

Supplementary Table 1. Major and trace elemental concentrations of the bulk sediments

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	Unit	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	mg/kg	mg/kg	mg/kg	wt. %	mg/kg	mg/kg	mg/kg	mg/kg
	MDL	0.05	0.1	0.02	0.2	20	0.1	0.2	1	0.01	0.2	0.1	0.1	1
Site	Depth (cm)	Mo (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Zn (mg/kg)	Ag (mg/kg)	Ni (mg/kg)	Co (mg/kg)	Mn (mg/kg)	Fe (wt. %)	As (mg/kg)	U (mg/kg)	Th (mg/kg)	Sr (mg/kg)
25005	0-1	3.57	17	9.5	52.2	182	36.1	12.3	471	2.76	29.5	8.8	11.4	379
25005	1-2	4.77	20.4	9.31	55.7	179	38.3	12.3	422	2.66	32.1	9.3	12.4	386
25005	2-3	1.8	12.4	9.86	43.8	74	32.4	11.5	421	2.45	16.2	8.2	5.1	385
25005	3-4	2.38	15	9.93	50.1	117	37.7	14.6	566	3.11	16.6	9.7	17.2	384
25005	4-5	2.76	14.2	9.39	49.5	136	35.6	12.9	469	2.62	16.4	11.9	9.2	537
25005	5-6	3.82	14.6	8.77	51.2	158	33.5	11.1	445	2.47	15.5	14.3	14.7	613
25005	6-7	3.18	15.8	9.27	52.8	150	35.1	12.9	499	2.72	15.3	13.3	17.4	590
25005	7-8	3	14.1	8.85	50.2	148	35.6	14.4	608	2.94	13.3	12.3	24.3	532
25005	8-9	2.71	12.4	8.53	46.5	100	32.4	13.1	554	2.76	10.5	12.1	14.8	540
25005	9-10	7.66	17	7.88	49	154	35.1	10.8	390	2.59	14.7	9.7	10.9	350
25005	10-11	9.75	21.9	6.6	59.1	189	37.2	8.4	269	2.19	19.6	9	7.3	352
25005	12-14	7.24	24.9	6.84	65.5	263	42	9.2	279	2.54	24.5	5.3	5.5	358
25005	14-15	7.47	28.8	6.62	70.2	274	46.1	8.7	249	2.47	25.7	5.4	5.6	348
25005	16-17	8.96	33.4	6.41	80.6	313	50.2	9	210	2.51	27	5.6	5.5	349
25005	18-19	7.92	30.5	6.75	75.1	325	48.4	9.2	239	2.54	25.4	5.8	5.7	346
25005	20-21	7.87	31.6	5.81	70.5	299	47.3	7.6	186	2.27	21.8	5.8	5.1	344
25005	22-23	7.7	29.6	5.79	72.3	261	46.1	7.4	214	2.4	24.2	5	5.3	339
25005	24-25	8.25	25.2	5.88	62.1	246	37.5	7	189	2.06	21.7	4.5	4.7	330

Pulp Duplicates

28	7.66	17	7.88	49	154	35.1	10.8	390	2.59	14.7	9.7	10.9	350
28	7.59	18	7.97	52.5	131	36.5	11.1	404	2.65	15.1	9.7	11.2	356

Reference Materials

STD OREAS45E	2.53	836.5	17.92	52.8	328	505.6	63.4	583	25.97	17.6	2.4	13.3	15
STD OREAS25A-4A	2.57	37	24.71	51.5	<20	48.5	8.1	483	6.5	11.6	2.5	14.2	43
BLK	<0.05	0.2	<0.02	<0.2	<20	0.3	<0.2	<1	<0.01	0.3	<0.1	<0.1	<1

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mg/kg	mg/kg	mg/kg	mg/kg	wt. %	wt. %	mg/kg	mg/kg	wt. %	mg/kg	wt. %	wt. %	wt. %	wt. %	mg/kg
0.02	0.02	0.04	1	0.01	0.001	0.1	1	0.01	1	0.001	0.01	0.001	0.01	0.1
Cd (mg/kg)	Sb (mg/kg)	Bi (mg/kg)	V (mg/kg)	Ca (wt. %)	P (wt. %)	La (mg/kg)	Cr (mg/kg)	Mg (wt. %)	Ba (mg/kg)	Ti (wt. %)	Al (wt. %)	Na (wt. %)	K (wt. %)	W (mg/kg)
23.85	0.32	0.05	122	5.21	1.137	32.4	284	1.78	327	0.497	3.46	2.317	1.37	0.5
24.19	0.34	0.06	112	5.3	1.096	36	261	1.69	310	0.487	3.54	3.083	1.35	0.7
23.75	0.3	0.04	107	4.95	1.173	23.2	235	1.59	348	0.399	3.64	1.664	1.48	0.6
23.45	0.3	0.06	135	5.31	1.091	46.9	310	1.93	325	0.626	3.52	1.872	1.4	0.5
25.85	0.35	0.05	118	6.32	1.602	33.1	300	1.73	318	0.489	3.3	1.846	1.26	0.5
28.79	0.27	0.05	114	7.17	1.888	37.4	291	1.58	286	0.511	3.08	1.907	1.17	0.5
27.86	0.29	0.05	121	6.82	1.784	40.3	305	1.72	294	0.579	3.24	1.768	1.23	0.6
24.11	0.23	0.05	132	6.76	1.554	58.6	332	1.85	278	0.457	3.19	1.747	1.2	0.4
23.77	0.21	0.04	122	6.61	1.62	45.2	293	1.72	280	0.456	3.19	1.534	1.17	0.3
22.83	0.36	<0.04	102	4.65	0.948	31.3	211	1.43	271	0.489	3.69	2.31	1.31	0.5
25.81	0.33	<0.04	81	4.46	0.843	20.3	176	1.26	243	0.336	3.42	3.516	1.19	0.4
26.17	0.36	<0.04	76	4.92	0.457	17.3	165	1.21	278	0.336	4.22	2.947	1.33	0.6
31.03	0.34	<0.04	72	4.72	0.36	17.5	164	1.2	251	0.312	4.04	3.22	1.28	0.6
38.42	0.3	0.05	72	4.6	0.339	15.8	173	1.13	217	0.272	3.72	2.966	1.21	0.6
34.01	0.34	<0.04	72	4.79	0.316	18.2	160	1.1	264	0.307	4.15	2.467	1.35	0.7
32.55	0.26	0.04	64	4.49	0.268	14.8	156	1.12	218	0.25	3.68	3.838	1.22	0.5
30.46	0.3	0.04	67	4.66	0.281	16.5	157	1.13	212	0.273	3.56	3.342	1.19	0.6
26.39	0.3	<0.04	56	4.33	0.229	13.9	128	1.05	240	0.24	3.79	4.077	1.22	0.5
22.83	0.36	<0.04	102	4.65	0.948	31.3	211	1.43	271	0.489	3.69	2.31	1.31	0.5
23.35	0.4	0.05	106	4.67	0.962	30.6	216	1.46	284	0.497	3.67	2.283	1.32	0.5
0.06	0.83	0.24	346	0.08	0.033	11	1089	0.16	248	0.577	7.26	0.058	0.34	0.9
0.07	0.49	0.31	162	0.28	0.044	19.4	129	0.33	144	0.977	8.9	0.131	0.47	1.8
<0.02	<0.02	<0.04	<1	<0.01	0.002	<0.1	3	<0.01	<1	<0.001	<0.01	0.002	<0.01	<0.1

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mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
0.1	0.1	0.1	0.1	0.02	0.1	0.1	0.1	0.04	0.1	0.02	0.01	0.002	0.3	0.05
Er (mg/kg)	Tm (mg/kg)	Yb (mg/kg)	Lu (mg/kg)	Hf (mg/kg)	Li (mg/kg)	Rb (mg/kg)	Ta (mg/kg)	Nb (mg/kg)	Cs (mg/kg)	Ga (mg/kg)	In (mg/kg)	Re (mg/kg)	Se (mg/kg)	Te (mg/kg)
3.6	0.5	3.5	0.5	2.22	13.5	55	0.5	7.99	1.6	8.45	0.03	0.02	2.5	1.36
3.2	0.5	3	0.5	2.1	15	57.3	0.5	8.1	1.9	9.14	0.01	0.035	3.4	1.13
3.2	0.4	3.1	0.5	1.71	13.8	59.4	0.6	9.07	1.5	8.28	0.02	0.017	3	0.84
4.1	0.6	3.7	0.5	2.57	14.2	57.3	0.6	10.01	1.6	8.55	0.05	0.028	1.9	1.18
4.3	0.6	4.1	0.6	2	11.1	53.1	0.5	8.04	1.4	8.04	0.02	0.022	2.2	1.05
4.4	0.7	4.2	0.6	1.87	12.1	49.3	0.5	7.68	1.5	7.44	0.03	0.024	2.4	1.29
4.8	0.6	4.4	0.7	2.08	12.4	50.9	0.6	8.86	1.4	7.89	0.02	0.03	2.1	1.04
4.4	0.6	4.1	0.6	2.47	10.8	48.5	0.4	6.26	1.4	7.31	<0.01	0.021	2	1.28
4.4	0.6	4.2	0.6	2.25	10.4	48	0.4	6.19	1.3	8.38	0.03	0.011	2.4	1.51
3.1	0.3	2.9	0.4	2.32	16.6	52.9	0.5	8.13	1.6	8.97	0.02	0.026	4.5	0.97
2.2	0.3	2	0.3	2.21	14.6	48.1	0.4	5.98	1.8	8.81	0.01	0.053	5.9	0.81
1.8	0.2	1.9	0.2	1.84	19.6	56.7	0.4	6.3	2.3	9.86	0.02	0.051	5.5	0.84
1.7	0.3	1.7	0.3	1.72	21.6	55.5	0.4	6.14	2.4	10.16	0.04	0.05	6.2	0.52
1.8	0.3	1.8	0.2	1.57	25.1	53.3	0.3	5.37	2.7	9.49	<0.01	0.051	7.1	0.58
1.8	0.2	1.8	0.3	1.7	24.3	56.4	0.4	5.96	2.6	11.1	0.02	0.041	6.1	0.57
1.6	0.2	1.4	0.2	1.32	24.6	51.9	0.3	4.98	2.5	9.63	<0.01	0.053	6.2	0.64
1.6	0.2	1.5	0.2	1.53	23	50.5	0.4	5.38	2.4	9.8	0.02	0.051	6.6	0.9
1.5	0.2	1.3	0.2	1.21	18.9	49	0.3	4.83	2.2	10.13	0.02	0.05	5.4	0.61
3.1	0.3	2.9	0.4	2.32	16.6	52.9	0.5	8.13	1.6	8.97	0.02	0.026	4.5	0.97
2.6	0.4	2.9	0.4	2.54	16.1	54.3	0.6	8.3	1.7	8.86	0.02	0.033	3.8	0.98
1	0.1	1.2	0.1	2.6	7	20.6	0.5	6.02	1.2	17.73	0.07	<0.002	1.2	0.08
1.3	0.2	1.1	0.1	4.02	35	55.5	1.3	19.33	5.5	25.01	0.08	<0.002	2.3	<0.05
<0.1	<0.1	<0.1	<0.1	<0.02	<0.1	0.2	<0.1	<0.04	<0.1	0.06	<0.01	<0.002	0.6	<0.05

Supplementary Table 1. Major and trace elemental concentrations of the bulk sediments

mg/kg

0.05

Tl (mg/kg)
1.82
1.47
2.05
1.95
1.89
1.83
1.77
1.68
1.62
1.37
1.31
1.33
1.09
0.9
1.12
0.8
0.86
0.98

1.37

1.41

0.14

0.33

<0.05

Supplementary Table 2. Bulk sediment TN, TS, TOC and stable isotope data

Core	Depth (cm)	TN [%]	$\delta^{15}\text{N}$ (‰)	TOC [%]	$\delta^{13}\text{C}$ (‰)	TS [%]	$\delta^{34}\text{S}$ (‰)
25005	0-1	0.22	5.31	1.37	-21.21	0.34	-14.63
25005	1-2	0.20	6.26	2.17	-20.71	0.37	-16.60
25005	2-3	0.07	5.49	1.11	-21.79	0.17	-18.43
25005	3-4	0.11	5.52	1.13	-21.68	0.28	-17.91
25005	4-5	0.11	5.66	2.39	-20.51	0.28	-18.02
25005	5-6	0.19	6.13	2.17	-20.61	0.47	-17.26
25005	6-7	0.11	6.24	1.92	-20.86	0.30	-17.39
25005	7-8	0.16	6.17	1.88	-20.37	0.36	-17.32
25005	8-9	0.07	5.78	0.71	-21.74	0.25	-18.08
25005	9-10	0.17	5.45	3.32	-19.82	0.52	-4.00
25005	10-11	0.25	8.09	3.83	-19.67	0.89	1.68
25005	12-14	0.26	6.82	3.29	-19.97	0.95	1.19
25005	14-15	0.21	6.55	3.23	-19.91	0.90	3.69
25005	16-17	0.23	6.22	4.23	-19.49	1.42	3.25
25005	18-19	0.34	6.13	4.31	-19.45	1.02	2.61
25005	20-21	0.30	6.11	4.78	-19.49	1.16	2.25
25005	22-23	0.27	5.87	3.69	-19.50	1.26	3.44
25005	24-25	0.26	5.80	3.7	-19.85	1.11	4.21

Table 3. Measured PAS, EES and CRS measured values

Core	Depth (cm)	PAS $\delta^{34}\text{S}$ (‰)	EES $\delta^{34}\text{S}$ (‰)
25005	0-1	19.16	16.48
25005	1-2	18.02	19.07
25005	2-3	17.22	15.34
25005	3-4	17.72	17.41
25005	4-5	19.75	18.25
25005	5-6	19.61	19.15
25005	6-7	20.01	19.21
25005	7-8	19.78	18.69
25005	8-9	20.46	17.22
25005	9-10	19.22	20.34
25005	10-11	19.68	22.75
25005	12-14	-	-
25005	14-15	19.84	23.75
25005	16-17	19.06	23.71
25005	18-19	19.45	24.16
25005	20-21	19.33	24.67
25005	22-23	20.91	24.96
25005	24-25	20.20	25.59

Core	Depth (cm)	CRS $\delta^{34}\text{S}$ (‰)
25005	0-1	-20.25
25005	0-1	-20.56
25005	2-3	-21.71
25005	2-3	-20.86
25005	2-3	-21.50
25005	3-4	-21.06
25005	3-4	-21.46
25005	4-5	-21.16
25005	4-5	-21.53
25005	5-6	-21.03
25005	5-6	-22.14
25005	6-7	-20.38
25005	6-7	-21.24
25005	7-8	-20.17
25005	7-8	-21.49
25005	8-9	-19.10
25005	8-9	-19.39
25005	9-10	-6.48
25005	9-10	-6.84
25005	10-11	-1.66
25005	10-11	-0.30
25005	12-13	3.28
25005	14-15	2.84
25005	14-15	2.80
25005	16-17	1.21
25005	16-17	1.06
25005	18-19	2.15
25005	18-19	1.42
25005	20-21	0.49
25005	20-21	0.33
25005	22-23	1.89
25005	22-23	1.49
25005	24-25	1.92
25005	24-25	2.54