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Holocene dynamics in the Bering Strait inflow to the Arctic and the Beaufort Gyre circulation based on sedimentary records from the Chukchi Sea

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Supplementary material

Table S1. The quartz/feldspar (Q/F) and Q/F with logarithmic function (log Q/F), (chlorite + kaolinite)/illite (CK/I) and chlorite/illite (C/I) ratios in bulk fraction of the Beaufort Sea surface sediments

Cruise	Station	Latitude (°N)	Longtitude (°E)	Water depth (m)	Q/F	Log Q/F	C+K/I	C/I
ARA4C	01MUC1B	71.8987	-154.0939	257	14.22	1.15	1.52	0.79
ARA4C	02MUC2B	71.8970	-154.0826	235	16.17	1.21	1.50	0.60
ARA4C	04MUC2B	71.6348	-152.4005	282	15.87	1.20	1.62	0.65
ARA4C	07MUC2B	69.9917	-137.8675	127	22.47	1.35	1.17	0.47
ARA4C	25MUC2B	70.6147	-135.6457	75	23.70	1.37	1.16	0.50
ARA4C	26MUC3B	70.6600	-135.5461	97	40.72	1.61	1.16	0.50
ARA4C	27MUC1B	70.7895	-135.5662	419	20.83	1.32	0.83	0.24
ARA4C	32MUC1B	70.9849	-134.6047	260	21.13	1.32	1.13	0.52
ARA4C	37MUC1B	70.6338	-139.3676	1173	18.63	1.27	1.23	0.50
ARA4C	38MUCB	70.6534	-138.7913	1194	19.53	1.29	1.19	0.53
ARA4C	40MUC1B	70.1339	-138.7000	331	25.61	1.41	1.13	0.39
ARA4C	43MUC2B	69.9710	-137.2299	57	25.66	1.41	1.09	0.50
ARA5B	01BOXB	70.7890	-135.5675	420	15.90	1.20	0.90	0.39
ARA5B	02BOXB	70.7058	-135.5675	410	19.60	1.29	1.10	0.31
ARA5B	10BOXB	70.6495	-135.9458	277	21.73	1.34	1.31	0.49
ARA5B	17BOXB	70.8567	-136.2112	848	18.58	1.27	1.13	0.52
ARA5B	18BOXB	70.8018	-136.0977	740	19.54	1.29	1.17	0.49
ARA5B	33BOXB	70.7552	-134.1577		18.30	1.26	1.19	0.51
ARA5B	34BOXB	70.6045	-134.8036		22.64	1.35	1.16	0.51

Table S2(1) Radiocarbon ages of moluscan shells in core ARA-02B 01A-GC

Depth	Conventional age	±	ΔR = 0		ΔR = 500		
			Calendar age	±	Calendar age	±	
cm	years	years	years BP	years	years BP	years	Data source
107.5	3740	30	3709	51	3057	58	Ref. 1
159.5	4370	30	4497	54	3842	52	Ref. 1
204.5	4860	30	5187	70	4482	50	Ref. 1
241.5	5180	30	5544	39	4893	46	Ref. 1
347.5	6110	30	6539	51	5991	56	Ref. 1
456.5	7690	30	8149	50	7644	36	Ref. 1
509.5	8670	30	9350	47	8642	56	Ref. 1

Ref. 1: Stein et al. (2017).

Table S2(2) Radiocarbon ages of moluscan shells in core HYL0501-05JPC

Depth	Adjusted depth	Conventional age	±	ΔR = 0		
				Calendar age	±	
cm	cm	years	years	years BP	years	Data source
37.0	112.0	1930	45	1477	59	Ref. 2
484.0	559.0	4465	40	4656	74	Ref. 2
569.5	644.5	4820	70	5110	112	Ref. 2
689.5	764.5	5220	40	5584	44	Ref. 2
800.0	875.0	5885	40	6304	45	Ref. 2
880.5	955.5	6395	45	6871	115	Ref. 2

Ref. 2: Darby et al. (2009).

Table S2(3) Radiocarbon ages of moluscan shells and paleomagnetic datums in core HYL0501-06JPC

				ΔR = 0		Paleomagnetic datums	
Depth	Adjusted	Conventional	±	Calendar	±	Calendar	±

	depth	age			age			age		
cm	cm	years	years		years BP	years		years BP	years	Data source
771.0	918.0	8160	183	B	7690	180				Ref. 3
879.0	1026.0	13710	68		12375	60				Ref. 3
144.0	211.0							2030	130	I-1 in Ref. 3
192.0	259.0							2150	110	R-1 in Ref. 3
308.0	375.0							3580	90	R-2 in Ref. 3
586.0	653.0						A	5780	130	D-1 in Ref. 3
595.0	662.0						A	5680	180	R-3 in Ref. 3
607.0	674.0							6000	70	I-2 in Ref. 3
666.0	733.0							6330	130	R-4 in Ref. 3
819.0	886.0						B	7800	50	D-2 in Ref. 3
859.0	926.0						B	7680	30	R-5 in Ref. 3
882.0	949.0						B	7830	120	I-3 in Ref. 3

A: D-1 and R-3 datums are conbined. B: thsee datums are combined.Ref. 3: Lisé-Pronovost et al. (2009).

Table S3. The quartz/feldspar (Q/F) and Q/F with logarithmic function (log Q/F) of bulk fraction and the (chlorite + kaolinite)/illite (CK/I), chlorite/illite (C/I) and kaolinite/illite (K/I) ratios of clay fraction in core ARA02B 01A-GC.

			Age (ka)					
Leg	Core	Depth (cm)	ΔR=500	Q/F	log Q/F	CK/I	C/I	K/I
ARA02B	01-GC	0	0.00	8.00	0.90	1.35	0.43	0.22
ARA02B	01-GC	5	0.14	8.75	0.94	1.37	0.69	0.21
ARA02B	01-GC	10	0.28	6.45	0.81	1.25	0.67	0.21
ARA02B	01-GC	15	0.43	7.62	0.88	1.37	0.78	0.24
ARA02B	01-GC	20	0.57	8.19	0.91	1.35	0.68	0.21
ARA02B	01-GC	25	0.71	8.66	0.94	1.24	0.76	0.15
ARA02B	01-GC	30	0.85	9.87	0.99	1.45	0.79	0.24
ARA02B	01-GC	35	1.00	7.62	0.88	1.29	0.68	0.15
ARA02B	01-GC	40	1.14	9.61	0.98	1.18	0.62	0.20
ARA02B	01-GC	45	1.28	8.23	0.92	1.26	0.66	0.20
ARA02B	01-GC	50	1.42	8.43	0.93	1.28	0.67	0.20
ARA02B	01-GC	55	1.56	9.01	0.95	1.19	0.50	0.16
ARA02B	01-GC	60	1.71	8.10	0.91	1.18	0.49	0.15
ARA02B	01-GC	65	1.85	8.54	0.93	1.21	0.53	0.16
ARA02B	01-GC	70	1.99	8.94	0.95	1.25	0.65	0.23
ARA02B	01-GC	75	2.13	8.74	0.94	1.27	0.66	0.17
ARA02B	01-GC	80	2.27	10.58	1.02	1.21	0.60	0.20
ARA02B	01-GC	85	2.42	8.48	0.93	1.39	0.91	0.29
ARA02B	01-GC	90	2.56	8.31	0.92	1.33	0.71	0.23
ARA02B	01-GC	95	2.70	8.99	0.95	1.32	0.51	0.25
ARA02B	01-GC	100	2.84	8.11	0.91	1.24	0.63	0.18
ARA02B	01-GC	105	2.99	8.42	0.93	1.21	0.67	0.19
ARA02B	01-GC	110	3.09	7.94	0.90	1.22	0.66	0.23
ARA02B	01-GC	115	3.17	10.22	1.01	1.26	0.64	0.19
ARA02B	01-GC	120	3.25	9.62	0.98	1.26	0.63	0.19
ARA02B	01-GC	125	3.32	9.38	0.97	1.34	0.68	0.22
ARA02B	01-GC	130	3.40	9.44	0.97	1.34	0.69	0.18

ARA02B	01-GC	135	3.47	8.61	0.93	1.32	0.68	0.19
ARA02B	01-GC	140	3.55	9.14	0.96	1.28	0.61	0.19
ARA02B	01-GC	145	3.62	9.68	0.99	1.37	0.77	0.24
ARA02B	01-GC	150	3.70	9.07	0.96	1.26	0.66	0.22
ARA02B	01-GC	155	3.77	9.74	0.99	1.25	0.66	0.22
ARA02B	01-GC	160	3.85	8.57	0.93	1.24	0.64	0.19
ARA02B	01-GC	165	3.92	8.89	0.95	1.24	0.69	0.20
ARA02B	01-GC	170	3.99	9.73	0.99	1.25	0.68	0.22
ARA02B	01-GC	175	4.06	9.52	0.98	1.28	0.75	0.23
ARA02B	01-GC	180	4.13	10.27	1.01	1.32	0.73	0.23
ARA02B	01-GC	185	4.20	9.19	0.96	1.24	0.65	0.20
ARA02B	01-GC	190	4.28	10.09	1.00	1.53	0.84	0.21
ARA02B	01-GC	195	4.35	9.18	0.96	1.44	0.67	0.19
ARA02B	01-GC	200	4.42	8.89	0.95	1.33	0.83	0.27
ARA02B	01-GC	205	4.49	10.93	1.04	1.27	0.70	0.22
ARA02B	01-GC	210	4.54	9.37	0.97	1.22	0.67	0.23
ARA02B	01-GC	215	4.60	9.46	0.98	1.46	0.81	0.23
ARA02B	01-GC	221	4.65	8.78	0.94	1.37	0.79	0.26
ARA02B	01-GC	225	4.71	9.34	0.97	1.23	0.69	0.23
ARA02B	01-GC	230	4.76	10.15	1.01	1.20	0.66	0.21
ARA02B	01-GC	235	4.82	8.63	0.94	1.19	0.63	0.21
ARA02B	01-GC	240	4.88	8.23	0.92	1.31	0.74	0.25
ARA02B	01-GC	245	4.93	8.03	0.90	1.19	0.64	0.21
ARA02B	01-GC	250	4.98	9.49	0.98	1.28	0.71	0.21
ARA02B	01-GC	255	5.03	8.01	0.90	1.18	0.61	0.19
ARA02B	01-GC	260	5.08	9.39	0.97	1.27	0.77	0.24
ARA02B	01-GC	265	5.14	8.11	0.91	1.28	0.74	0.25
ARA02B	01-GC	270	5.19	8.47	0.93	1.27	0.68	0.19
ARA02B	01-GC	275	5.24	9.72	0.99	1.41	0.80	0.28
ARA02B	01-GC	280	5.29	10.14	1.01	1.41	0.76	0.23
ARA02B	01-GC	285	5.34	8.42	0.93	1.32	0.80	0.26
ARA02B	01-GC	290	5.39	10.17	1.01	1.24	0.68	0.22

ARA02B	01-GC	295	5.45	9.31	0.97	1.27	0.73	0.24
ARA02B	01-GC	300	5.50	8.90	0.95	1.20	0.63	0.20
ARA02B	01-GC	305	5.55	8.84	0.95	1.33	0.73	0.22
ARA02B	01-GC	310	5.60	9.00	0.95	1.63	1.02	0.35
ARA02B	01-GC	315	5.65	10.96	1.04	1.20	0.61	0.21
ARA02B	01-GC	320	5.71	10.93	1.04	1.16	0.61	0.20
ARA02B	01-GC	325	5.76	10.30	1.01	1.14	0.60	0.20
ARA02B	01-GC	330	5.81	11.04	1.04	1.10	0.62	0.22
ARA02B	01-GC	335	5.86	10.37	1.02	1.20	0.60	0.21
ARA02B	01-GC	340	5.91	10.94	1.04	1.51	0.75	0.24
ARA02B	01-GC	345	5.96	10.98	1.04	1.40	0.80	0.27
ARA02B	01-GC	350	6.03	11.15	1.05	1.34	0.85	0.25
ARA02B	01-GC	355	6.10	10.67	1.03	1.16	0.63	0.22
ARA02B	01-GC	360	6.18	10.60	1.03	1.22	0.57	0.17
ARA02B	01-GC	365	6.26	11.48	1.06	1.18	0.64	0.23
ARA02B	01-GC	370	6.33	9.42	0.97	1.16	0.62	0.21
ARA02B	01-GC	375	6.41	11.50	1.06	1.20	0.63	0.21
ARA02B	01-GC	380	6.48	10.59	1.02	1.20	0.63	0.22
ARA02B	01-GC	385	6.56	7.68	0.89	1.17	0.64	0.23
ARA02B	01-GC	390	6.64	10.27	1.01	1.21	0.65	0.23
ARA02B	01-GC	395	6.71	9.53	0.98	1.22	0.66	0.22
ARA02B	01-GC	400	6.79	11.28	1.05	1.17	0.64	0.24
ARA02B	01-GC	405	6.86	9.67	0.99	1.29	0.75	0.26
ARA02B	01-GC	410	6.94	11.39	1.06	1.13	0.62	0.23
ARA02B	01-GC	415	7.01	12.02	1.08	1.14	0.63	0.23
ARA02B	01-GC	420	7.09	10.75	1.03	1.16	0.65	0.23
ARA02B	01-GC	425	7.17	10.86	1.04	1.15	0.68	0.26
ARA02B	01-GC	430	7.24	11.37	1.06	1.10	0.60	0.23
ARA02B	01-GC	435	7.32	9.71	0.99	1.16	0.70	0.24
ARA02B	01-GC	440	7.39	10.10	1.00	1.20	0.65	0.25
ARA02B	01-GC	445	7.47	9.44	0.98	1.17	0.62	0.25
ARA02B	01-GC	450	7.55	11.33	1.05	1.09	0.60	0.23

ARA02B	01-GC	455	7.62	9.78	0.99	1.13	0.64	0.26
ARA02B	01-GC	460	7.71	9.81	0.99	1.13	0.61	0.24
ARA02B	01-GC	465	7.80	12.81	1.11	1.07	0.57	0.24
ARA02B	01-GC	470	7.90	10.44	1.02	1.05	0.57	0.23
ARA02B	01-GC	475	7.99	14.79	1.17	1.02	0.52	0.21
ARA02B	01-GC	480	8.09	11.85	1.07	1.02	0.54	0.22
ARA02B	01-GC	485	8.18	10.87	1.04	1.02	0.55	0.23
ARA02B	01-GC	490	8.27	12.61	1.10	1.03	0.57	0.24
ARA02B	01-GC	495	8.37	10.42	1.02	1.04	0.59	0.25
ARA02B	01-GC	500	8.46	10.86	1.04	1.02	0.56	0.24
ARA02B	01-GC	505	8.56	12.88	1.11	1.10	0.66	0.27
ARA02B	01-GC	510	8.65	10.80	1.03	1.05	0.57	0.25
ARA02B	01-GC	515	8.75	12.90	1.11	1.13	0.63	0.26
ARA02B	01-GC	520	8.84	13.25	1.12	1.06	0.61	0.26
ARA02B	01-GC	525	8.93	14.60	1.16	1.00	0.56	0.23
ARA02B	01-GC	530	9.03	17.39	1.24	0.98	0.59	0.20
ARA02B	01-GC	535	9.12	11.31	1.05	0.99	0.59	0.23
ARA02B	01-GC	540	9.22	13.50	1.13	0.98	0.51	0.25
ARA02B	01-GC	545	9.31	10.86	1.04	0.93	0.45	0.19

Table S4. The quartz/feldspar (Q/F) and Q/F with logarithmic function (log Q/F), (chlorite + kaolinite)/illite (CK/I), chlorite/illite (C/I) and kaolinite/illite (K/I) ratios, and the intensity of dolomite (D) of bulk fraction in core HLY0501-05JPC/TC

Leg	Core	Composite depth (cm)	Age (ka) ΔR=0	Q/F	log Q/F	CK/I	C/I	K/I	D (cps)
HLY05-01	5TC	9	0.08	7.13	0.85	1.20	0.75	0.12	172
HLY05-01	5TC	25	0.33	6.32	0.80	1.23	0.77	0.05	175
HLY05-01	5TC	52	0.74	7.24	0.86	1.29	0.59	0.10	142
HLY05-01	5JPC	76	1.11	7.15	0.85	1.39	0.74	0.10	185
HLY05-01	5TC	100	1.48	8.22	0.92	1.42	0.78	0.07	160
HLY05-01	5JPC	136	1.73	8.22	0.92	1.19	0.66	udl	173
HLY05-01	5TC	150	1.90	8.52	0.93	1.26	0.73	0.09	240
HLY05-01	5JPC	160	2.00	7.88	0.90	1.43	0.82	0.06	219
HLY05-01	5JPC	173	2.01	7.86	0.90	1.22	0.71	0.09	190
HLY05-01	5JPC	175	2.17	7.61	0.88	1.28	0.75	0.08	213
HLY05-01	5JPC	197	2.24	7.49	0.87	1.20	0.61	0.07	176
HLY05-01	5TC	200	2.34	7.87	0.90	1.40	0.71	0.09	182
HLY05-01	5JPC	221	2.36	8.12	0.91	1.42	0.80	0.11	153
HLY05-01	5JPC	223	2.57	6.73	0.83	1.25	0.79	0.08	155
HLY05-01	5TC	248	2.80	8.44	0.93	1.30	0.78	udl	155
HLY05-01	5JPC	253	3.01	6.73	0.83	1.25	0.79	0.09	155
HLY05-01	5JPC	285	3.20	9.29	0.97	1.36	0.87	0.04	193
HLY05-01	5JPC	342	3.55	7.72	0.89	1.32	0.70	0.11	0
HLY05-01	5JPC	392	3.60	7.79	0.89	1.22	0.62	0.10	214
HLY05-01	5JPC	398	3.74	9.30	0.97	1.20	0.82	0.07	289
HLY05-01	5JPC	462	4.05	9.23	0.97	1.42	0.87	0.10	208
HLY05-01	5JPC	523	4.48	10.09	1.00	1.45	0.91	0.09	212
HLY05-01	5JPC	575	4.81	7.65	0.88	1.28	0.73	0.09	210
HLY05-01	5JPC	611	5.00	8.01	0.90	1.30	0.73	0.07	340
HLY05-01	5JPC	630	5.08	7.98	0.90	1.27	0.59	0.09	214
HLY05-01	5JPC	680	5.30	9.46	0.98	1.34	0.80	0.08	237

HLY05-01	5JPC	775	5.73	9.22	0.96	1.33	0.80	0.07	281
HLY05-01	5JPC	823	6.04	9.28	0.97	1.34	0.76	0.06	298
HLY05-01	5JPC	855	6.25	8.47	0.93	1.26	0.64	0.11	172
HLY05-01	5JPC	951	6.93	10.23	1.01	1.44	0.81	0.10	184
HLY05-01	5JPC	975	7.10	8.27	0.92	1.17	0.75	0.07	275
HLY05-01	5JPC	978	7.12	11.43	1.06	1.24	0.73	0.11	210
HLY05-01	5JPC	1023	7.43	10.29	1.01	1.37	0.84	0.06	307
HLY05-01	5JPC	1055	7.66	9.96	1.00	1.08	0.69	0.06	208
HLY05-01	5JPC	1096	7.94	11.38	1.06	1.31	0.83	0.08	332
HLY05-01	5JPC	1098	7.96	9.67	0.99	1.16	0.83	0.06	233
HLY05-01	5JPC	1120	8.11	7.53	0.88	1.33	0.85	0.09	256
HLY05-01	5JPC	1144	8.28	10.77	1.03	1.27	0.77	0.14	250
HLY05-01	5JPC	1192	8.62	13.96	1.15	1.14	0.62	0.06	309
HLY05-01	5JPC	1215	8.79	11.19	1.05	1.26	0.76	0.05	354
HLY05-01	5JPC	1238	8.95	12.94	1.11	1.10	0.65	0.05	1264
HLY05-01	5JPC	1262	9.12	10.36	1.02	1.23	0.75	0.09	303
HLY05-01	5JPC	1286	9.29	11.95	1.08	1.26	0.78	0.10	317
HLY05-01	5JPC	1310	9.46	10.33	1.01	1.31	0.82	0.04	347
HLY05-01	5JPC	1353	10.98	10.00	1.00	1.19	0.61	0.10	1797
HLY05-01	5JPC	1376	11.85	23.13	1.36	1.34	0.78	0.22	615
HLY05-01	5JPC	1425	12.62	9.79	0.99	1.02	0.59	0.07	223
HLY05-01	5JPC	1522	13.93	14.48	1.16	1.22	0.80	0.15	200
HLY05-01	5JPC	1591	14.86	7.76	0.89	1.34	0.75	0.11	129
HLY05-01	5JPC	1610	15.12	7.79	0.89	1.44	0.88	0.09	127

Table S5. The quartz/feldspar (Q/F) and Q/F with logarithmic function (log Q/F), (chlorite + kaolinite)/illite (CK/I), chlorite/illite (C/I) and kaolinite/illite (K/I) ratios, and the intensity of dolomite (D) of bulk fraction in core HLY0501-06JPC

Leg	Core	Composite depth (cm)	Age (ka)	Q/F	log Q/F	CK/I	C/I	K/I	D (cps)
HLY05-01	6JPC	147	1.40	8.37	0.92	1.24	0.79	0.10	91
HLY05-01	6JPC	157	1.50	8.66	0.94	1.20	0.79	0.09	64
HLY05-01	6JPC	167	1.60	8.92	0.95	1.24	0.75	0.08	86
HLY05-01	6JPC	177	1.69	8.71	0.94	1.20	0.77	0.11	85
HLY05-01	6JPC	187	1.79	8.67	0.94	1.20	0.68	0.08	79
HLY05-01	6JPC	197	1.89	8.94	0.95	1.12	0.71	0.10	72
HLY05-01	6JPC	207	1.99	9.29	0.97	1.21	0.62	0.14	82
HLY05-01	6JPC	217	2.05	9.64	0.98	1.13	0.58	0.20	128
HLY05-01	6JPC	227	2.07	9.20	0.96	0.99	0.64	0.09	120
HLY05-01	6JPC	237	2.10	9.19	0.96	1.12	0.58	0.16	67
HLY05-01	6JPC	247	2.12	9.08	0.96	1.18	0.78	0.06	95
HLY05-01	6JPC	257	2.15	9.22	0.96	1.22	0.79	0.08	79
HLY05-01	6JPC	267	2.25	9.58	0.98	1.23	0.73	0.09	79
HLY05-01	6JPC	277	2.37	8.87	0.95	1.14	0.70	0.08	94
HLY05-01	6JPC	287	2.50	10.03	1.00	1.19	0.77	0.07	67
HLY05-01	6JPC	297	2.62	9.41	0.97	1.09	0.72	0.06	34
HLY05-01	6JPC	307	2.74	8.98	0.95	1.22	0.75	0.10	68
HLY05-01	6JPC	317	2.87	9.64	0.98	1.15	0.62	0.15	99
HLY05-01	6JPC	327	2.99	9.87	0.99	1.42	0.85	0.10	132
HLY05-01	6JPC	337	3.11	9.32	0.97	1.15	0.82	0.12	71
HLY05-01	6JPC	347	3.23	9.46	0.98	1.23	0.76	0.10	113
HLY05-01	6JPC	357	3.36	8.49	0.93	1.22	0.76	0.08	106
HLY05-01	6JPC	367	3.48	8.65	0.94	1.38	0.81	0.18	99
HLY05-01	6JPC	377	3.60	8.83	0.95	1.11	0.73	0.05	60
HLY05-01	6JPC	387	3.67	8.83	0.94	1.23	0.80	0.11	104
HLY05-01	6JPC	397	3.75	8.60	0.93	1.32	0.77	0.10	92
HLY05-01	6JPC	407	3.82	8.86	0.95	1.16	0.71	0.09	105

HLY05-01	6JPC	417	3.90	9.10	0.96	1.31	0.86	0.12	106
HLY05-01	6JPC	427	3.98	8.81	0.94	1.24	0.81	0.11	123
HLY05-01	6JPC	437	4.05	9.37	0.97	1.33	0.81	0.10	112
HLY05-01	6JPC	447	4.13	9.71	0.99	1.25	0.76	0.08	120
HLY05-01	6JPC	457	4.20	9.84	0.99	1.06	0.69	0.10	103
HLY05-01	6JPC	467	4.28	8.83	0.95	1.22	0.75	0.11	113
HLY05-01	6JPC	477	4.36	8.74	0.94	1.27	0.80	0.10	118
HLY05-01	6JPC	487	4.43	8.75	0.94	1.35	0.83	0.11	100
HLY05-01	6JPC	497	4.51	9.46	0.98	1.23	0.80	0.10	114
HLY05-01	6JPC	507	4.58	8.49	0.93	1.22	0.84	0.11	99
HLY05-01	6JPC	517	4.66	8.65	0.94	1.38	0.73	0.12	99
HLY05-01	6JPC	527	4.74	8.75	0.94	1.16	0.87	0.12	85
HLY05-01	6JPC	537	4.81	8.83	0.94	1.23	0.85	0.11	99
HLY05-01	6JPC	547	4.89	9.05	0.96	1.27	0.68	0.09	111
HLY05-01	6JPC	557	4.97	8.93	0.95	1.22	0.71	0.10	107
HLY05-01	6JPC	567	5.04	10.99	1.04	1.02	0.61	0.06	50
HLY05-01	6JPC	587	5.19	10.20	1.01	1.30	0.79	0.10	110
HLY05-01	6JPC	597	5.27	9.59	0.98	1.20	0.64	0.08	104
HLY05-01	6JPC	607	5.35	9.37	0.97	1.06	0.67	0.08	128
HLY05-01	6JPC	617	5.42	8.66	0.94	1.17	0.73	0.10	81
HLY05-01	6JPC	627	5.50	10.06	1.00	1.09	0.70	0.09	92
HLY05-01	6JPC	637	5.57	9.49	0.98	1.12	0.63	0.09	109
HLY05-01	6JPC	647	5.65	8.91	0.95	1.40	0.86	0.12	121
HLY05-01	6JPC	657	5.73	8.95	0.95	1.25	0.77	0.09	103
HLY05-01	6JPC	667	5.89	10.11	1.00	1.01	0.65	0.10	89
HLY05-01	6JPC	677	6.02	9.37	0.97	1.34	0.74	0.10	129
HLY05-01	6JPC	687	6.07	9.49	0.97	1.24	0.72	0.10	135
HLY05-01	6JPC	697	6.13	8.88	0.95	1.26	0.74	0.11	114
HLY05-01	6JPC	707	6.18	10.08	1.00	1.31	0.71	0.10	110
HLY05-01	6JPC	717	6.24	9.64	0.98	1.41	0.76	0.10	94
HLY05-01	6JPC	727	6.30	9.11	0.96	1.23	0.72	0.10	96
HLY05-01	6JPC	737	6.36	9.52	0.98	1.11	0.61	0.09	125

HLY05-01	6JPC	747	6.45	9.43	0.97	1.28	0.73	0.10	138
HLY05-01	6JPC	757	6.53	9.35	0.97	1.20	0.79	0.11	124
HLY05-01	6JPC	767	6.61	9.37	0.97	1.17	0.76	0.11	152
HLY05-01	6JPC	777	6.69	9.99	1.00	1.15	0.65	0.08	123
HLY05-01	6JPC	787	6.77	8.70	0.94	1.02	0.63	0.08	131
HLY05-01	6JPC	797	6.86	8.83	0.95	1.06	0.64	0.09	130
HLY05-01	6JPC	807	6.94	8.66	0.94	1.09	0.68	0.11	127
HLY05-01	6JPC	817	7.02	10.12	1.00	1.23	0.72	0.10	119
HLY05-01	6JPC	827	7.10	9.91	1.00	1.13	0.70	0.11	84
HLY05-01	6JPC	837	7.19	9.04	0.96	1.23	0.63	0.08	111
HLY05-01	6JPC	847	7.27	9.30	0.97	1.10	0.68	0.09	114
HLY05-01	6JPC	857	7.35	8.89	0.95	1.31	0.81	0.14	117
HLY05-01	6JPC	867	7.43	9.47	0.98	1.14	0.70	0.12	112
HLY05-01	6JPC	877	7.52	10.70	1.03	1.19	0.71	0.12	127
HLY05-01	6JPC	887	7.60	9.18	0.96	1.19	0.72	0.10	100
HLY05-01	6JPC	897	7.68	9.79	0.99	1.12	0.65	0.10	81
HLY05-01	6JPC	907	7.76	10.46	1.02	1.16	0.72	0.11	111
HLY05-01	6JPC	917	7.84	9.74	0.99	1.12	0.75	0.14	111
HLY05-01	6JPC	927	7.93	9.74	0.98	1.21	0.72	0.08	104
HLY05-01	6JPC	937	8.01	11.19	1.05	1.22	0.68	0.15	174
HLY05-01	6JPC	947		11.40	1.06	1.10	0.68	0.14	156
HLY05-01	6JPC	957		12.95	1.11	1.24	0.69	0.13	129
HLY05-01	6JPC	967		11.64	1.07	1.29	0.76	0.15	182
HLY05-01	6JPC	977		10.22	1.01	1.18	0.72	0.12	187
HLY05-01	6JPC	987		12.03	1.08	1.04	0.59	0.15	114
HLY05-01	6JPC	997		10.39	1.02	1.14	0.68	0.18	219
HLY05-01	6JPC	1017		18.26	1.26	1.02	0.61	0.18	921
HLY05-01	6JPC	1037		22.39	1.35	1.20	0.59	0.27	528
HLY05-01	6JPC	1057		20.21	1.30	1.22	0.68	0.25	277
HLY05-01	6JPC	1077		12.79	1.11	0.93	0.57	0.19	72
HLY05-01	6JPC	1097		20.17	1.30	1.16	0.52	0.31	85
HLY05-01	6JPC	1117		15.94	1.20	1.18	0.64	0.19	50

HLY05-01	6JPC	1137	14.48	1.16	0.96	0.54	0.20	94
HLY05-01	6JPC	1157	15.29	1.18	0.90	0.51	0.15	60
HLY05-01	6JPC	1177	18.79	1.27	0.96	0.51	0.21	91
HLY05-01	6JPC	1197	18.24	1.26	1.13	0.65	0.27	144
HLY05-01	6JPC	1217	19.41	1.29	1.09	0.61	0.25	146
HLY05-01	6JPC	1237	13.42	1.13	0.98	0.59	0.19	77
HLY05-01	6JPC	1257	16.36	1.21	0.77	0.52	0.17	113
HLY05-01	6JPC	1277	13.12	1.12	1.00	0.54	0.16	176
HLY05-01	6JPC	1297	15.22	1.18	1.12	0.60	0.16	358
HLY05-01	6JPC	1317	12.78	1.11	1.01	0.62	0.18	436
HLY05-01	6JPC	1337	9.22	0.96	1.00	0.59	0.09	66
HLY05-01	6JPC	1357	27.04	1.43	1.06	0.59	0.31	1447
HLY05-01	6JPC	1377	10.89	1.04	0.97	0.62	0.13	635
HLY05-01	6JPC	1397	7.74	0.89	1.01	0.62	0.08	115
HLY05-01	6JPC	1417	9.39	0.97	1.24	0.70	0.09	198
HLY05-01	6JPC	1437	8.75	0.94	1.35	0.79	0.09	102
HLY05-01	6JPC	1457	10.46	1.02	1.02	0.55	0.09	112
HLY05-01	6JPC	1477	10.83	1.03	1.09	0.66	0.14	85
HLY05-01	6JPC	1497	18.35	1.26	1.09	0.58	0.27	90
HLY05-01	6JPC	1517	10.10	1.00	0.88	0.52	0.12	41
HLY05-01	6JPC	1532	9.62	0.98	1.07	0.61	0.07	82
HLY05-01	6JPC	1537	16.39	1.21	1.12	0.59	0.21	389
HLY05-01	6JPC	1547	11.66	1.07	1.08	0.62	0.11	78
HLY05-01	6JPC	1557	13.04	1.12	1.02	0.64	0.12	124
HLY05-01	6JPC	1572	12.45	1.09	1.00	0.67	0.11	196
HLY05-01	6JPC	1582	11.29	1.05	0.77	0.45	0.08	2613
HLY05-01	6JPC	1587	11.54	1.06	0.52	0.31	0.08	4240
HLY05-01	6JPC	1594	16.22	1.21	0.64	0.36	0.04	3187
HLY05-01	6JPC	1602	12.24	1.09	1.08	0.63	0.09	1901
HLY05-01	6JPC	1617	14.21	1.15	1.02	0.54	0.10	2728
HLY05-01	6JPC	1637	15.06	1.17	0.95	0.54	0.11	1248
HLY05-01	6JPC	1657	10.44	1.02	1.10	0.63	0.07	421

HLY05-01	6JPC	1677	9.66	0.98	1.01	0.60	0.09	197
HLY05-01	6JPC	1697	9.84	0.99	0.96	0.60	0.11	492

udl: under detection limit.

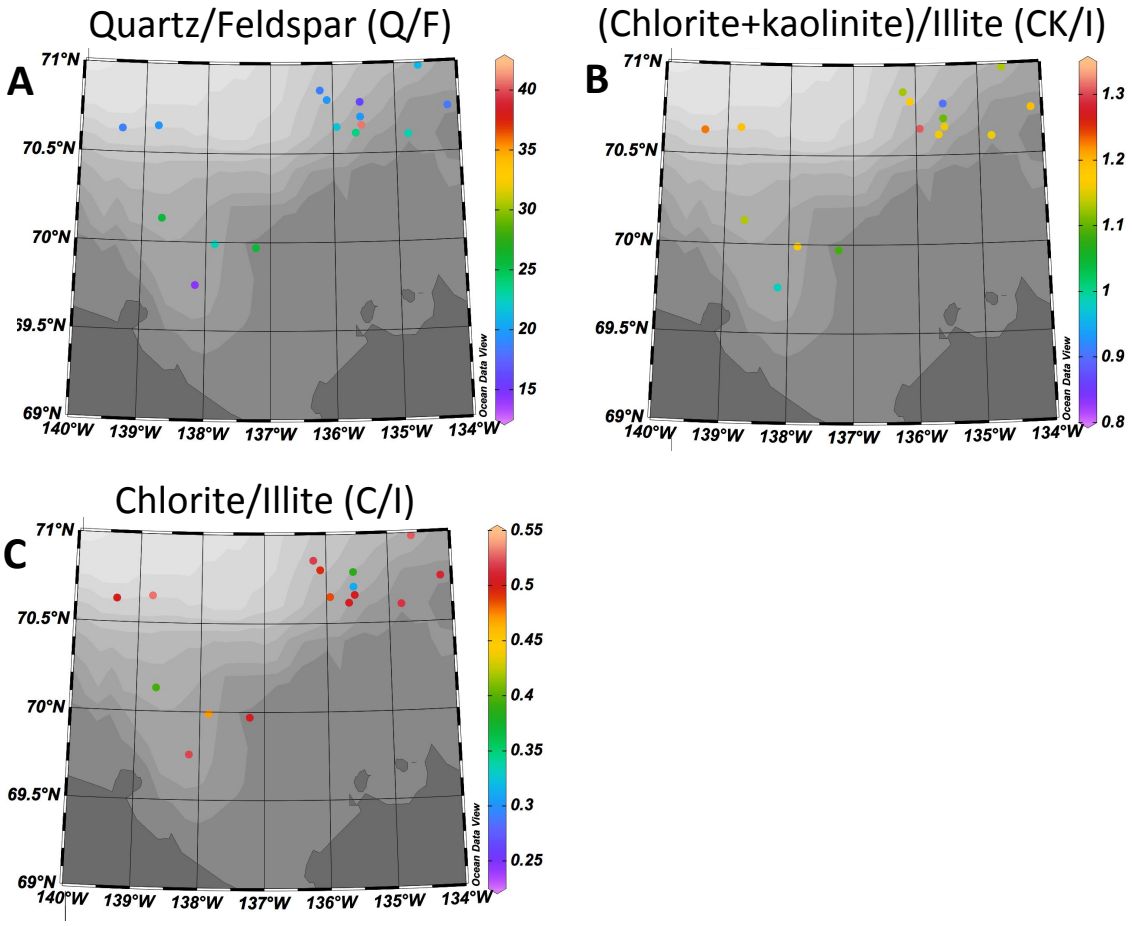


Fig. S1. Spatial distributions of the diffraction intensity ratios of (A) feldspar to quartz (Q/F), and of (B) chlorite+kaolinite and (C) chlorite to illite (CK/I and C/I, respectively) of bulk sediments in the Mackenzie River estuary.

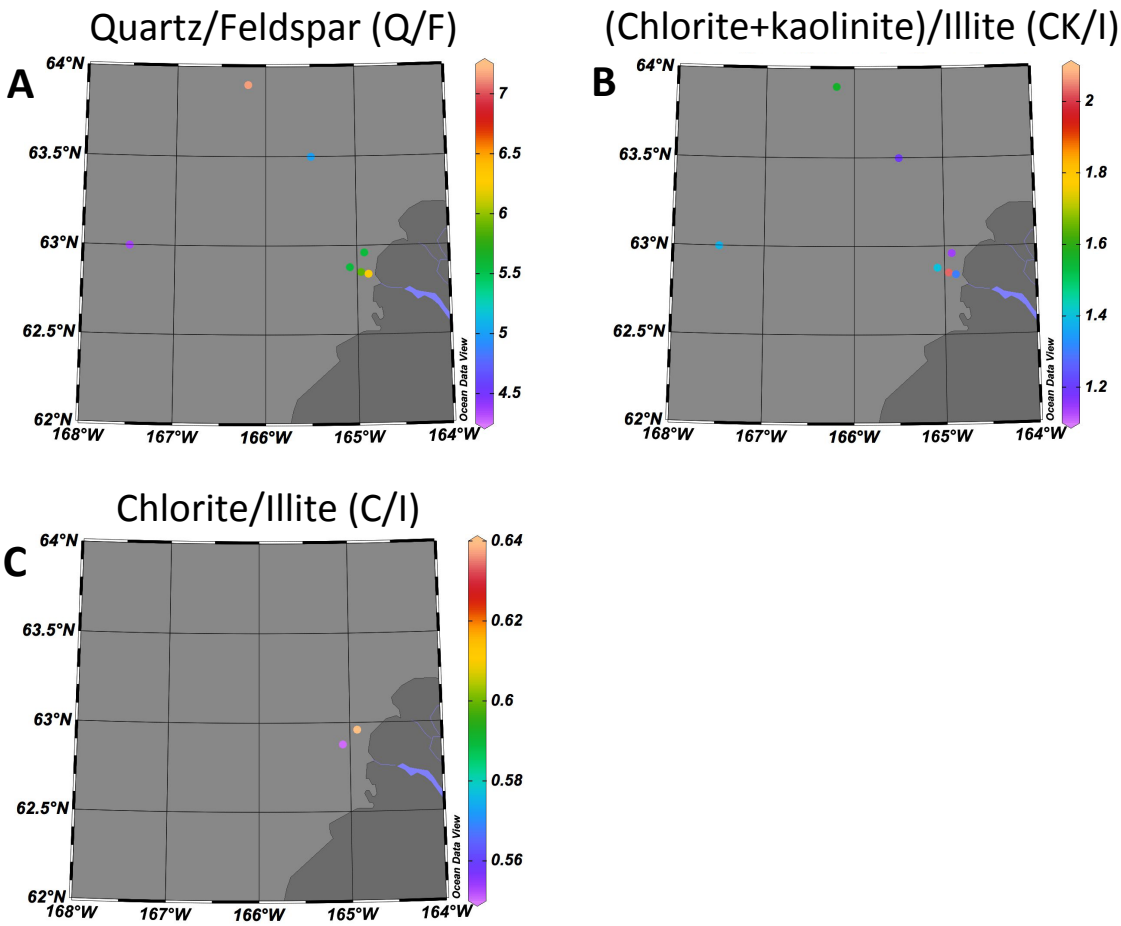


Fig. S2. Spatial distributions of the diffraction intensity ratios of (A) feldspar to quartz (Q/F), and of (B) chlorite+kaolinite and (C) chlorite to illite (CK/I and C/I, respectively) of bulk sediments in the Yukon River estuary.

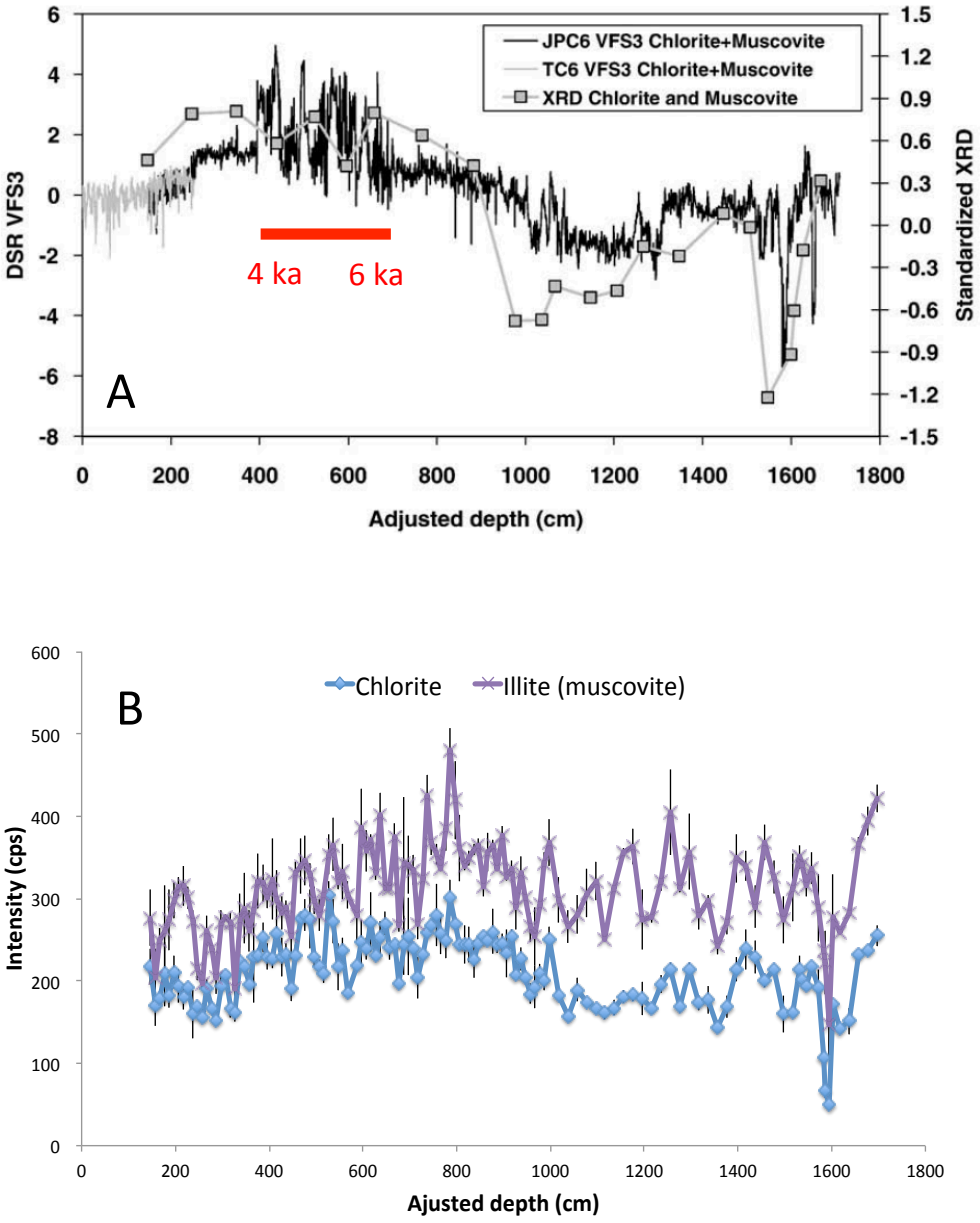


Fig. S3. (A) Chlorite proxy obtained by diffusive spectral reflectance analysis (DSR VFS3) and the abundance of chlorite+muscovite obtained by quantitative XRD analysis (Ortiz et al., 2009) and (B) XRD peak intensities of chlorite at 25.1°2θ (d = 3.54 Å) and illite (muscovite) at 8.8°2θ (d = 10.1 Å) in core HLY0501-06JPC obtained in this study. The changing pattern of peak intensities of chlorite and illite (Panel B) generally agrees well with that of chlorite proxy (Panel A), but the peak intensities do not culminate between 400 and 700 cm in contrast to chlorite proxy.