Supplementary Material

Sources, Reactivity and Burial of Organic Matter in East China Sea sediments as Indicated by a Multi-geochemical Proxy Approach

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Table S1. Sampling stations with their location, date of sampling, water column surface and bottom salinity, temperature, Chlorophyll *a (Chl- a*) concentration and organic carbon (OC_x) content, and f_x parameters (see sec. 2 for calculation; terr: terrestrial). Chlorophyll *a* values for stations C0501, C0508 and C0608 were sourced from Yang et al., 2012.

Station	Date	Longitude (E°)	Latitude (N°)	Salinity (‰)	Temperature (°C)	Chl-a-YSI	Chl-*a* (mg·m^{-3})	OC_{plant} (mg·g^{-1})	$OC_{terr-plant}$ (mg·g^{-1})	OC_{marine} (mg·g^{-1})	f_{terr} (%)	f_{plant} (%)	$f_{terr-plant}$ (%)	f_{marine} (%)
C0501	May 2009	122.33	31.50	surface: 19.0	18.3	-	0.65(Yang et al., 2012)	106.8	171.1	305.2	47.7	18.3	29.3	52.3
				bottom: 31.2	16.5	-								
CFJA	May 2009	122.68	30.97	-	-	-		24.2	124.8	213.5	41.1	6.7	34.4	58.9
Ra1 (CFJA)	May 2010	122.64	30.50	2 m layer: 26.6	16.4	1.93	12.69		-				-	
				10 m layer: 29.0	16.3	15.60	4.72							
				28 m layer: 33.4	17.1	3.16	1.54							
DHa-2	June 2010	123.00	30.50	-	-	-		2.6	26.7	304.1	8.8	0.8	8.0	91.2
Ra5 (DHa-2)	May 2010	123.03	30.50	2 m layer: 27.6	16.7	0.61	2.18		-				-	
				15 m layer: 30.1	16.7	27.79	4.45							
				61 m layer: 34.1	17.8	1.03	0.34							
DHa-3	June 2010	123.50	30.50	-	-	-		3.8	62.5	309.2	17.6	1.0	16.6	82.4
Ra7a (DHa-3)	May 2010	123.50	30.50	2 m layer: 29.3	17.2	0.51	2.12		-				-	
				12 m layer: 31.5	16.6	62.71	9.25							
				53 m layer: 33.6	16.8	1.68	0.73							
DHa-4	June 2010	124.01	30.50	-	-	-		1.4	65.1	255.5	20.7	0.4	20.2	79.3

DHa-5	June 2010	124.49	30.49	-	-	-		0.7	25.5	167.0	13.5	0.4	13.2	86.5
C0508	May 2009	125.86	30.85	surface: 33.0	18.4	-	0.49(Yang et al., 2012)	2.5	72.9	189.6	28.4	0.9	27.5	71.6
				bottom: 33.2	12.1	-	0.4							
C0608	May 2009	128.21	30.83	surface: 34.6	19.6	-	0.79(Yang et al., 2012)	1.4	286.3	1153.9	20.0	0.1	19.9	80.0
				bottom: 34.4	6.9	-	0.4							

23 Note. -: Unknown.

Table S2. List of sampling stations along the East China Sea transect with turbidity, and nutrient concentrations (dissolved inorganic nitrogen (DIN), phosphate (PO_4-P) and silicate (SiO_3-Si)) and ratios at various water column depths.

Station	Turbidity-YSI	DIN (μmol·L^{-1})	PO_4-P (μmol·L^{-1})	SiO_3-Si (μmol·L^{-1})	N/P	Si/P	Si/N
Ra1 (CFJA)	2.18	2 m layer: 27.85	0.13	26.24	218	205	1
	5.89	10 m layer: 25.13	0.14	22.08	185	163	1
	90.95	28 m layer:12.68	0.58	15.65	22	27	1
Ra5 (DHa-2)	0.20	2 m layer: 11.57	0.16	17.66	73	112	2
	0.11	15 m layer: 6.49	0.10	13.32	66	136	2
	13.34	61 m layer: 9.98	0.66	14.17	15	21	1
Ra7a (DHa-3)	-0.044	2 m layer: 4.40	0.13	10.24	34	79	2
	0.24	12 m layer: 3.90	0.08	7.47	49	95	2
	1.67	53 m layer: 9.83	0.12	12.82	81	106	1

Note. The atomic ratios of N/P, Si/N and Si/P were calculated from DIN, PO_4 and SiO_3 concentrations...

Table S3. Sedimentation rates (SR) in the East China Sea from published sources. The location of sampling stations is provided.

Station	Longitude (E°)	Latitude (N°)	SR ($cm \cdot yr^{-1}$)	Reference
DH45	122.68	29.36	0.94	
3050-2	123.02	30.49	2.14	
DH5-0	122.48	29.14	1.24	
3000-2	123.00	30.00	1.06	
3100-1	122.45	30.90	3.1	
DH5-2a	123.07	28.78	0.87	
DH4-0	122.83	29.63	0.82	
DH5-2	122.87	28.90	1.19	
DH6-1	122.18	28.45	1.26	
DH56	122.36	28.81	1.25	
DH5-1a	122.67	29.02	1.19	
DH5-3	123.28	28.65	0.2	
C1	121.09	31.75	1.33	
C3	121.32	31.58	1.34	
C5	121.53	31.42	1.49	
C7	121.78	31.24	1.71	
C8	121.88	31.16	1.73	
A6-1	122.04	30.99	1.81	
A6-3	122.38	30.91	4.1	
A6-5	122.65	30.83	2.54	
A6-7	123.00	30.72	1.64	
A6-9	123.50	30.57	1.52	(Guo et al., 2021)
A6-11	124.00	30.44	1.24	
3300-1	121.60	33.00	0.51	
3300-3	122.50	33.00	0.64	
3300-4	123.00	33.00	0.5	
3300-5	123.50	33.00	0.52	
3300-6	124.00	33.00	0.5	
3400-1	120.60	34.00	0.27	
3400-2	121.00	34.00	0.32	
3400-3	121.50	34.00	0.31	
3400-5	122.50	34.00	0.29	
3400-6	123.00	34.00	0.11	
3400-7	123.50	34.00	0.25	
3400-8	124.00	34.00	0.12	
3500-1	119.50	35.00	0.35	
3500-2	120.00	35.00	0.34	
3500-3	120.50	35.00	0.27	
3500-4	121.00	35.00	0.31	
3500-5	121.50	35.00	0.35	
3500-6	122.00	35.00	0.32	
3500-7	122.50	35.00	0.26	
3500-8	123.00	35.00	0.19	
3500-9	123.50	35.00	0.18	

3500-10	124.00	35.00	0.18	
3600-1	120.50	36.00	0.32	
3600-2	121.00	36.00	0.34	
3600-3	121.50	36.00	0.35	
3600-4	122.00	36.00	0.38	
3600-5	122.50	36.00	0.31	
3600-6	123.00	36.00	0.31	
3600-7	123.50	36.00	0.28	
3600-8	124.00	36.00	0.32	
12250-1	122.50	32.50	0.86	
12250-2	122.50	32.00	0.89	
12250-3	122.50	31.50	1.12	
12250-4	122.50	31.00	3.15	
12250-5	122.50	30.50	2.23	
12250-6	122.50	30.00	1.25	
12300-1	123.00	32.50	0.83	
12300-4	123.00	31.00	1.41	
12300-5	123.00	30.50	2.14	
12300-6	123.00	30.00	1.05	
DEB5	122.90	30.36	2.14	(Liu et al., 2006)
DEB6	122.67	29.80	0.9	
1202	122.50	24.81	0.4	(Diekmann et al., 2008)
MD05-2908	122.49	24.80	0.228	(Li et al., 2009)
255	123.12	25.20	0.0594	(Jian et al., 2000)
B-3GC	128.52	31.48	0.0103	
PC-1	128.42	31.46	0.0187	(Xu et al., 2014)
C1	122.35	25.01	0.52	
C2	122.52	25.19	0.37	(Hsu et al., 2006)
C3	122.67	25.00	0.25	
A7	126.97	27.82	0.0156	(Xiang et al., 2007)
E017	126.03	26.58	0.0119	
DGKS9603	127.33	28.37	0.0063	

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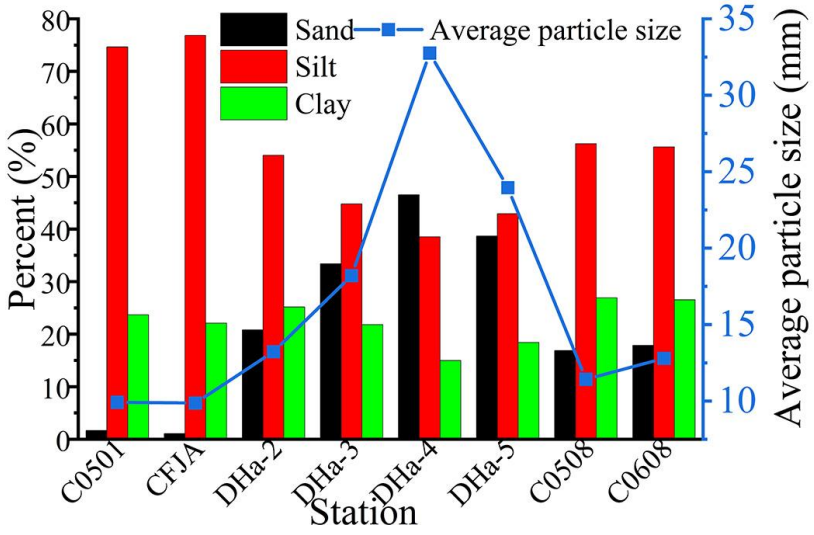

Figure S1. Spatial distribution of mean particle size and percent composition in surface sediments of the East China Sea study transect.

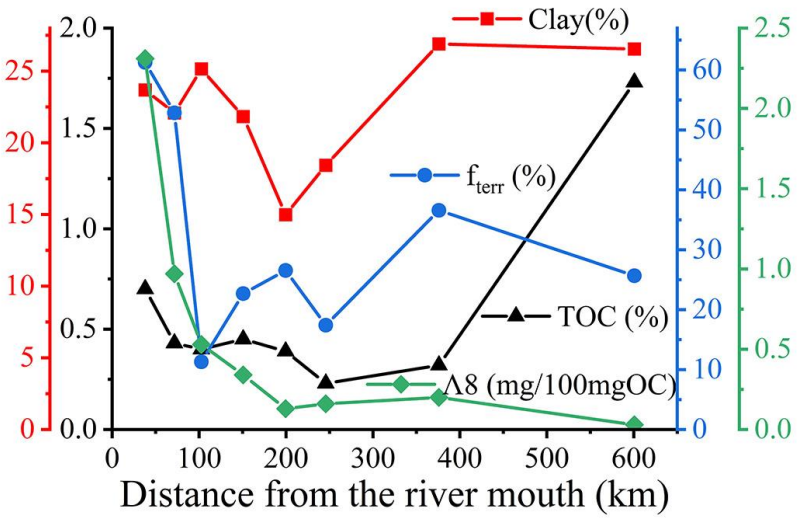

Figure S2. Total organic carbon **(**TOC) content, percent clay, percent terrestrial organic matter (f_{terr}) and OC-normalized total lignin-phenol (Λ8) concentration along the East China Sea study transect in the sediment.

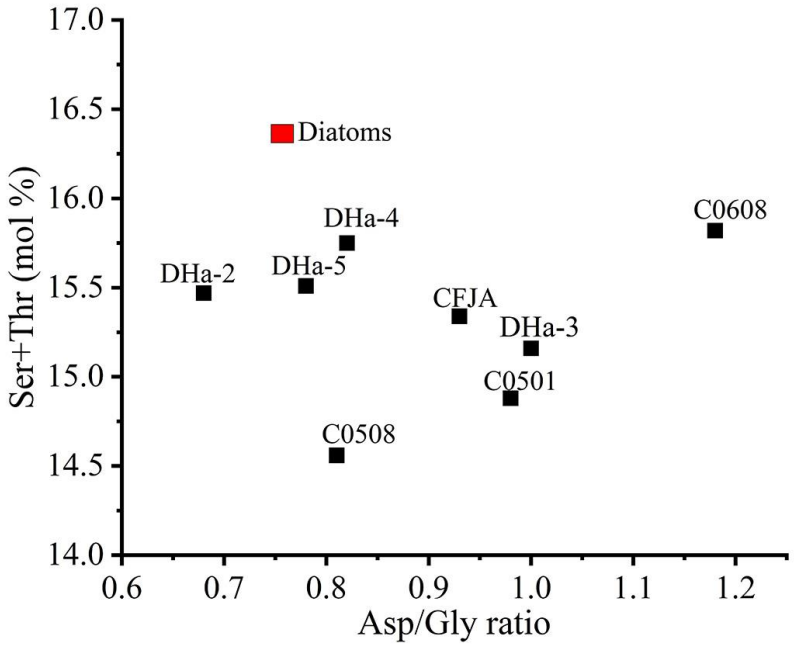

Figure S3. Characterization of diatomaceous sources of sediment organic matter at eight stations of the East China Sea transect. Asp/Gly: aspartate to glycine ratio; Ser + Thr: serine +threonine.

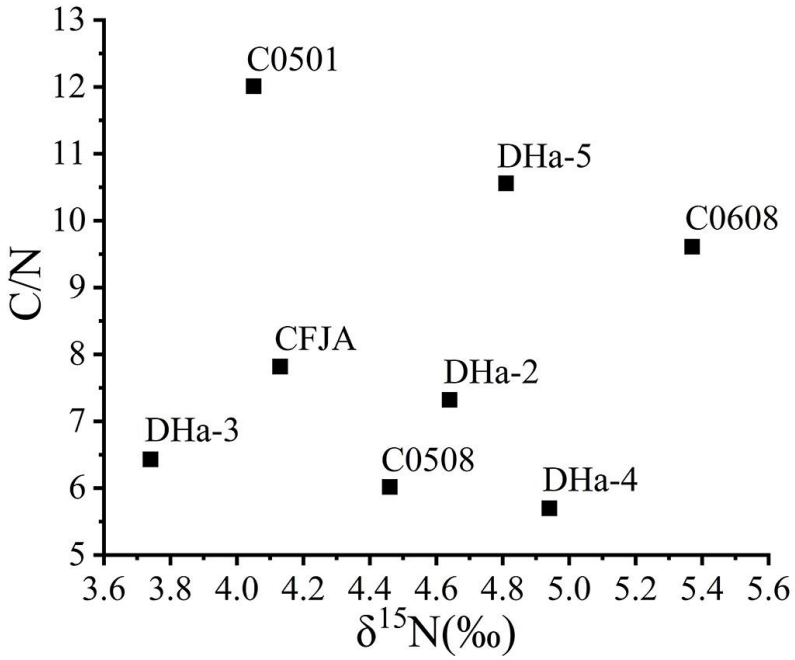

Figure S4. Stable nitrogen isotopic signature ($\delta^{15}N$) of sediments vs. the carbon to nitrogen ratio (C/N) at eight stations along the East China Sea study transect.

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