Tuff	46.25	2.47
SA 157.1	NI 30144				157.1	Tuff	46.58	2.51
SA 170	NI 30145				170.0	Tuff	43.81	2.37
SE-1-170					171.0	Tephra	45.90	2.48
2017 Core (SE-02B, Hole C)								
RS-1-4		4	2	53-85	22.7	Tuff	45.80	2.33
RS-2-4		9	2	58-88	34.7	Tuff	45.93	2.32
RS-3-4		13	2	39-69	43.6	Tuff	45.72	2.27
RS-4-4		17	2	68-98	55.9	Tuff	45.81	2.29
RS-5-4		22	2	57-87	65.3	Tuff	45.68	2.23
RS-6-4		27	3	51-81	78.1	Tuff	45.98	2.20
RS-7-4		30	2	38-68	86.3	Tuff	45.85	2.23
RS-8-4		33	2	61-91	92.5	Tuff	45.73	2.21
RS-9-4		36	2	44-74	101.3	Tuff	46.00	2.23
RS-10-4		39	2	68-96	110.9	Tuff	45.66	2.28
RS-11-4		42	3	35-65	120.5	Tuff	45.65	2.29
RS-12-4		45	1	38-68	127.9	Tuff	45.76	2.31
RS-13-4		49	3	17-48	138.3	Tuff	45.72	2.31
RS-14-4		52	3	60-89	148.6	Tuff	45.62	2.40
RS-15-4		55	3	30-58	157.1	Tuff	45.36	2.43
RS-16-4		59	2	35-65	165.6	Tuff	45.45	2.50
RS-17-4		62	3	60-93	176.1	Tuff	45.52	2.55
RS-18-4		65	2	32-64	180.8	Tuff	45.44	2.54
BIR-1							47.39	0.93
BIR-1 (USGS preferred value)							47.96	0.96
Fe2O3* is total Fe as Fe2O3 following ignition of the sample at 1020 degrees C for > 2 hours								
LOI is loss in weight following ignition of the sample at 1020 degrees C for > 2 hours								
XRF methods are those of Rhodes and Vollinger (2004)								

Al2O3 wt %	Fe2O3* wt %	MnO wt %	MgO wt %	CaO wt %	Na2O wt %	K2O wt %	P2O5 wt %	SO3 wt %	Total wt %	LOI wt %
16.03	13.59	0.21	7.93	9.04	3.07	0.59	0.33	0.01	100.08	8.40
16.03	13.64	0.22	7.79	8.09	3.81	0.78	0.34	0.03	100.19	6.81
15.65	13.25	0.21	8.33	10.01	3.15	0.52	0.30	0.04	100.24	-0.28
16.17	13.44	0.21	7.23	9.15	3.59	0.63	0.35	0.13	99.76	8.49
16.24	13.54	0.22	7.27	9.26	3.52	0.65	0.36	0.47	100.36	7.68
16.39	13.38	0.21	7.04	9.07	3.94	0.58	0.36	0.15	100.23	3.35
16.28	13.24	0.21	7.24	8.98	4.29	0.61	0.35	0.21	100.21	8.90
16.25	13.18	0.21	7.07	9.41	3.85	0.64	0.35	0.28	99.97	7.77
16.16	13.62	0.22	6.75	9.38	4.22	0.78	0.35	0.40	100.16	8.32
16.26	13.79	0.22	6.57	9.22	3.96	0.61	0.35	0.29	99.99	7.81
16.33	14.07	0.24	8.93	4.86	5.30	0.26	0.36	0.41	99.84	6.90
15.45	13.27	0.21	6.65	10.64	3.31	0.59	0.35	3.65	100.30	0.42
15.78	14.56	0.22	7.93	8.54	3.73	0.62	0.34	0.15	100.26	-0.12
16.32	13.55	0.21	7.16	9.48	3.38	0.66	0.36	n.d.	99.25	11.91
16.42	13.35	0.20	7.07	9.07	4.12	0.61	0.36	n.d.	99.45	9.97
16.31	13.24	0.20	7.20	9.34	3.75	0.79	0.37	n.d.	99.21	10.18
16.34	13.24	0.20	7.05	9.28	4.27	0.64	0.38	n.d.	99.50	11.39
16.18	13.10	0.20	7.00	9.21	5.58	0.64	0.37	n.d.	100.18	13.01
16.50	12.91	0.20	6.98	8.96	4.69	0.49	0.36	n.d.	99.27	10.97
16.30	13.01	0.20	7.00	9.16	4.51	0.65	0.37	n.d.	99.27	10.46
16.34	12.90	0.20	6.86	9.42	4.75	0.78	0.36	n.d.	99.56	10.62
16.49	12.95	0.20	7.13	8.91	5.06	0.44	0.36	n.d.	99.77	10.66
16.41	13.14	0.20	6.94	9.09	4.53	0.64	0.37	n.d.	99.27	10.99
16.33	13.18	0.20	7.01	9.52	4.33	0.71	0.36	n.d.	99.58	10.00
16.37	13.28	0.20	6.84	8.79	4.72	0.54	0.36	n.d.	99.18	9.72
16.39	13.29	0.20	6.70	8.23	5.84	0.30	0.36	n.d.	99.34	9.96
16.41	13.63	0.21	6.75	9.10	4.45	0.56	0.38	n.d.	99.50	10.68
16.41	13.61	0.21	6.47	9.14	4.48	0.62	0.39	n.d.	99.12	10.61
16.35	13.95	0.21	6.47	8.95	4.34	0.69	0.38	n.d.	99.29	10.45
16.44	14.09	0.21	6.43	8.45	4.92	0.62	0.39	n.d.	99.63	10.00
16.45	14.16	0.22	6.90	8.52	3.64	0.67	0.39	n.d.	98.93	1.15
15.82	11.36	0.18	9.59	13.3	1.87	0.03	0.02	n.d.	100.46	n.d.
15.5	11.3	0.17	9.7	13.3	1.82	0.03	0.02	n.d.	100.76	n.d.