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Table S1. Additional total suspended matter (TSM) samples, which were included into the mean TSM calculation, but not analyzed for CuO oxidation products.

Sample code	Sample & site description	Date of sampling	Latitude [dec]	Longitude [dec]	Water depth [m]
Lena River total suspended matter					
1	Olenyokskaya Channel	14-Aug-2009	72.4771	125.2856	0.5
2	Olenyokskaya Channel	14-Aug-2009	72.3598	125.6728	0.5
3	Lena River main channel	16-Aug-2009	72.1526	126.9159	0.5
5	Sardakhskaya/Trofimovskaya Channel	17-Aug-2009	72.5825	127.1891	0.5
6	Sardakhskaya Channel	17-Aug-2009	72.7002	127.4929	0.5
7	Sardakhskaya/Trofimovskaya Channel	17-Aug-2009	72.6268	127.3860	0.5
8	near Kurungnakh Island	18-Aug-2009	72.2904	126.0909	0.5
9	Lena River mai channel	19-Aug-2009	72.2987	126.7080	0.5
12	Bykovskaya Channel	20-Aug-2009	72.4140	126.9124	0.5
18	NE of Muostakh Island	22-Aug-2009	71.6761	130.1728	0.5
20	W of Muostakh Island	23-Aug-2009	71.6088	129.9393	0.5
21	close to Muostakh Island shoreline	23-Aug-2009	71.5750	129.8200	0.5
22	off Samoylov Island	30-July-2010	72.3650	126.4628	0.5
23	off Kurungnakh Island	30-July-2010	72.3392	126.3115	0.5
24	Trofimovskaya Channel	31-July-2010	72.5343	126.8794	0.5
33	Bykovskaya Channel	4-Aug-2010	72.3604	127.6765	0.5

Table S2. Total suspended matter concentration of individual TSM samples from 2009 and 2010. Not determined denoted by n.d.

Sample code	TSM [mg/L]
July/Aug 2009	
1	3.10
2	14.17
3	6.33
4	29.01
5	11.65
6	14.09
7	7.45
8	8.82
9	66.39
10	38.97
11	52.51
12	20.20
13	29.26
14	33.32
15	15.72
16	19.56
17	174.92
18	6.72
19	n.d.
20	10.52
21	7.33
July/Aug 2010	
22	14.89
23	16.26
24	11.83
25	32.23
26	28.94
27	25.28
28	22.56
29	26.57
30	25.81
31	31.11

32	19.88
33	19.07
34	3.52
35	9.30
36	10.54

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Table S3. Organic carbon (OC), total nitrogen (TN), and atomic OC to TN ratio ($OC:TN_{at}$) for individual soil samples of the Lena Delta first terrace bulk samples. Bulk samples include the >2mm fraction. Sample depth is given in meter below surface [m b.s.].

	Depth	OC	TN	$OC:TN_{at}$
	[m b.s.]	[wt%]		
Lena Delta first terrace bulk				
Gorgolevsky Island (L09-08)				
	0.02	5.39	0.18	35.1
	1.70	8.95	0.28	37.0
	3.40	7.91	0.28	33.6
Samoylov Island (L09-12)				
	0.45	9.24	0.45	23.7
	1.35	15.49	0.32	56.3
	2.50	17.14	0.39	51.5
	4.70	13.58	0.23	68.0
	5.80	11.69	0.24	56.5
Bykovsky Channel (L09-28)				
	0.30	6.14	0.19	33.1
	1.70	2.69	0.12	21.7
Baron Belkey Island (L10-04)				
	0.05	1.82	0.06	34.6
	0.28	1.13	0.03	38.1
	0.93	1.68	0.08	24.6
	1.25	5.48	0.26	24.5
	1.43	1.02	0.04	29.4
	2.15	4.59	0.16	32.8
	3.58	10.45	0.25	49.1
	4.70	7.61	0.24	37.7
	6.00	10.05	0.26	44.8

Table S4. Sediment-normalized CuO oxidation products and parameters of individual bulk soil samples from the first delta terrace and total suspended matter samples from 2009 and 2010. Bulk samples include >2mm fraction and sample depth is given in meters below surface [m b.s.]. When sample material was not sufficient for analysis, not determined is denoted by n.d. Not applicable denoted by n.a.

Depth	V	S	C	Σ8	P	Pn
[m b.s.]		[mg/g dws]				
Lena Delta first terrace bulk						
Gorgolevsky Island (L09-08)						
0.02	0.47	0.49	0.32	1.28	0.69	0.13
1.70	0.85	0.72	0.38	1.95	1.14	0.20
3.40	0.89	0.55	0.14	1.58	0.82	0.06
Samoylov Island (L09-12)						
0.45	0.94	0.74	0.30	1.98	1.01	0.22
1.35	2.41	2.82	1.87	7.10	3.68	0.42
2.50	1.55	2.46	1.80	5.81	2.14	0.42
4.70	0.73	0.42	0.20	1.35	0.45	0.04
5.80	0.78	0.71	0.71	2.04	0.65	0.13
Bykovsky Channel (L09-28)						
0.30	0.88	0.77	0.34	1.99	0.87	0.10
1.70	0.47	0.33	0.16	0.96	0.21	0.03
Baron Belkey Island (L10-04)						
0.05	0.64	0.66	0.31	1.61	0.16	0.02
0.28	0.04	0.04	0.02	0.1	0.05	0.00
0.93	0.05	0.05	0.03	0.13	0.06	0.01
1.25	0.31	0.37	0.24	0.92	0.37	0.04
1.43	0.07	0.09	0.04	0.20	0.09	0.01
2.15	0.69	0.47	0.21	1.37	0.47	0.04
3.58	0.79	0.76	0.44	1.99	0.86	0.18
4.70	0.68	0.75	0.42	1.85	0.72	0.10
6.00	1.08	0.92	0.48	2.48	1.53	0.23
TSM Aug 2009						
sample code						
4	n.a.	0.18	0.06	0.03	0.27	0.15	0.05
10	n.a.	0.19	0.07	0.03	0.29	0.17	0.06

11	n.a.	0.15	0.04	0.02	0.21	0.11	0.05
13	n.a.	0.14	0.07	0.03	0.24	0.09	0.05
14	n.a.	0.10	0.05	0.02	0.17	0.07	0.04
16	n.a.	0.17	0.07	0.03	0.27	0.21	0.05
17	n.a.	0.22	0.17	0.08	0.47	0.20	0.07
TSM July/Aug 2010							
25	n.a.	0.20	0.08	0.04	0.32	0.13	0.05
26	n.a.	0.20	0.08	0.03	0.31	0.17	0.06
27	n.a.	0.18	0.08	0.04	0.29	0.11	0.05
28	n.a.	0.17	0.06	0.03	0.26	0.13	0.05
29	n.a.	0.21	0.07	0.03	0.31	0.17	0.05
30	n.a.	0.34	0.14	0.05	0.53	0.30	0.06
31	n.a.	0.28	0.13	0.06	0.46	0.18	0.05
32	n.a.	0.08	0.03	0.01	0.12	0.07	0.02

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Table S5. CuO oxidation products and parameters of individual bulk soil samples from the first delta terrace and total suspended matter from 2009-2011. Bulk samples include >2mm fraction and sample depth is given in meters below surface [m b.s.]. When sample material was not sufficient for analysis, not determined is denoted by n.d. Not applicable is denoted by n.a. Abbreviations like in table 4 and 5 of the manuscript.

Depth	V	S	C	Λ8	P	Pn	Ad/Al_V	Ad/Al_S	C/V	S/V	P/V	Pn/P
[m b.s.]			[mg/100 mg OC]									
Lena Delta first terrace bulk												
Gorgolevsky Island (L09-08)												
0.02	0.87	0.91	0.59	2.37	1.28	0.23	0.63	0.44	0.68	1.05	1.48	0.18
1.70	0.95	0.80	0.43	2.18	1.28	0.22	0.68	0.63	0.45	0.85	1.34	0.18
3.40	1.13	0.70	0.18	2.01	1.04	0.07	0.74	0.62	0.16	0.62	0.92	0.07
Samoylov Island (L09-12)												
0.45	1.02	0.80	0.33	2.15	1.09	0.24	0.99	0.82	0.32	0.78	1.07	0.22
1.35	1.55	1.82	1.21	4.58	2.38	0.27	0.56	0.58	0.78	1.17	1.53	0.11
2.50	0.91	1.44	1.05	3.40	1.25	0.25	0.63	0.48	1.16	1.58	1.38	0.20
4.70	0.54	0.31	0.14	0.99	0.33	0.03	0.84	0.64	0.27	0.58	0.62	0.09
5.80	0.67	0.61	0.47	1.75	0.56	0.11	0.62	0.60	0.71	0.91	0.84	0.20
Bykovsky Channnel (L09-28)												
0.30	1.44	1.25	0.55	3.24	1.41	0.16	0.79	0.69	0.38	0.87	0.98	0.11
1.70	1.74	1.23	0.60	3.57	0.76	0.11	0.64	0.60	0.35	0.71	0.44	0.15
Baron Belsky Island (L10-04)												
0.05	3.50	3.62	1.69	8.81	0.85	0.13	0.41	0.37	0.48	1.04	0.24	0.15
0.28	0.34	0.31	0.14	0.79	0.41	0.04	0.85	0.67	0.41	0.92	1.19	0.09
0.93	0.30	0.31	0.17	0.78	0.35	0.05	0.78	0.62	0.57	1.06	1.17	0.14
1.25	0.57	0.68	0.45	1.70	0.67	0.08	0.77	0.60	0.79	1.21	1.19	0.11
1.43	0.73	0.88	0.43	2.05	0.91	0.10	0.77	0.61	0.59	1.21	1.25	0.11
2.15	1.51	1.02	0.47	3.00	1.02	0.08	1.03	0.83	0.31	0.68	0.67	0.08
3.58	0.76	0.73	0.42	1.91	0.82	0.17	0.85	0.76	0.56	0.96	1.08	0.21
4.70	0.89	0.98	0.56	2.43	0.95	0.13	0.59	0.51	0.62	1.10	1.06	0.14
6.00	1.07	0.92	0.48	2.47	1.52	0.23	1.19	1.01	0.45	0.86	1.41	0.15
TSM Aug 2009												
sample code												
4	0.76	0.26	0.11	1.13	0.61	0.05	2.25	1.51	0.15	0.34	0.81	0.08
10	0.80	0.30	0.12	1.22	0.71	0.05	1.91	1.21	0.15	0.37	0.89	0.08

11	0.68	0.17	0.09	0.94	0.52	0.05	3.97	1.44	0.14	0.25	0.76	0.09
13	0.59	0.27	0.13	0.99	0.38	0.05	0.91	0.56	0.22	0.47	0.65	0.12
14	0.43	0.20	0.09	0.72	0.29	0.04	0.68	0.52	0.22	0.45	0.66	0.13
16	0.55	0.23	0.10	0.88	0.69	0.05	1.36	0.98	0.19	0.41	1.25	0.07
17	0.62	0.48	0.24	1.34	0.58	0.07	0.88	0.72	0.39	0.77	0.93	0.11
TSM July/Aug 2010												
25	0.77	0.30	0.14	1.21	0.49	0.05	0.98	0.69	0.19	0.39	0.64	0.11
26	0.77	0.30	0.13	1.20	0.67	0.06	1.76	0.99	0.17	0.39	0.87	0.08
27	0.72	0.30	0.14	1.17	0.45	0.05	0.96	0.80	0.20	0.42	0.62	0.11
28	0.65	0.24	0.11	1.00	0.52	0.05	1.28	0.93	0.17	0.37	0.80	0.09
29	0.69	0.22	0.10	1.02	0.57	0.05	1.59	0.93	0.15	0.32	0.83	0.08
30	0.93	0.37	0.15	1.44	0.81	0.06	1.62	1.11	0.16	0.40	0.88	0.07
31	0.76	0.35	0.16	1.26	0.51	0.05	0.69	0.55	0.20	0.45	0.67	0.10
32	0.28	0.09	0.05	0.42	0.25	0.02	2.02	0.48	0.18	0.34	0.89	0.09

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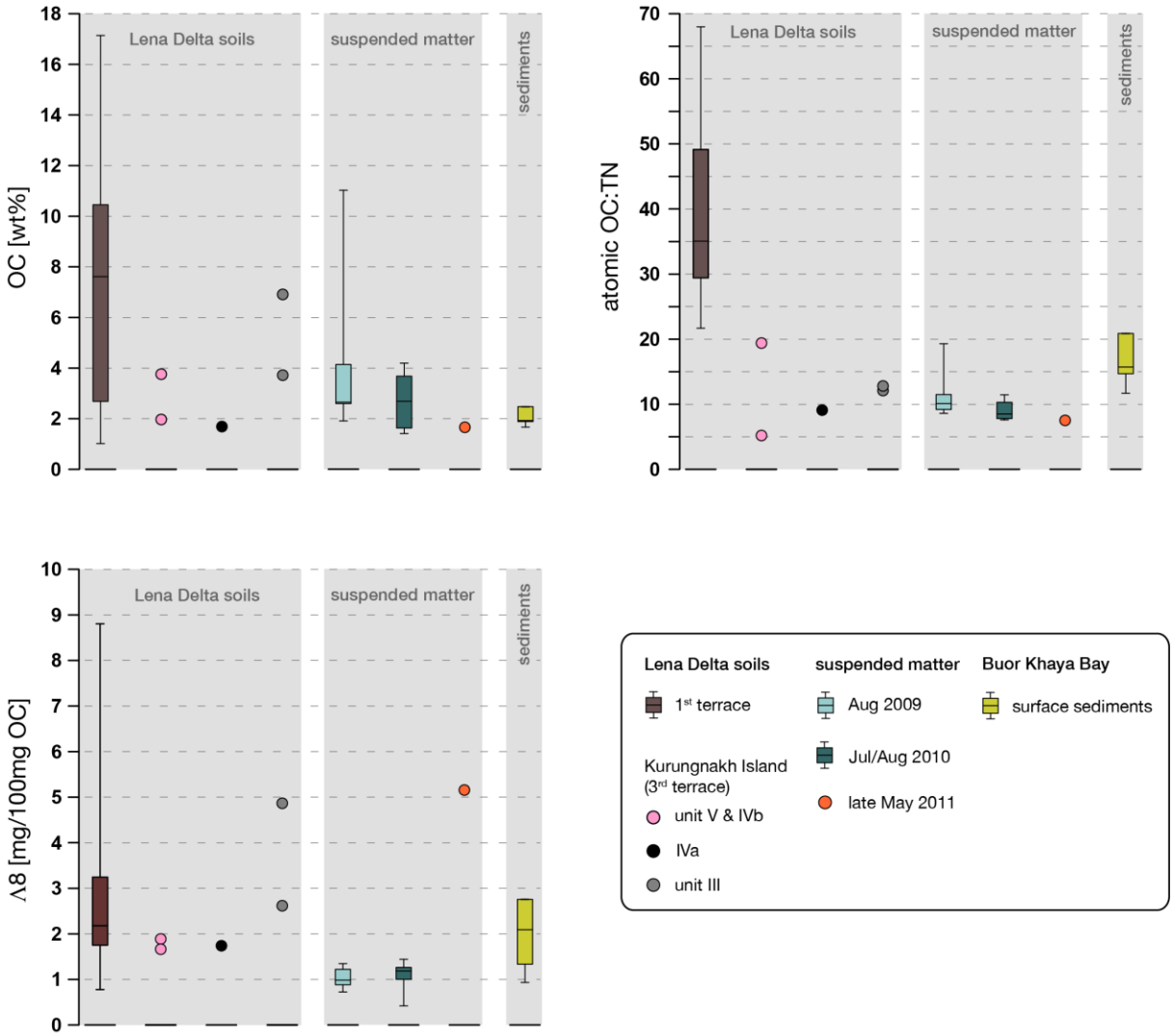

Figure S6. Bulk elemental parameters of Lena Delta soils, suspended matter from surface waters, and surface sediments from the Buor Khaya Bay. The OC content and OC:TN ratios of Kurungnakh Island samples are from (Wetterich et al., 2008).

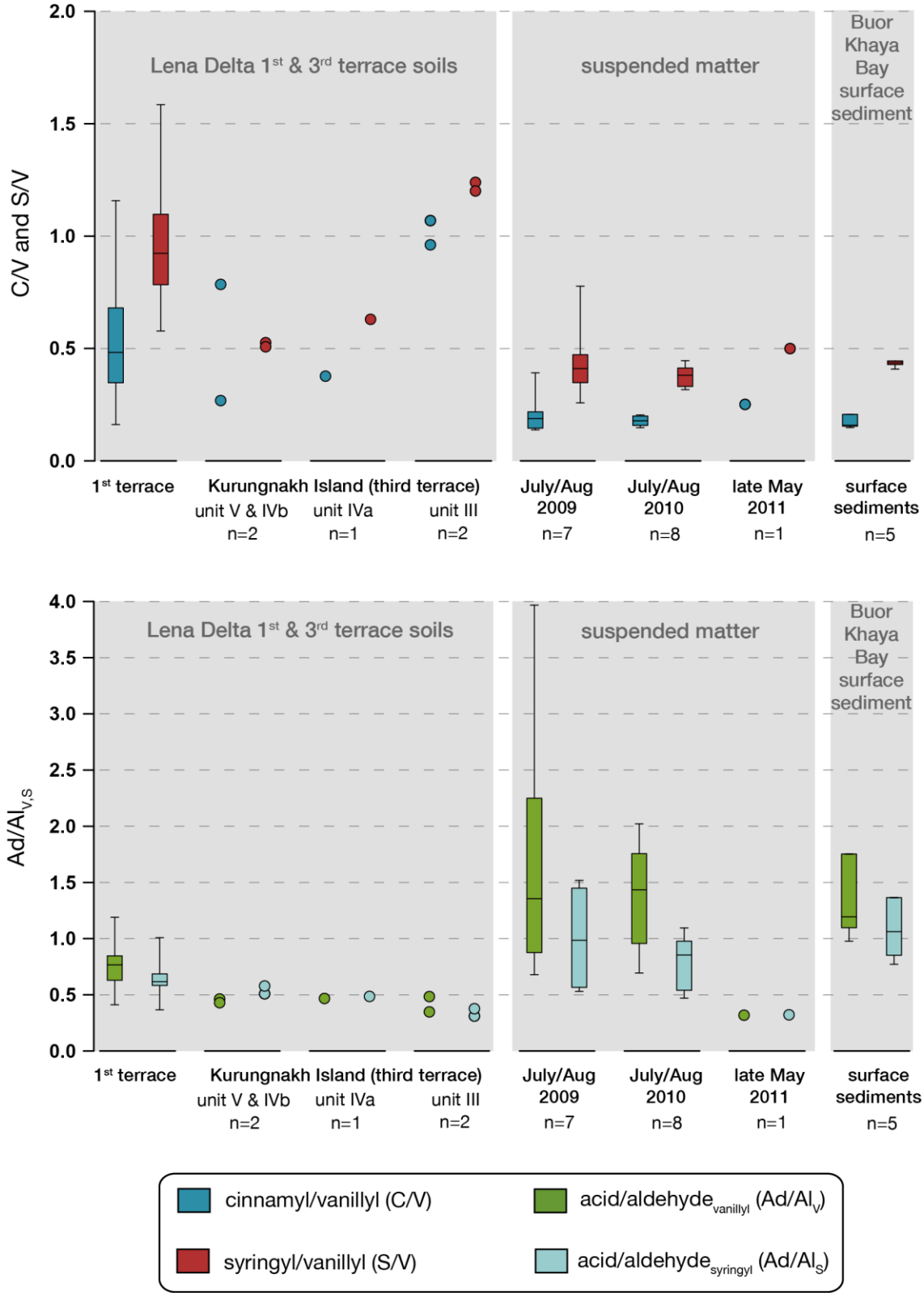

Figure S7. Parameters for different vegetation contributions (C/V and S/V) and degradation indicators (Ad/Al$_{V,S}$) for Lena Delta soils, suspended matter from surface water, and Buor Khaya Bay surface sediments.