Supplemental File, doi:10.1130/GES01044.S1, for:

Brumley, K., Miller, E.L., Konstantinou, A., Grove, M., Meisling, K.E., and Mayer, L.A., 2015, First bedrock samples dredged from submarine outcrops in the Chukchi Borderland, Arctic Ocean: Geosphere, v. 11, p. 76–92, doi:10.1130/GES01044.1

Table A.1 | Zircon U-Pb lead geochronologic data and apparent ages from Chukchi Borderland amphibolite samples 5-009 (IGSN ECS 008102), 5-043b (IGSN ECS 008136) (*HLY0905-DS5 77.8136N, 161.3465W*). "Preferred age" for samples under 1000 Ma is ^{207}Pb corrected ^{206}Pb/^{238}U age.

Spot Name	% comm ^{206}Pb	U ppm	Th ppm	^{232}Th /^{238}U	Total ^{238}U/ ^{206}Pb	% err	total ^{207}Pb/ ^{206}Pb	% err	Preferred Age	1 σ err
Amphibolite 5-009										
5-009_3.1	1.07	35	16	0.48	12.79	1.9	.0581	5.0	484.6	9.3
5-009_19	0.25	70	41	0.61	12.84	1.3	.0547	3.6	484.8	6.4
5-009_18	0.00	18	6	0.35	12.74	2.7	.0604	7.1	485.1	13.2
5-009_21.1	5.96	20	8	0.41	12.62	2.5	.0568	6.8	491.8	12.1
5-009_13	2.45	30	12	0.40	12.44	2.0	.0628	5.2	494.8	9.9
5-009_25	0.55	56	25	0.46	12.51	1.5	.0570	4.1	496.0	7.5
5-009_14	3.51	20	9	0.49	12.37	2.6	.0604	6.6	499.2	12.9
5-009_8.1	0.36	160	81	0.52	12.30	0.9	.0570	2.4	504.2	4.5
5-009_17	3.26	26	12	0.49	12.28	2.3	.0578	6.1	504.3	11.3
5-009_2.1	0.17	107	102	0.99	12.30	1.1	.0557	3.0	504.8	5.6
5-009_22	0.00	101	109	1.12	12.23	1.1	.0574	3.1	506.6	5.7
5-009_7.1	0.87	23	8	0.37	12.10	2.4	.0655	6.0	506.9	12.1
5-009_16.2	3.15	11	4	0.36	12.21	3.3	.0579	9.1	507.0	16.7
5-009_24	0.00	383	395	1.06	12.17	0.6	.0582	1.5	508.4	2.9
5-009_23	0.00	22	9	0.41	12.22	2.3	.0549	6.2	508.6	11.5
5-009_21.2	0.90	99	108	1.13	12.17	1.2	.0570	3.1	509.2	5.8
5-009_16.1	0.20	224	269	1.24	12.16	0.8	.0572	2.0	509.6	3.8
5-009_5.1	3.50	23	10	0.45	12.13	2.4	.0586	6.1	509.7	12.0
5-009_9.1	1.75	26	11	0.43	12.12	2.3	.0592	6.0	510.0	11.5
5-009_1.1	1.44	21	9	0.43	12.10	2.5	.0591	6.5	511.0	12.7
5-009_5.2	0.28	108	129	1.23	12.08	1.1	.0579	2.9	512.4	5.6
5-009_6.1	1.53	21	8	0.42	11.99	2.5	.0551	6.8	517.9	13.0
5-009_15	0.12	201	69	0.36	11.94	0.8	.0567	2.2	518.9	4.1
5-009_4.1	0.25	193	104	0.56	11.91	0.8	.0572	2.2	520.2	4.2
5-009_11	0.67	95	101	1.10	11.89	1.2	.0549	3.1	522.7	6.0
5-009_20	0.36	99	117	1.22	11.76	1.1	.0571	3.0	526.4	5.8
5-009_10	0.00	84	84	1.03	11.67	1.2	.0564	3.3	531.2	6.5
5-009_12	0.87	21	9	0.44	11.63	2.5	.0557	6.5	533.3	13.0
Amphibolite 5-043										
5-043_14.1	-1.20	51	27	0.55	13.19	2.1	.0593	3.8	469.4	9.7
5-043_15.2	0.54	108	95	0.90	13.22	1.8	.0571	2.5	469.6	8.2
5-043_4.1	0.61	30	18	0.62	13.21	2.4	.0579	5.0	469.7	11.4
5-043_7.1	-1.57	127	159	1.29	13.18	1.7	.0593	2.8	469.7	7.9
5-043_10.2	-0.08	78	90	1.20	13.16	2.0	.0576	3.2	471.3	9.2
5-043_8.1	-0.84	59	54	0.95	13.26	2.0	.0505	3.8	472.2	9.4
5-043_3.1	-2.13	37	25	0.68	13.01	2.6	.0589	4.9	476.0	12.1
5-043_1.1	-1.70	52	42	0.84	12.96	2.2	.0569	4.0	479.2	10.3
5-043_8.2	1.58	28	17	0.61	12.85	2.4	.0628	4.6	479.6	11.5
5-043_15.1	-0.27	30	17	0.60	12.76	2.5	.0602	8.4	484.3	12.0
5-043_10.1	0.00	46	29	0.65	12.78	2.1	.0541	3.9	487.3	10.1
5-043_16.1	0.21	71	77	1.12	12.68	2.1	.0584	3.1	488.4	10.3
5-043_17.1	-4.75	23	16	0.70	12.65	2.7	.0583	6.0	489.6	13.1
5-043_12.1	-0.81	66	51	0.80	12.65	1.9	.0579	3.4	489.9	9.4
5-043_9.1	0.65	101	120	1.23	12.51	1.7	.0606	2.6	493.5	8.5
5-043_13.1	-0.24	147	154	1.08	12.56	1.6	.0574	2.2	493.8	7.9
5-043_2.1	-1.23	69	56	0.84	12.52	1.9	.0563	3.2	495.9	9.1
5-043_11.1	-0.53	162	135	0.86	12.40	1.6	.0564	2.2	500.4	8.0
5-043_5.1	0.27	170	207	1.26	12.15	1.6	.0552	2.0	511.5	7.9
5-043_6.1	0.26	112	122	1.12	11.93	1.7	.0548	2.5	521.0	8.6

Spot Name	% comm ^{206}Pb	U ppm	Th ppm	$^{232}Th/^{238}U$	Total $^{238}U/^{206}Pb$	% err	total $^{207}Pb/^{206}Pb$	% err	Preferred Age	1 σ err
Leucogranititc vein in 5-043										
043L_19.1	0.99	128	146	1.18	13.69	1.7	.0561	2.4	454.3	7.4
043L_10.2	0.45	70	74	1.09	13.53	2.0	.0610	3.6	456.7	9.0
043L_11.1	0.63	123	138	1.16	13.54	1.7	.0587	2.6	457.8	7.7
043L_1.1	0.22	93	66	0.73	13.29	1.8	.0567	3.1	467.3	8.4
043L_27.1	0.18	83	78	0.97	13.20	1.8	.0556	2.9	471.3	8.3
043L_25.1	0.00	54	52	1.00	12.94	2.0	.0638	3.5	475.7	9.5
043L_12.2	0.72	81	95	1.21	12.96	1.8	.0575	3.0	478.6	8.6
043L_20.1	0.21	155	228	1.52	12.90	1.6	.0592	3.0	479.8	7.6
043L_28.1	1.61	78	74	0.98	12.69	1.8	.0608	2.9	486.7	8.7
043L_10.1	1.46	30	17	0.60	12.67	2.5	.0594	5.0	488.0	11.9
043L_21.1	0.55	104	124	1.24	12.64	1.7	.0588	2.5	489.8	8.2
043L_12.1	6.27	34	21	0.65	12.72	2.4	.0531	8.4	490.3	12.0
043L_26.1	0.00	73	77	1.09	12.55	1.8	.0607	3.7	491.8	9.0
043L_8.1	0.51	69	75	1.12	12.57	1.9	.0568	3.3	493.8	9.2
043L_13.1	0.20	156	157	1.04	12.56	1.6	.0571	2.3	494.0	7.9
043L_5.1	0.35	145	178	1.27	12.51	1.7	.0587	2.2	494.8	8.3
043L_7.1	0.58	81	104	1.33	12.52	1.8	.0562	2.9	496.0	8.8
043L_9.2	0.44	63	54	0.88	12.45	1.9	.0591	3.3	496.8	9.4
043L_6.1	1.01	82	86	1.08	12.46	1.8	.0585	2.7	496.8	8.6
043L_9.1	1.72	20	11	0.57	12.40	2.8	.0610	7.3	497.8	14.0
043L_22.1	0.30	121	75	0.64	12.46	1.7	.0562	2.3	498.1	8.1
043L_23.1	0.54	211	326	1.59	12.30	1.6	.0637	1.7	499.9	7.8
043L_4.1	0.50	57	64	1.15	12.39	2.0	.0548	4.0	501.8	9.9
043L_3.1	0.36	155	208	1.39	12.36	1.6	.0561	2.0	502.2	7.8
043L_16.1	0.75	99	92	0.96	12.28	1.8	.0602	2.3	502.7	8.9
043L_2.1	0.00	102	125	1.28	12.34	1.7	.0549	2.6	503.8	8.5
043L_24.1	0.23	217	175	0.83	12.27	1.6	.0566	1.8	505.4	7.9
043L_15.1	0.83	98	114	1.21	12.20	1.7	.0589	2.8	506.7	8.7
043L_17.1	0.13	106	96	0.93	12.24	1.7	.0560	2.4	507.3	8.5
043L_18.1	0.26	237	265	1.15	12.18	1.5	.0562	1.7	509.6	7.6
043L_14.1	0.87	60	51	0.89	12.12	1.9	.0555	3.4	512.3	9.8

Table A.2 | Zircon trace element abundances (ppm) for samples #5-019 (IGSN #ECS008044) and #5-009 (IGSN #ECS008102).

Sample/spot	Y	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb
Garnet bearing gneiss #5-019										
5-019_1.1	332	0.072	4	2.3	6.4	0.05	31	51	43	55
5-019_1.2	295	0.014	3	2.3	6.0	0.04	31	48	33	31
5-019_10.1	308	0.028	11	0.2	0.6	0.17	6	25	59	164
5-019_10.2	330	0.012	2	2.0	5.5	0.05	34	57	36	32
5-019_11.1	1085	0.006	6	0.4	1.5	0.06	15	95	192	350
5-019_11.2	2646	0.016	1	0.6	2.3	0.03	29	211	495	965
5-019_2.1	302	0.022	4	1.8	5.3	0.04	29	49	34	33
5-019_3.1	531	0.012	2	0.8	3.0	0.04	26	76	66	67
5-019_3.2	743	0.524	4	2.7	3.3	0.06	44	102	103	153
5-019_4.1	1101	0.002	1	0.5	1.9	0.03	18	99	201	372
5-019_4.2	726	0.016	17	0.7	2.1	0.36	18	74	132	232
5-019_5.1	341	0.036	3	1.5	4.2	0.04	24	53	38	32
5-019_6.1	363	0.535	2	1.5	4.2	0.04	29	59	39	33
5-019_7.1	350	0.015	2	1.5	4.8	0.04	29	55	39	37
5-019_7.2	1924	0.027	62	2.6	6.1	1.86	43	166	349	684
5-019_8.1	277	0.013	3	1.9	5.3	0.04	25	42	33	38
5-019_9.1	267	0.022	3	1.9	5.2	0.03	26	42	30	30
5-019_9.2	320	0.018	2	1.4	4.6	0.03	27	50	37	36
Biotite Amphibolite #5-009										
5-009_1.1	185	0.021	5	0.4	0.7	0.18	5	19	32	60
5-009_2.1	608	0.062	15	1.8	2.6	0.46	17	61	108	184
5-009_3.1	275	0.029	7	0.5	1.0	0.26	7	27	49	93
5-009_4.1	482	0.027	14	0.5	1.1	0.15	10	47	90	167
5-009_5.1	287	0.021	5	0.6	1.1	0.29	8	28	51	93
5-009_5.2	1228	0.043	14	3.7	7.0	0.97	47	141	206	318
5-009_6.1	266	0.021	5	0.6	0.9	0.28	8	27	47	87
5-009_7.1	237	0.022	5	0.5	0.9	0.24	7	24	40	74
5-009_8.1	452	0.032	10	1.2	2.0	0.35	13	46	85	169
5-009_9.1	255	0.019	5	0.5	0.9	0.24	7	25	45	81
5-009_10	800	0.144	13	3.0	4.4	0.71	26	87	138	221
5-009_11	1080	0.038	12	2.4	4.8	0.73	36	118	182	281
5-009_12	257	0.023	5	0.5	1.0	0.27	7	26	45	79
5-009_13	278	0.070	5	0.3	0.8	0.20	6	26	50	99
5-009_14	280	0.022	5	0.6	1.1	0.31	8	29	49	87
5-009_15	266	0.008	10	0.2	0.5	0.08	4	23	50	110
5-009_16.1	1700	0.166	20	5.6	8.3	0.84	54	181	282	429
5-009_16.2	260	0.016	7	0.5	1.0	0.28	7	27	45	86
5-009_17	259	0.017	6	0.6	1.0	0.26	7	26	45	84
5-009_18	232	0.015	6	0.4	0.8	0.26	6	24	42	80
5-009_19	264	0.016	9	0.3	0.6	0.17	5	24	49	99
5-009_20	1174	0.268	15	6.2	8.7	1.10	46	135	198	293
5-009_21.1	247	0.042	5	0.5	1.0	0.26	7	24	42	75
5-009_21.2	927	0.034	14	2.1	4.4	0.67	31	104	159	254
5-009_22	1047	0.035	13	1.8	4.2	0.64	33	111	177	273
5-009_23	208	0.011	4	0.4	0.7	0.21	5	20	36	64
5-009_24	1534	0.149	27	3.5	6.1	0.57	42	149	257	405
5-009_25	454	0.008	5	0.3	0.9	0.29	9	41	81	156

Table A.3 | Zircon U-Pb lead geochronologic data and apparent ages from Chukchi Borderland garnet-bearing mylonitic gneiss samples #5-019 (IGSN ECS #008044) and #5-020b (IGSN #ECS008045) (*HLY0905-DS5 77.8136N, 161.3465W*). "Preferred age" for samples under 1000 Ma is the ^{207}Pb corrected ^{206}Pb/^{238}U age. Analyses over 1000 Ma are ^{204}Pb corrected ^{207}Pb/^{206}Pb ages. Sample 5-019 was mounted on two different mounts (KJB002 and ESG08) and run in two different sessions. Sample 5-020 was mounted on one zircon mount (KJB002) but run in two different sessions. Blue bars outline analyses from zircons with igneous trace element patterns while non-colored regions correspond to zircons with metamorphic trace element patterns and morphology (see text for discussion). Notes on zircon morphology seen in CL images appear in the far right column.

Spot Name	% comm ^{206}Pb	U ppm	Th ppm	^{232}Th/^{238}U	Total ^{238}U/^{206}Pb	% err	total ^{207}Pb/^{206}Pb	% err	Preferred Age	1 σ err	Note
Garmet bearing gneiss #5-019											
mount KJB002											
5-019_1.2	0.00	300	162	0.56	12.92	1.4	.0571	2.3	**480.5**	**6.7**	rounded
5-019_11.1	0.20	298	53	0.18	12.41	1.4	.0570	1.8	**499.5**	**6.9**	rim
5-019_8.1	0.07	746	226	0.31	12.24	1.3	.0578	1.1	**506.1**	**6.5**	patchy
5-019_10.2	0.11	333	118	0.37	12.24	1.4	.0572	1.6	**506.2**	**6.9**	rim
5-019_6.1	0.11	281	129	0.48	12.15	1.4	.0586	2.3	**509.1**	**7.1**	rounded
5-019_7.1	0.00	294	129	0.45	12.15	1.4	.0581	1.8	**509.4**	**7.1**	rim
5-019_3.1	0.00	434	68	0.16	11.99	1.4	.0570	1.5	**516.9**	**7.0**	patchy
5-019_5.1	0.00	831	93	0.12	11.93	1.3	.0573	1.1	**519.1**	**6.7**	rounded
5-019_9.1	0.00	712	171	0.25	11.86	1.3	.0574	1.3	**522.3**	**6.7**	rim
5-019_2.1	0.00	1061	123	0.12	11.79	1.3	.0576	0.9	**525.0**	**6.7**	rounded
5-019_1.1	0.00	1034	233	0.23	11.71	1.3	.0560	1.1	**529.7**	**6.8**	rounded
5-019_3.2	0.07	546	200	0.38	11.34	1.4	.0575	1.3	**545.2**	**7.2**	patchy
5-019_9.2	0.18	296	126	0.44	11.16	1.4	.0611	4.4	**551.5**	**7.8**	core
5-019_4.1	0.00	570	48	0.09	11.04	1.3	.0563	1.2	**560.7**	**7.3**	rim
5-019_11.2	0.00	698	75	0.11	10.31	1.3	.0589	1.6	**597.5**	**7.9**	core
5-019_4.2	0.17	171	64	0.39	5.66	1.5	.0853	5.6	**1293.7**	**111.4**	core
5-019_10.1	0.00	594	69	0.12	4.92	1.3	.0961	2.5	**1549.0**	**46.4**	core
5-019_7.2	0.02	279	286	1.06	3.59	1.4	.0996	0.7	**1614.4**	**13.9**	core
mount ESG08											
5-019-1-3	0.02	717	123	0.18	.0576	0.8	13.09	0.4	**474.1**	**1.8**	planar zoned
5-019-8.2	0.09	432	100	0.24	12.32	0.7	.0562	1.3	**503.8**	**3.3**	rim
5-019-18.1	0.08	697	57	0.08	12.18	0.5	.0580	1.0	**508.4**	**2.3**	rounded
5-019-16.1	0.08	390	162	0.43	12.15	0.6	.0577	1.3	**509.8**	**3.0**	rounded
5-019-11.2	0.02	981	164	0.17	12.10	0.4	.0578	0.8	**511.6**	**2.2**	rim
5-019-3.1	0.02	810	105	0.13	.0585	0.7	12.09	0.4	**511.9**	**1.9**	rim
5-019-15.2	0.07	254	46	0.19	12.08	0.9	.0566	2.6	**513.5**	**4.4**	rim
5-019-9.1	0.03	622	114	0.19	12.03	0.6	.0569	1.0	**515.0**	**3.2**	rim
5-019-19.1	0.04	820	33	0.04	12.01	0.4	.0581	0.8	**515.1**	**2.1**	rim
5-019-13.1	0.00	419	206	0.51	11.92	0.7	.0566	1.3	**519.9**	**3.4**	rounded
5-019-20.1	0.08	415	168	0.42	11.86	0.5	.0577	1.4	**521.9**	**2.7**	rounded
5-019-8.1	0.04	1193	50	0.04	11.67	0.4	.0579	1.1	**529.9**	**2.1**	core
5-019-17.1	0.10	385	155	0.42	11.64	0.6	.0590	1.2	**530.9**	**3.0**	rim
5-019-6.1	0.00	903	25	0.03	.0605	1.2	11.59	0.4	**532.0**	**2.4**	patchy
5-019-12.2	0.09	320	187	0.60	11.60	0.8	.0589	2.5	**532.3**	**4.3**	rim

5-019-14.1	0.00	301	110	0.38	11.58	0.9	.0576	1.5	**534.4**	**4.7**	rim
5-019-5.2	0.00	883	92	0.11	.0566	1.2	11.54	0.5	**536.6**	**2.4**	patchy
5-019-5.1	0.02	1099	31	0.03	.0575	0.7	11.34	0.4	**545.6**	**2.2**	patchy
5-019-2.2	0.00	634	159	0.26	.0588	1.6	11.27	0.5	**547.7**	**2.7**	core
5-019-4.1	0.00	529	59	0.11	.0603	1.5	10.98	0.6	**561.0**	**3.2**	rim /old core
5-019-14.2	0.05	345	70	0.21	10.96	0.7	.0605	1.3	**562.0**	**3.9**	core
5-019-15.1	0.08	487	66	0.14	10.68	0.7	.0594	4.2	**576.9**	**4.2**	core
5-019-12.1	0.00	422	60	0.15	10.29	0.7	.0620	1.5	**596.3**	**4.0**	core
5-019-10.1	0.00	1004	205	0.21	10.00	0.4	.0597	1.1	**614.8**	**2.5**	prismatic
5-019-2.1	0.00	286	117	0.42	.0579	1.2	9.99	9.6	**616.6**	**57.7**	rim /old core
5-019-3.2	0.10	135	88	0.67	.0619	1.6	8.91	1.0	**641.3**	**39.6**	core
5-019-11.1	0.06	1184	957	0.84	7.49	1.3	.0734	1.1	**1011.7**	**22.2**	core
5-019-4.2	0.30	54	29	0.55	.0752	8.5	7.03	1.8	**1009.7**	**183.8**	core
5-019-9.2	-0.16	93	64	0.71	4.35	2.4	.1040	4.3	**1717.5**	**79.7**	core
Garmet bearing gneiss #5-020											
mount KJB002											
5-020-17.2	0.02	1249	158	0.13	12.36	1.4	.0581	0.8	**500.9**	**6.9**	rim
5-020-16	0.16	257	49	0.20	12.33	1.5	.0590	2.0	**501.7**	**7.6**	prismatic/rim
5-020-15	0.80	73	34	0.48	12.19	1.9	.0595	3.4	**507.1**	**9.6**	rounded
5-020-04	0.32	311	111	0.37	11.91	1.9	.0592	1.7	**518.8**	**9.9**	planar zoned
5-020-01	0.00	981	125	0.13	11.74	1.4	.0579	1.4	**527.0**	**7.4**	rounded
5-020-14.2	0.07	1162	189	0.17	11.73	1.4	.0578	0.9	**527.6**	**7.4**	rim
5-020-05	0.40	191	18	0.10	10.83	1.7	.0575	4.5	**570.6**	**9.6**	core
5-020-10	0.02	302	32	0.11	10.49	1.5	.0595	2.6	**587.0**	**8.9**	core
5-020-08	0.25	154	33	0.22	10.37	1.6	.0562	3.0	**596.0**	**9.5**	prismatic
5-020-06	0.26	248	54	0.23	10.03	1.6	.0663	5.7	**608.2**	**9.9**	prismatic
5-020-07	0.52	148	175	1.23	10.10	1.7	.0606	2.2	**608.5**	**9.9**	prismatic
5-020-17.1	0.42	52	83	1.65	9.64	2.1	.0638	4.7	**634.1**	**13.0**	core
5-020-14.1	-0.01	766	73	0.10	9.42	1.4	.0597	2.7	**652.0**	**9.3**	core
5-020-09	3.13	305	124	0.42	9.10	1.7	.0634	3.3	**671.2**	**11.1**	prismatic
5-020-03	-0.03	478	131	0.28	8.33	1.7	.0788	6.6	**1172.0**	**131.0**	discordnant
5-020-12	0.37	121	83	0.71	4.70	1.7	.0813	1.4	**1159.0**	**41.0**	core
5-020-11	0.09	212	79	0.38	4.14	1.5	.1016	3.2	**1643.0**	**60.0**	core
5-020-13	2.98	268	184	0.71	3.49	1.5	.1004	0.7	**1142.0**	**51.0**	core
5-020-02	0.03	336	156	0.48	3.42	1.5	.1012	1.3	**1642.0**	**25.0**	core
first run											
5-020_3	0.00	792	14	0.02	.0577	1.1	11.99	1.4	**516.5**	**7.1**	rounded
5-020_2.2	0.07	414	12	0.03	.0584	1.5	11.72	1.4	**527.7**	**7.1**	rim
5-020_1	-0.12	263	98	0.38	.0582	2.7	10.97	1.5	**562.4**	**8.3**	prismatic
5-020_2.1	0.09	226	99	0.45	.1000	3.4	3.68	1.5	**1612**	**64**	core

Table A.4 | Zircon U-Pb geochronologic data and apparent ages from Chukchi Borderland orthogneiss samples 5-002a (IGSN ECS008095), 5-001b (IGSN ECS008094) *(HLY0905-DS5 77.8136N, 161.3465W)*. Preferred age is ^{207}Pb corrected $^{206}Pb/^{238}U$ age for samples under 1000 Ma and ^{204}Pb corrected $^{207}Pb/^{206}Pb$ age for samples over 1000 Ma. Excluded analyses were not used in median age calculations but still appear as dotted ellipses on concordia diagrams. Areas highlighted in green are young zircon ages that correspond to high LREE patterns indicative of possible hydrothermal alteration (see text). Light blue highlighted fields denote spot analyses of older inherited zircon cores visible in cathodoluminescent images.

Spot Name	% comm ^{206}Pb	U ppm	Th ppm	$^{232}Th/^{238}U$	Total $^{238}U/^{206}Pb$	% err	total $^{207}Pb/^{206}Pb$	% err	Preferred Age	1 σ err	Note
Orthogneiss 5-001b											
5-001b-11	0.14	333	104	0.32	15.32	0.6	.0560	1.7	**407.0**	**2.5**	discordant
5-001b-19	0.21	1775	1183	0.69	15.26	0.3	.0566	0.7	**408.3**	**1.2**	Hi LREE
5-001b_6.1	0.75	1750	391	0.23	15.06	0.3	.0610	0.7	**411.3**	**1.2**	Hi LREE
5-001b-9	0.26	325	204	0.65	15.13	0.6	.0571	1.6	**411.4**	**2.4**	Hi LREE
5-001b-17C	0.05	335	277	0.86	14.89	0.6	.0555	1.5	**418.9**	**2.5**	discordant
5-001b-20C	0.02	339	270	0.82	14.88	0.6	.0553	1.6	**419.1**	**2.5**	
5-001b--5	0.16	452	329	0.75	14.83	1.0	.0565	1.4	**419.9**	**4.1**	
5-001b-8	-0.01	527	268	0.53	14.84	0.5	.0551	1.3	**420.3**	**2.0**	
5-001b-12	0.24	399	391	1.01	14.65	0.6	.0572	1.4	**424.8**	**2.7**	
5-001b16W	-0.10	235	296	1.30	14.63	0.7	.0546	2.0	**426.6**	**3.1**	
5-001b-23E	-0.04	1068	175	0.17	14.60	0.3	.0551	0.9	**427.1**	**1.5**	
5-001b-1	-0.13	318	358	1.16	14.58	0.7	.0544	1.8	**428.2**	**2.8**	discordant
5-001b-15E	0.17	937	231	0.25	14.50	0.3	.0568	0.9	**429.2**	**1.5**	
5-001b-2	-0.15	831	141	0.18	14.54	0.4	.0542	1.0	**429.3**	**1.6**	
5-001b_9.1	0.30	591	258	0.45	14.43	0.6	.0578	3.9	**430.6**	**3.0**	
5-001b-3E	-0.02	1016	119	0.12	14.45	0.3	.0553	0.9	**431.5**	**1.4**	
5-001b-6	0.10	806	292	0.37	14.41	0.4	.0563	1.1	**432.2**	**1.7**	
5-001b-18E	-0.11	913	365	0.41	14.39	0.4	.0546	0.9	**433.5**	**1.5**	
5-001b-7	-0.06	507	99	0.20	14.36	0.5	.0551	1.3	**434.2**	**2.1**	
5-001b_3.1	-0.07	1103	353	0.33	14.32	0.5	.0550	1.1	**435.4**	**2.0**	
5-001b-18C	-0.12	536	592	1.14	14.32	0.5	.0546	1.3	**435.6**	**2.1**	
5-001b_1.1	-0.11	525	185	0.36	14.30	0.7	.0547	1.5	**436.3**	**2.8**	
5-001b_12.1	0.23	551	272	0.51	14.18	0.6	.0575	2.0	**438.3**	**2.7**	
5-001b-21E	0.05	1244	145	0.12	14.15	0.3	.0561	0.8	**440.1**	**1.4**	
5-001b-10	0.02	774	233	0.31	14.13	0.5	.0559	1.1	**440.6**	**2.0**	
5-001b_7.1	-0.02	1306	252	0.20	14.00	0.4	.0557	0.9	**444.7**	**1.7**	
5-001b-22	0.02	1704	644	0.39	14.00	0.3	.0560	0.7	**444.7**	**1.2**	
5-001b_10.1	-0.28	411	117	0.29	13.97	0.7	.0536	3.0	**446.9**	**3.1**	
5-001b_5.1	0.22	816	403	0.51	13.81	0.5	.0577	1.9	**449.6**	**2.4**	
5-001b_4.1	0.00	1591	4254	2.76	13.63	0.3	.0561	0.7	**456.3**	**1.2**	
5-001b_2.1	-0.17	1051	1161	1.14	12.78	0.4	.0555	1.0	**486.4**	**2.1**	RD
5-001b-13	0.64	1041	71	0.07	11.93	0.4	.0628	0.9	**515.7**	**1.8**	discordant
5-001b-14C	0.58	172	100	0.60	8.30	0.8	.0684	1.9	**729.0**	**6.0**	discordant
5-001b-4C	0.12	217	148	0.70	6.56	0.6	.0705	1.2	**926**	**27**	
5-001b-3C	0.37	179	130	0.75	6.98	0.8	.0708	1.5	**941**	**31**	
5-001b-21C	0.53	206	372	1.87	6.79	0.7	.0728	1.3	**986**	**28**	

Spot Name	% comm ^{206}Pb	U ppm	Th ppm	$^{232}Th/^{238}U$	Total $^{238}U/^{206}Pb$	% err	total $^{207}Pb/^{206}Pb$	% err	Preferred Age	1 σ err	Note
5-001b_8.1c	0.37	357	147	0.43	4.80	0.6	.0839	1.4	**1168**	**38**	
5-001b-15C	1.00	162	69	0.44	4.59	0.7	.0910	1.0	**1437**	**21**	
5-001b_13.1C	-0.27	264	165	0.65	3.19	0.6	.1053	1.1	**1686**	**24**	
5-001b-23C	2.11	373	142	0.39	3.75	0.5	.1115	0.6	**1824**	**11**	
Orthogneiss 5-002a											
5-002a-8	0.13	658	761	1.20	15.13	0.5	.0560	1.3	**412.2**	**2.1**	Hi LREE
5-002a-10	0.01	963	447	0.48	14.98	0.3	.0552	0.9	**416.6**	**1.4**	Hi LREE
5-002a-11	0.09	307	322	1.08	14.88	0.6	.0559	1.7	**419.0**	**2.6**	
5-002a-5	-0.10	433	222	0.53	14.88	0.5	.0544	1.4	**419.7**	**2.2**	
5-002a-3R	0.02	590	138	0.24	14.84	0.4	.0553	1.2	**420.5**	**1.9**	
5-002a-9	0.14	603	177	0.30	14.77	0.4	.0564	1.2	**421.6**	**1.8**	
5-002a-4R	0.01	788	328	0.43	14.77	0.4	.0553	1.0	**422.3**	**1.5**	
5-002a-14	-0.06	1162	275	0.24	14.75	0.3	.0548	0.9	**423.2**	**1.4**	
5-002a-12	0.00	1159	392	0.35	14.72	0.4	.0553	0.9	**423.6**	**1.6**	
5-002a-15	-0.14	173	74	0.44	14.63	1.0	.0543	2.4	**426.9**	**4.3**	
5-002a-18	0.03	957	163	0.18	14.51	0.4	.0557	1.0	**429.6**	**1.6**	
5-002a-6	0.38	1656	167	0.10	14.46	0.3	.0585	0.9	**429.6**	**1.2**	
5-002a-1R	0.04	689	733	1.10	14.48	0.5	.0558	1.2	**430.2**	**2.2**	
5-002a_2.1	2.23	362	210	0.60	14.13	0.8	.0735	4.6	**431.2**	**3.8**	discordant
5-002a--20	0.03	1780	399	0.23	14.39	0.3	.0557	1.1	**432.9**	**1.4**	
5-002a-7	-0.04	1012	347	0.35	14.34	0.4	.0552	0.9	**434.7**	**1.7**	
5-002a-17	0.01	1164	340	0.30	14.28	0.3	.0557	0.9	**436.4**	**1.4**	
5-002a-19	-0.04	1220	297	0.25	14.23	0.3	.0553	1.1	**437.9**	**1.5**	
5-002a-2R	-0.02	1466	374	0.26	14.20	0.3	.0555	0.8	**438.7**	**1.4**	
5-002a-16	-0.04	1407	475	0.35	14.19	0.3	.0554	0.8	**439.2**	**1.3**	
5-002a_1.1	-0.24	1165	267	0.24	13.91	0.4	.0539	1.2	**448.6**	**1.8**	
5-002a_6.1	-0.17	628	110	0.18	13.66	1.8	.0547	2.0	**456.2**	**8.1**	
5-002a_5.1	-0.20	514	633	1.27	13.31	0.6	.0548	2.6	**467.8**	**2.8**	
5-002a_3.1	-0.05	392	148	0.39	11.68	0.7	.0576	1.6	**529.7**	**3.7**	
5-002a_4.1C	0.04	1028	995	1.00	6.45	0.3	.0704	1.1	**860**	**28**	
5-002a-13C	0.80	652	333	0.53	3.27	0.4	.1116	0.7	**1824**	**13**	

Table A.5 | Zircon trace elements (ppm) for samples 5-001b and 5-002a. Spots highlighted in green correspond to the youngest ages and could represent hydrothermally altered zircons from *Table A4*.

Sample/Spot#	Y	La	Ce	Nd	Sm	Eu	Gd	Dy	Er	Yb	Hf
5-001b--11	803	0.322	7	1.6	2.8	0.92	21	80	132	241	9500
5-001b-3E	348	0.169	16	0.2	0.5	0.17	5	27	62	151	10088
5-001b-8	867	0.07	19	1.2	2.6	0.54	21	84	148	278	10263
5-001b-1	1600	0.126	27	3.8	6.2	2.1	49	161	259	440	8844
5-001b-16	1901	0.114	25	5.4	9.7	4.12	66	203	309	534	8718
5-001b-6	1103	0.009	20	1	2.6	0.59	23	105	188	367	11140
5-001b-10	761	0.018	11	1.2	2.5	0.7	19	78	151	320	10416
5-001b--5	1081	0.048	20	1.7	4	0.86	30	110	184	343	9297
5-001b-7	490	0.008	4	0.1	0.5	0.1	7	42	91	189	12902
5-001b-9	1000	2.535	20	4.6	4.4	1.4	28	95	159	293	9537
5-001b-2	584	0.204	8	0.6	0.9	0.24	9	52	109	234	11407
5-001b-18C	1841	0.03	44	2.3	5.2	1.97	41	169	329	657	8891
5-001b-12	2029	0.087	19	4.1	8.8	2.75	65	221	338	566	8462
5-001b-20C	1402	0.064	24	3.3	5.9	1.9	44	150	234	394	8523
5-001b-19	1936	3.989	56	10	9.4	2.46	58	208	332	614	8591
5-001b-14	946	2.164	15	2.5	4.2	0.36	31	102	149	248	8766
5-001b-18	1144	0.011	13	0.8	2.3	0.57	23	110	204	395	12417
5-001b-15	726	0.023	11	0.3	1.1	0.3	12	67	133	276	10705
5-001b-23	845	2.059	27	4.1	3.1	1.06	18	73	125	247	12499
5-001b-22	1112	0.018	20	0.5	1.9	0.52	21	104	193	374	11283
5-001b-21	668	0.007	6	0.3	1	0.15	11	59	119	259	13662
5-001b-17C	1224	0.05	29	2.6	5.2	1.52	38	136	205	347	10079
5-001b-13	626	0.266	5	0.8	1.1	0.25	9	56	110	223	13028
5-001b-3C	554	0.067	19	0.8	1.4	0.86	12	44	94	214	10091
5-001b-4	548	0.022	24	0.5	1	0.65	10	44	102	241	9834
5-001b-21C	2050	0.113	21	5	9.7	0.54	75	226	341	541	9673
5-001b-15C	736	0.019	27	0.8	2.1	0.73	17	72	139	268	9449
5-001b-23C	753	0.023	33	0.5	1.4	0.17	14	69	142	277	10989
5-002a-8	1983	0.054	107	3.7	7.9	2.12	60	198	292	466	9386
5-002a-1	1632	0.063	46	4.4	8	2.3	54	165	256	436	9818
5-002a-9	712	0.375	30	1.6	2.1	0.49	15	66	122	244	10020
5-002a-15	344	0.011	9	0.3	0.6	0.22	6	30	61	140	11347
5-002a-18	791	0.016	8	0.3	1.2	0.3	12	68	143	302	11629
5-002a-7	822	0.012	18	0.4	1.5	0.39	15	72	139	275	10896
5-002a-14	699	0.014	9	0.3	1	0.24	12	62	123	239	11174
5-002a-12	1462	0.008	20	0.8	2.8	0.83	31	142	254	477	10304
5-002a-11	1931	0.093	18	4.1	7.6	3.13	57	194	311	543	9028
5-002a-10	1087	0.141	29	3.4	5.6	1.84	35	119	193	373	8356
5-002a-19	798	0.034	12	0.4	1.3	0.31	13	71	136	278	11221
5-002a-16	936	0.008	17	0.4	1.5	0.36	16	85	163	325	11442
5-002a-4R	678	0.076	19	0.6	1.5	0.44	13	62	118	243	9158
5-002a-2R	1083	0.016	17	0.4	1.4	0.42	18	98	192	373	11705
5-002a-3R	622	0.015	8	0.1	0.7	0.23	9	53	112	247	12095
5-002a-17	802	0.014	13	0.4	1.3	0.27	14	73	138	272	11734
5-002a-20	1348	0.012	14	0.4	1.8	0.32	21	119	238	482	11734
5-002a-5	611	0.027	13	1.1	2.1	0.63	14	59	108	216	10997
5-002a-6	784	1.383	83	2.7	1.8	0.41	9	56	140	366	15141
5-002a-13C	1451	0.01	26	0.8	2.5	1.1	27	130	262	530	11480

Table A.6 | Whole rock Sr and Nd isotopic ratios of Chukchi Borderland orthogneiss samples 5-002a and 5-001b

	U-Pb	Elemental conc.			87Rb/86Sr	87Sr/86 Sr	Error	87Sr/86Sr	Elemental conc.			143Nd/144Nd	Error	εNd	143Nd/144Nd	model	CHUR	Model
sample ID	age	Rb (ppm)	Sr (ppm)	Rb/Sr	est.	meas.	2 σ	initial	Nd ppb	Sm ppb	Sm/Nd	meas.	2 σ	t=0	Initial	εNd(t)	t	CHUR age
DS5-2A	420	165.05	483.36	0.34	0.989562	0.713652	20	0.707732	55.04	9.04	0.16	---	---	---	---	---	---	---
DS5-1B	420	197.62	410.56	0.48	1.394935	0.715392	14	0.707048	41.46	8.53	0.21	0.5121913	12	-8.7	0.511851	-4.8	0.51210	935

Table A.7 | CIPW normative calculations based on major element composition for dredged Chukchi Borderland orthogneiss samples 5-002a, and 5-001b.

Normalized CIPW Norm.		
	DS5-2A	DS5-1B
Q	***19.5***	***23.2***
C	0.9	2.1
Or	***24.7***	***29.6***
Ab	34.2	30.9
An	16.0	10.1
Di	0.0	0.0
Hy	3.3	2.8
Ol	0.0	0.0
Il	0.1	0.1
Tn	0.0	0.0
Ru	0.6	0.6
Ap	0.6	0.6
Total Feld.	***50.2***	***41.0***
Sum	100.0	100.0

Table A.8 **|** Unormalized whole rock trace elements (ppm) of Chukchi Borderland orthogneiss samples 5-002a and 5-001b.

Unnormalized Trace Elements (ppm):		
	5-002a	5-001b
Ni	12	11
Cr	10	9
Sc	8	8
V	50	46
Ba	965	992
Rb	171	202
Sr	488	410
Zr	337	304
Y	24	39
Nb	19.7	26.5
Ga	22	21
Cu	7	14
Zn	64	83
Pb	18	22
La	80	53
Ce	155	97
Th	30	20
Nd	52	40
U	2	2
Cs	3	10
As >/=	0	5

Table A.9 | Whole rock normalized major elements of the Chukchi Borderland orthogneiss samples 5-002a and 5-001b.

Normalized Major Elements (Weight %):		
	5-002a	5-001b
SiO2	65.18	66.79
TiO2	0.664	0.604
Al2O3	17.24	16.58
FeO*	4.01	4.08
MnO	0.065	0.051
MgO	1.27	1.07
CaO	3.42	2.27
Na2O	3.88	3.50
K2O	4.01	4.80
P2O5	0.251	0.241
Total	100.00	100.00