

SUPPLEMENTAL INFORMATION:

**A biomarker record of Lake El'gygytyn, Far East Russian Arctic: Investigating sources of organic matter and carbon cycling during marine isotope stages 1-3**

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Core LZ1029 Normal alkane concentrations (ng /g TLE)

Sample ID	Sample depth (cm)	Sample age (yrs)	C21	C23	C25	C27	C29	C31	C33
LE 007	14	3235		10.46	12.50	18.26	15.57	11.52	2.39
LE 019	38	6579		2.65	3.95	6.76	7.76	7.77	1.75
LE 027	54	9979		0.70	1.29	2.50	3.39	4.02	0.92
LE 037	74	13368		0.90	1.56	2.78	3.88	4.53	1.07
LE 047	94	16326		0.79	1.37	2.02	2.71	3.34	0.98
LE 057	114	19276		1.39	2.12	2.45	2.41	2.21	0.61
LE 067	134	21455	4.30	3.51	3.40	3.46	2.80	2.39	0.53
LE 077	154	26017	2.65	2.11	3.10	4.44	4.44	4.81	1.18
LE 087	174	31809	0.76	1.20	2.07	3.36	3.88	4.86	1.31
LE 097	194	37600			1.62	1.68	2.32	2.81	0.69
LE 108	216	44020			1.16	2.10	3.19	3.93	0.90
LE 117	234	49379			0.72	1.41	2.20	2.86	0.63
LE 127	254	55333			1.42	2.30	3.01	4.13	1.16
LE 137	274	61287		1.33	2.50	3.79	3.98	4.47	1.48

Core LZ1029 Normal alkane concentrations ( $\mu\text{g/g}$  TOC)

Sample ID	Sample depth (cm)	Sample age (yrs)	C21	C23	C25	C27	C29	C31	C33
LE 007	14	3235		568.27	679.41	992.51	846.25	626.20	129.75
LE 019	38	6579		119.20	177.24	303.60	348.63	348.89	78.60
LE 027	54	9979		70.84	130.69	252.41	342.60	406.75	92.70
LE 037	74	13368		68.54	118.53	210.78	293.91	343.04	80.99
LE 047	94	16326		56.81	98.59	145.38	194.75	240.32	70.83
LE 057	114	19276		160.21	245.01	282.80	277.94	255.42	70.29
LE 067	134	21455	628.01	512.13	495.64	505.61	408.63	348.72	78.07
LE 077	154	26017	221.34	176.62	258.89	371.44	370.76	401.82	98.89
LE 087	174	31809	72.36	114.06	196.85	318.91	368.73	461.10	124.12
LE 097	194	37600			213.34	220.98	304.94	369.89	90.87
LE 108	216	44020			74.11	134.52	203.71	251.39	57.37
LE 117	234	49379			54.64	107.05	167.11	217.44	47.48
LE 127	254	55333			79.19	127.68	167.16	229.53	64.65
LE 137	274	61287		80.26	151.17	229.25	240.56	269.92	89.39

Core LZ1029 Fatty acid concentrations (ng /g TLE)

Sample ID	Sample depth (cm)	Sample age (yrs)	C14	C16	C18	C20	C22	C24	C26	C28	C30	C32
LE 007	14	3235	0.322	1.027	0.810	0.859	2.529	9.506	13.281	11.239	3.154	0.548
LE 019	38	6579	0.092	0.675	0.664	0.775	2.116	7.609	11.247	9.230	3.147	0.000
LE 027	54	9979	0.073	0.374	0.303	0.264	0.617	2.297	4.481	4.860	1.744	0.521
LE 037	74	13368	0.090	0.490	0.398	0.466	0.972	3.648	6.793	6.071	2.408	0.645
LE 047	94	16326	0.071	0.383	0.310	0.313	0.645	2.387	4.094	3.339	1.226	0.313
LE 057	114	19276	0.145	0.576	0.446	1.379	2.417	6.722	11.082	7.595	3.452	0.528
LE 067	134	21455	0.250	0.827	0.698	2.955	3.882	5.975	9.074	5.505	2.227	0.448
LE 077	154	26017	0.206	0.899	0.734	2.121	3.095	7.381	9.546	7.758	2.722	0.660
LE 087	174	31809	0.173	0.735	0.662	1.553	2.319	5.961	8.077	7.167	2.561	0.769
LE 097	194	37600	0.125	0.518	0.366	0.478	0.765	2.089	3.124	2.733	0.992	0.288
LE 108	216	44020	0.101	0.662	0.504	0.327	0.537	1.582	2.651	2.524	1.012	0.307
LE 117	234	49379	0.140	0.982	0.685	0.292	0.451	1.090	2.097	1.960	0.787	0.213
LE 127	254	55333	0.076	0.610	0.454	0.331	0.571	1.857	3.499	3.524	1.568	0.540
LE 137	274	61287	0.057	0.452	0.397	0.360	0.664	2.798	3.818	3.629	1.682	0.611

Core LZ1029 Fatty acid concentrations ( $\mu\text{g/g}$  TOC)

Sample ID	Sample depth (cm)	Sample age (yrs)	C14	C16	C18	C20	C22	C24	C26	C28	C30	C32
LE 007	14	3235	17.50	55.84	44.02	46.66	137.42	516.63	721.79	610.81	171.41	29.79
LE 019	38	6579	4.15	30.33	29.80	34.80	95.03	341.70	505.04	414.48	141.32	
LE 027	54	9979	7.36	37.86	30.63	26.68	62.44	232.26	453.22	491.47	176.40	52.71
LE 037	74	13368	6.84	37.08	30.14	35.32	73.64	276.32	514.53	459.85	182.39	48.88
LE 047	94	16326	5.11	27.51	22.30	22.51	46.38	171.64	294.41	240.11	88.17	22.51
LE 057	114	19276	16.74	66.52	51.52	159.23	279.00	776.15	1279.49	876.90	398.56	60.97
LE 067	134	21455	36.48	120.74	101.84	431.27	566.65	872.06	1324.39	803.53	325.05	65.43
LE 077	154	26017	17.21	75.14	61.31	177.24	258.66	616.76	797.69	648.27	227.46	55.18
LE 087	174	31809	16.48	69.79	62.83	147.49	220.23	566.11	767.04	680.64	243.27	73.01
LE 097	194	37600	16.38	68.16	48.17	62.86	100.56	274.58	410.67	359.36	130.43	37.81
LE 108	216	44020	6.45	42.33	32.19	20.92	34.32	101.10	169.45	161.30	64.66	19.64
LE 117	234	49379	10.64	74.59	52.04	22.20	34.23	82.80	159.24	148.83	59.79	16.19
LE 127	254	55333	4.20	33.92	25.22	18.41	31.72	103.27	194.53	195.93	87.16	30.02
LE 137	274	61287	3.43	27.32	23.98	21.75	40.15	169.12	230.77	219.38	101.65	36.96

Core LZ1029 Normal alcohol concentrations (ng/g TLE)

Sample ID	Sample depth (cm)	Sample age (yrs)	C21	C22	C24	C26	C28
LE 007	14	3235	1.55	2.19	2.12	3.66	4.84
LE 019	38	6579	1.04	1.41	3.60	4.36	5.17
LE 027	54	9979	0.67	0.76	6.68	0.27	0.44
LE 037	74	13368	0.83	0.66	1.42	0.83	0.98
LE 047	94	16326	0.91	1.23	2.26	0.48	0.49
LE 057	114	19276	2.87	0.38	0.51	0.36	0.42
LE 067	134	21455	1.37	4.80	3.10	2.48	1.83
LE 077	154	26017	3.94	0.68	1.73	0.92	2.24
LE 087	174	31809	2.16	0.70	1.05	1.93	3.38
LE 097	194	37600	0.85	0.80	2.20	0.69	1.11
LE 108	216	44020	0.49	0.60	6.19	0.53	0.91
LE 117	234	49379	0.31	0.61	4.57	0.31	0.44
LE 127	254	55333	0.39	0.81	4.21	0.86	0.80
LE 137	274	61287	0.87	0.77	6.12	0.59	0.57

Core LZ1029 Normal alcohol concentrations ( $\mu\text{g/g}$  TOC)

Sample ID	Sample depth (cm)	Sample age (yrs)	C21	C22	C24	C26	C28
LE 007	14	3235	84.33	119.17	115.48	199.17	263.09
LE 019	38	6579	46.63	63.36	161.87	195.76	232.14
LE 027	54	9979	67.26	76.41	675.31	27.45	44.84
LE 037	74	13368	63.16	50.21	107.76	63.16	74.18
LE 047	94	16326	65.44	88.12	162.45	34.62	34.90
LE 057	114	19276	331.63	43.33	58.82	41.28	48.68
LE 067	134	21455	199.72	701.14	451.91	362.65	267.23
LE 077	154	26017	329.03	56.82	144.27	77.06	186.84
LE 087	174	31809	205.58	66.43	99.29	183.46	321.39
LE 097	194	37600	112.13	105.22	288.98	90.43	145.57
LE 108	216	44020	31.30	38.06	395.54	34.07	58.47
LE 117	234	49379	23.17	46.54	346.83	23.64	33.36
LE 127	254	55333	21.53	45.17	234.19	48.07	44.23
LE 137	274	61287	52.40	46.75	369.99	35.63	34.28

Core LZ1029 Alkane  $\delta^{13}\text{C}$  values (‰)

Sample ID	Sample depth (cm)	Sample age (yrs)	C21	C23	C25	C27	C29	C31	C33
LE 007	14	3235	-30.871	-32.925	-33.274	-32.836	-32.593	-32.987	
LE 019	38	6579	-32.171	-32.353	-32.928	-32.671	-32.72	-33.246	-33.96
LE 027	54	9979		-31.666	-33.044	-33.039	-33.239	-33.757	-34.067
LE 037	74	13368		-32.219	-32.856	-32.992	-33.216	-33.57	-34.276
LE 047	94	16326			-34.122	-33.54	-33.452	-33.778	-34.576
LE 057	114	19276	-38.114	-35.418	-35.856	-34.268	-33.194	-33.539	-34.358
LE 067	134	21455	-40.244	-35.352	-35.857	-34.458	-33.198	-33.633	-34.797
LE 077	154	26017	-36.355	-34.475	-34.794	-33.995	-33.171	-33.777	
LE 087	174	31809	-38.253	-33.982	-33.966	-33.589	-33.073	-33.53	-34.507
LE 097	194	37600				-34.57	-35.161	-37.684	-40.14
LE 108	216	44020				-33.232	-32.827	-33.467	-33.71
LE 117	234	49379				-33.182	-33.452	-33.702	-34.249
LE 127	254	55333			-32.758	-33.116	-33.225	-33.498	-34.387
LE 137	274	61287			-32.434	-32.951	-33.3	-33.678	-34.476

Core LZ1029 Fatty Acid  $\delta^{13}\text{C}$  values (‰)

Sample ID	Sample depth (cm)	Sample age (yrs)	C14	C16	C18	C20	C22	C24	C26	C28	C30
LE 007	14	3235	-29.174	-29.565	-30.209	-33.260	-32.677	-33.184	-33.818	-34.048	-35.151
LE 019	38	6579	-28.501	-27.542	-29.775	-33.110	-32.650	-33.044	-33.689	-33.897	-34.228
LE 027	54	9979	-25.931	-26.375	-27.956	-33.707	-32.981	-32.911	-33.515	-33.431	-34.131
LE 037	74	13368	-28.318	-28.514	-30.003	-33.689	-33.451	-33.617	-34.167	-33.778	-34.387
LE 047	94	16326	-28.931	-26.825	-28.912	-36.139	-36.418	-36.287	-36.600	-35.419	-33.361
LE 057	114	19276	-32.585	-31.718	-35.388	-41.823	-40.453	-38.686	-39.462	-36.921	-32.215
LE 067	134	21455	-32.457	-31.874	-36.993	-43.204	-42.646	-38.968	-39.803	-37.483	-32.603
LE 077	154	26017	-27.859	-28.612	-32.968	-41.710	-41.000	-38.093	-37.937	-37.053	-32.408
LE 087	174	31809	-28.677	-29.530	-32.780	-39.451	-38.601	-36.922	-36.357	-32.880	-32.636
LE 097	194	37600	-25.768	-26.387	-28.582	-37.400	-36.688	-35.791	-35.479	-34.261	-32.413
LE 108	216	44020	-24.818	-25.405	-25.294	-34.668	-34.316	-34.092	-34.229	-33.976	-34.211
LE 117	234	49379	-24.089	-24.396	-24.332	-34.621	-33.947	-34.399	-34.604	-33.870	-34.875
LE 127	254	55333		-27.885	-28.017	-34.119	-34.434	-35.368	-34.412	-34.381	-33.718
LE 137	274	61287		-27.256		-36.428	-35.675	-34.666	-34.680	-34.114	-33.701



Core LZ1029 Normal alcohol  $\delta^{13}\text{C}$  values (‰)

Sample ID	Sample depth (cm)	Sample age (yrs)	C21	C22	C24	C26	C28
LE 007	14	3235	-31.107	-28.273	-28.723	-33.450	-32.945
LE 019	38	6579	-27.780	-28.419	-28.471	-33.595	-33.161
LE 027	54	9979	-27.683	-28.522	-27.763	-36.571	-33.814
LE 037	74	13368	-27.646	-28.050	-32.421	-32.532	-32.986
LE 047	94	16326	-27.859		-28.131	-37.680	-35.994
LE 057	114	19276	-42.166	-43.501	-38.267	-37.287	-41.698
LE 067	134	21455	-34.196	-46.095	-43.815	-36.300	-36.191
LE 077	154	26017		-44.276	-41.085	-35.458	-34.984
LE 087	174	31809					-43.458
LE 097	194	37600	-27.655	-28.124	-28.655		
LE 108	216	44020	-29.008	-29.568	-29.186		
LE 117	234	49379	-31.423	-31.224	-29.847		
LE 127	254	55333	-29.711	-30.314	-30.008		
LE 137	274	61287	-29.442	-29.651	-29.254	-32.442	-32.557

## Core LZ1029 GDGTs

Sample ID	Sample depth (cm)	Sample age (yrs)	BIT Index	MBT	CBT	1292 ( $\mu\text{g/g TLE}$ )	total br GDGT ( $\mu\text{g/g TLE}$ )
LE 007	14	3235	0.93	0.09	0.76	0.33	5.13
LE 019	38	6579	0.98	0.14	0.84	0.39	19.99
LE 027	54	9979	0.97	0.22	1.02	0.22	7.73
LE 037	74	13368	0.98	0.11	0.88	0.98	46.79
LE 047	94	16326	0.97	0.08	0.71	2.17	89.24
LE 057	114	19276	0.41	0.10	0.89	42.03	33.81
LE 067	134	21455	0.39	0.08	0.91	149.02	106.00
LE 077	154	26017	0.69	0.08	0.81	15.29	39.35
LE 087	174	31809	0.83	0.09	0.65	6.89	40.59
LE 097	194	37600	0.93	0.06	0.69	5.70	88.05
LE 108	216	44020	0.98	0.07	0.75	1.62	112.24
LE 117	234	49379	0.98	0.06	0.97	1.03	46.97
LE 127	254	55333	0.88	0.13	0.88	1.75	13.55
LE 137	274	61287	0.94	0.07	0.61	0.92	17.91