Supplementary table 1. 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	CK/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

Supplementary table 2. The quartz/feldspar (Q/F) and Q/F with logarithmic function (log Q/F) of bulk fraction, and (chlorite + kaolinite)/illite (CK/I), chlorite/illite (C/I) and kaolinite/illite (K/I) ratios of clay fraction in the core ARA02B 01A-GC.

Leg	Core	Depth (cm)	Age (ka) ΔR=500y	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

Supplementary table 3. 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 of bulk fraction in the core HLY0501-05JPC/TC

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

HLY05-01	5JPC	680	5.30	9.46	0.98	1.34	0.80	0.08
HLY05-01	5JPC	775	5.73	9.22	0.96	1.33	0.80	0.07
HLY05-01	5JPC	823	6.04	9.28	0.97	1.34	0.76	0.06
HLY05-01	5JPC	855	6.25	8.47	0.93	1.26	0.64	0.11
HLY05-01	5JPC	951	6.93	10.23	1.01	1.44	0.81	0.10
HLY05-01	5JPC	975	7.10	8.27	0.92	1.17	0.75	0.07
HLY05-01	5JPC	978	7.12	11.43	1.06	1.24	0.73	0.11
HLY05-01	5JPC	1023	7.43	10.29	1.01	1.37	0.84	0.06
HLY05-01	5JPC	1055	7.66	9.96	1.00	1.08	0.69	0.06
HLY05-01	5JPC	1096	7.94	11.38	1.06	1.31	0.83	0.08
HLY05-01	5JPC	1098	7.96	9.67	0.99	1.16	0.83	0.06
HLY05-01	5JPC	1120	8.11	7.53	0.88	1.33	0.85	0.09
HLY05-01	5JPC	1144	8.28	10.77	1.03	1.27	0.77	0.14
HLY05-01	5JPC	1192	8.62	13.96	1.15	1.14	0.62	0.06
HLY05-01	5JPC	1215	8.79	11.19	1.05	1.26	0.76	0.05
HLY05-01	5JPC	1238	8.95	12.94	1.11	1.10	0.65	0.05
HLY05-01	5JPC	1262	9.12	10.36	1.02	1.23	0.75	0.09
HLY05-01	5JPC	1286	9.29	11.95	1.08	1.26	0.78	0.10
HLY05-01	5JPC	1310	9.46	10.33	1.01	1.31	0.82	0.04
HLY05-01	5JPC	1353	10.98	10.00	1.00	1.19	0.61	0.10
HLY05-01	5JPC	1376	11.85	23.13	1.36	1.34	0.78	0.22
HLY05-01	5JPC	1425	12.62	9.79	0.99	1.02	0.59	0.07
HLY05-01	5JPC	1522	13.93	14.48	1.16	1.22	0.80	0.15
HLY05-01	5JPC	1591	14.86	7.76	0.89	1.34	0.75	0.11
HLY05-01	5JPC	1610	15.12	7.79	0.89	1.44	0.88	0.09

udl: under detection limit

Supplementary table 4. 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 of bulk fraction in the core HLY0501-06JPC

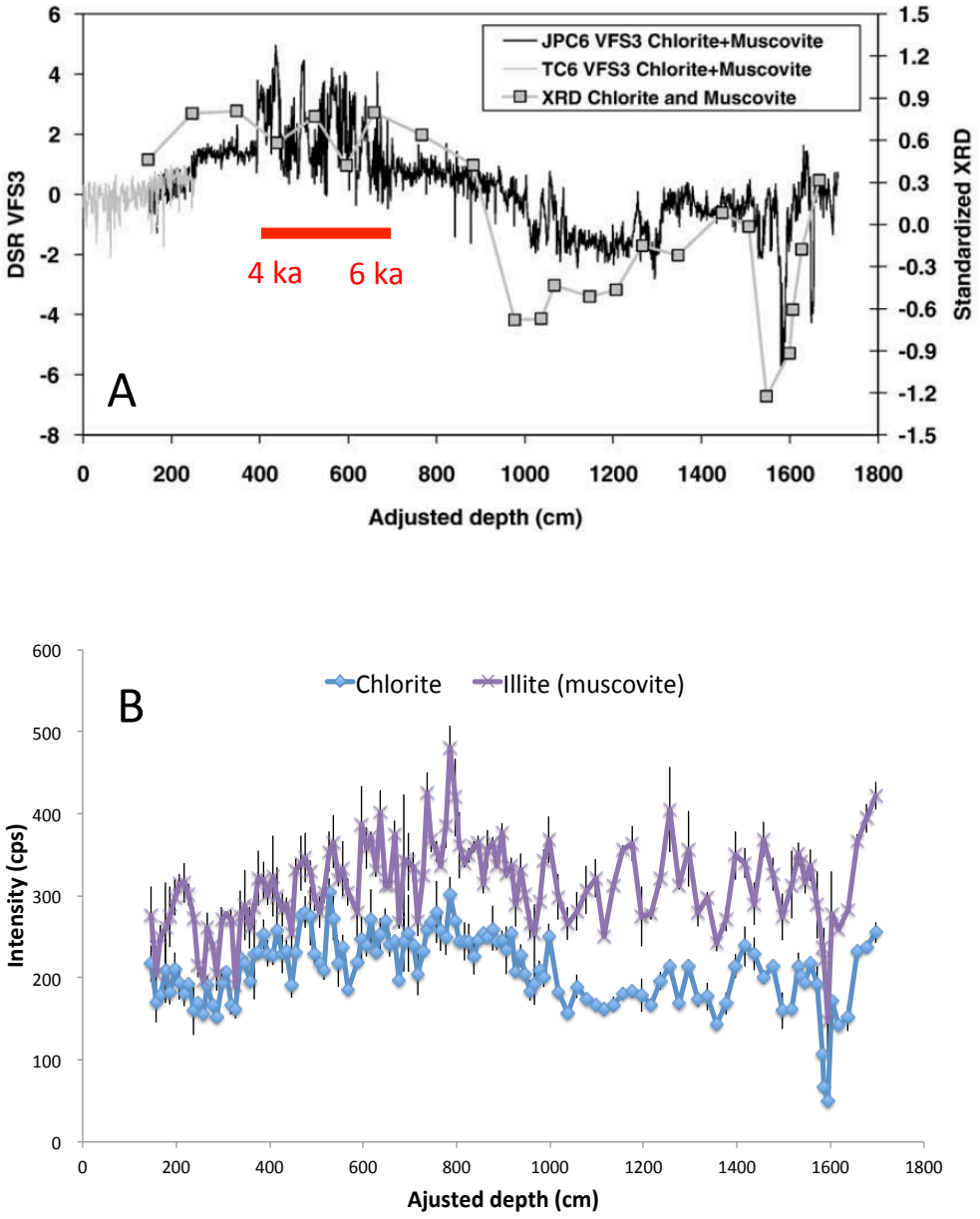
Leg	Core	Composite depth (cm)	Age (ka)	Q/F	log Q/F	CK/I	C/I	K/I
HLY05-01	6JPC	147	1.40	8.37	0.92	1.24	0.79	0.10
HLY05-01	6JPC	157	1.50	8.66	0.94	1.20	0.79	0.09
HLY05-01	6JPC	167	1.60	8.92	0.95	1.24	0.75	0.08
HLY05-01	6JPC	177	1.69	8.71	0.94	1.20	0.77	0.11
HLY05-01	6JPC	187	1.79	8.67	0.94	1.20	0.68	0.08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

HLY05-01	6JPC	397	3.75	8.60	0.93	1.32	0.77	0.10
HLY05-01	6JPC	407	3.82	8.86	0.95	1.16	0.71	0.09
HLY05-01	6JPC	417	3.90	9.10	0.96	1.31	0.86	0.12
HLY05-01	6JPC	427	3.98	8.81	0.94	1.24	0.81	0.11
HLY05-01	6JPC	437	4.05	9.37	0.97	1.33	0.81	0.10
HLY05-01	6JPC	447	4.13	9.71	0.99	1.25	0.76	0.08
HLY05-01	6JPC	457	4.20	9.84	0.99	1.06	0.69	0.10
HLY05-01	6JPC	467	4.28	8.83	0.95	1.22	0.75	0.11
HLY05-01	6JPC	477	4.36	8.74	0.94	1.27	0.80	0.10
HLY05-01	6JPC	487	4.43	8.75	0.94	1.35	0.83	0.11
HLY05-01	6JPC	497	4.51	9.46	0.98	1.23	0.80	0.10
HLY05-01	6JPC	507	4.58	8.49	0.93	1.22	0.84	0.11
HLY05-01	6JPC	517	4.66	8.65	0.94	1.38	0.73	0.12
HLY05-01	6JPC	527	4.74	8.75	0.94	1.16	0.87	0.12
HLY05-01	6JPC	537	4.81	8.83	0.94	1.23	0.85	0.11
HLY05-01	6JPC	547	4.89	9.05	0.96	1.27	0.68	0.09
HLY05-01	6JPC	557	4.97	8.93	0.95	1.22	0.71	0.10
HLY05-01	6JPC	567	5.04	10.99	1.04	1.02	0.61	0.06
HLY05-01	6JPC	587	5.19	10.20	1.01	1.30	0.79	0.10
HLY05-01	6JPC	597	5.27	9.59	0.98	1.20	0.64	0.08
HLY05-01	6JPC	607	5.35	9.37	0.97	1.06	0.67	0.08
HLY05-01	6JPC	617	5.42	8.66	0.94	1.17	0.73	0.10
HLY05-01	6JPC	627	5.50	10.06	1.00	1.09	0.70	0.09
HLY05-01	6JPC	637	5.57	9.49	0.98	1.12	0.63	0.09
HLY05-01	6JPC	647	5.65	8.91	0.95	1.40	0.86	0.12
HLY05-01	6JPC	657	5.73	8.95	0.95	1.25	0.77	0.09
HLY05-01	6JPC	667	5.89	10.11	1.00	1.01	0.65	0.10
HLY05-01	6JPC	677	6.02	9.37	0.97	1.34	0.74	0.10
HLY05-01	6JPC	687	6.07	9.49	0.97	1.24	0.72	0.10
HLY05-01	6JPC	697	6.13	8.88	0.95	1.26	0.74	0.11
HLY05-01	6JPC	707	6.18	10.08	1.00	1.31	0.71	0.10
HLY05-01	6JPC	717	6.24	9.64	0.98	1.41	0.76	0.10

HLY05-01	6JPC	727	6.30	9.11	0.96	1.23	0.72	0.10
HLY05-01	6JPC	737	6.36	9.52	0.98	1.11	0.61	0.09
HLY05-01	6JPC	747	6.45	9.43	0.97	1.28	0.73	0.10
HLY05-01	6JPC	757	6.53	9.35	0.97	1.20	0.79	0.11
HLY05-01	6JPC	767	6.61	9.37	0.97	1.17	0.76	0.11
HLY05-01	6JPC	777	6.69	9.99	1.00	1.15	0.65	0.08
HLY05-01	6JPC	787	6.77	8.70	0.94	1.02	0.63	0.08
HLY05-01	6JPC	797	6.86	8.83	0.95	1.06	0.64	0.09
HLY05-01	6JPC	807	6.94	8.66	0.94	1.09	0.68	0.11
HLY05-01	6JPC	817	7.02	10.12	1.00	1.23	0.72	0.10
HLY05-01	6JPC	827	7.10	9.91	1.00	1.13	0.70	0.11
HLY05-01	6JPC	837	7.19	9.04	0.96	1.23	0.63	0.08
HLY05-01	6JPC	847	7.27	9.30	0.97	1.10	0.68	0.09
HLY05-01	6JPC	857	7.35	8.89	0.95	1.31	0.81	0.14
HLY05-01	6JPC	867	7.43	9.47	0.98	1.14	0.70	0.12
HLY05-01	6JPC	877	7.52	10.70	1.03	1.19	0.71	0.12
HLY05-01	6JPC	887	7.60	9.18	0.96	1.19	0.72	0.10
HLY05-01	6JPC	897	7.68	9.79	0.99	1.12	0.65	0.10
HLY05-01	6JPC	907	7.76	10.46	1.02	1.16	0.72	0.11
HLY05-01	6JPC	917	7.84	9.74	0.99	1.12	0.75	0.14
HLY05-01	6JPC	927	7.93	9.74	0.98	1.21	0.72	0.08
HLY05-01	6JPC	937	8.01	11.19	1.05	1.22	0.68	0.15
HLY05-01	6JPC	947		11.40	1.06	1.10	0.68	0.14
HLY05-01	6JPC	957		12.95	1.11	1.24	0.69	0.13
HLY05-01	6JPC	967		11.64	1.07	1.29	0.76	0.15
HLY05-01	6JPC	977		10.22	1.01	1.18	0.72	0.12
HLY05-01	6JPC	987		12.03	1.08	1.04	0.59	0.15
HLY05-01	6JPC	997		10.39	1.02	1.14	0.68	0.18
HLY05-01	6JPC	1017		18.26	1.26	1.02	0.61	0.18
HLY05-01	6JPC	1037		22.39	1.35	1.20	0.59	0.27
HLY05-01	6JPC	1057		20.21	1.30	1.22	0.68	0.25
HLY05-01	6JPC	1077		12.79	1.11	0.93	0.57	0.19

HLY05-01	6JPC	1097	20.17	1.30	1.16	0.52	0.31
HLY05-01	6JPC	1117	15.94	1.20	1.18	0.64	0.19
HLY05-01	6JPC	1137	14.48	1.16	0.96	0.54	0.20
HLY05-01	6JPC	1157	15.29	1.18	0.90	0.51	0.15
HLY05-01	6JPC	1177	18.79	1.27	0.96	0.51	0.21
HLY05-01	6JPC	1197	18.24	1.26	1.13	0.65	0.27
HLY05-01	6JPC	1217	19.41	1.29	1.09	0.61	0.25
HLY05-01	6JPC	1237	13.42	1.13	0.98	0.59	0.19
HLY05-01	6JPC	1257	16.36	1.21	0.77	0.52	0.17
HLY05-01	6JPC	1277	13.12	1.12	1.00	0.54	0.16
HLY05-01	6JPC	1297	15.22	1.18	1.12	0.60	0.16
HLY05-01	6JPC	1317	12.78	1.11	1.01	0.62	0.18
HLY05-01	6JPC	1337	9.22	0.96	1.00	0.59	0.09
HLY05-01	6JPC	1357	27.04	1.43	1.06	0.59	0.31
HLY05-01	6JPC	1377	10.89	1.04	0.97	0.62	0.13
HLY05-01	6JPC	1397	7.74	0.89	1.01	0.62	0.08
HLY05-01	6JPC	1417	9.39	0.97	1.24	0.70	0.09
HLY05-01	6JPC	1437	8.75	0.94	1.35	0.79	0.09
HLY05-01	6JPC	1457	10.46	1.02	1.02	0.55	0.09
HLY05-01	6JPC	1477	10.83	1.03	1.09	0.66	0.14
HLY05-01	6JPC	1497	18.35	1.26	1.09	0.58	0.27
HLY05-01	6JPC	1517	10.10	1.00	0.88	0.52	0.12
HLY05-01	6JPC	1532	9.62	0.98	1.07	0.61	0.07
HLY05-01	6JPC	1537	16.39	1.21	1.12	0.59	0.21
HLY05-01	6JPC	1547	11.66	1.07	1.08	0.62	0.11
HLY05-01	6JPC	1557	13.04	1.12	1.02	0.64	0.12
HLY05-01	6JPC	1572	12.45	1.09	1.00	0.67	0.11
HLY05-01	6JPC	1582	11.29	1.05	0.77	0.45	0.08
HLY05-01	6JPC	1587	11.54	1.06	0.52	0.31	0.08
HLY05-01	6JPC	1594	16.22	1.21	0.64	0.36	0.04
HLY05-01	6JPC	1602	12.24	1.09	1.08	0.63	0.09
HLY05-01	6JPC	1617	14.21	1.15	1.02	0.54	0.10

HLY05-01	6JPC	1637	15.06	1.17	0.95	0.54	0.11
HLY05-01	6JPC	1657	10.44	1.02	1.10	0.63	0.07
HLY05-01	6JPC	1677	9.66	0.98	1.01	0.60	0.09
HLY05-01	6JPC	1697	9.84	0.99	0.96	0.60	0.11



Supplementary Fig. 1. (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.