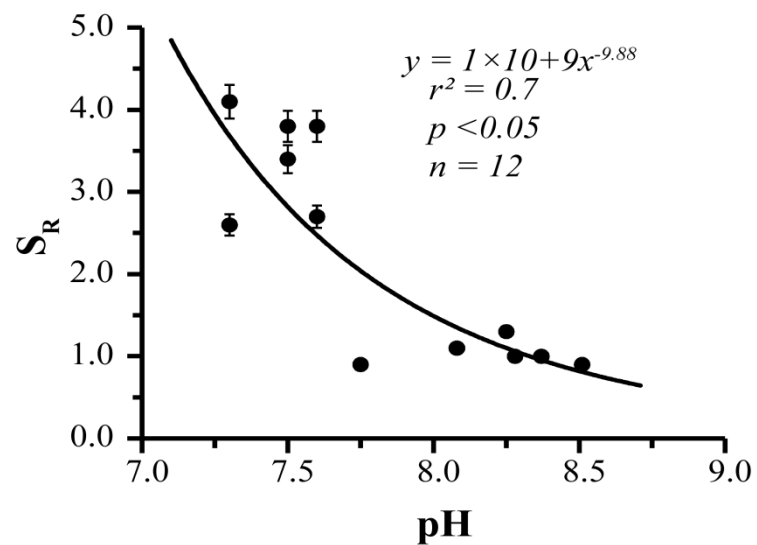
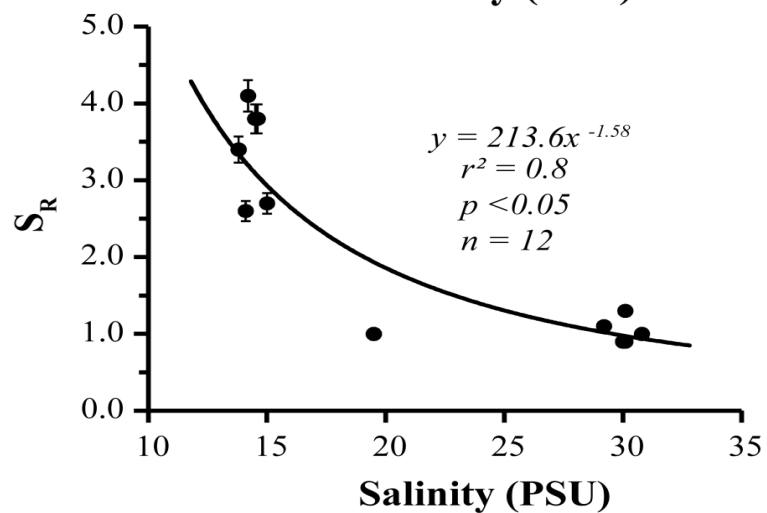
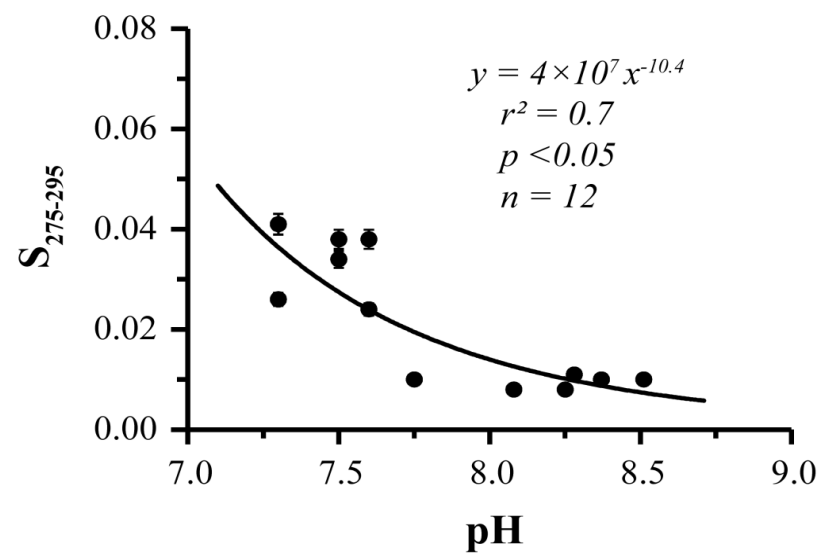
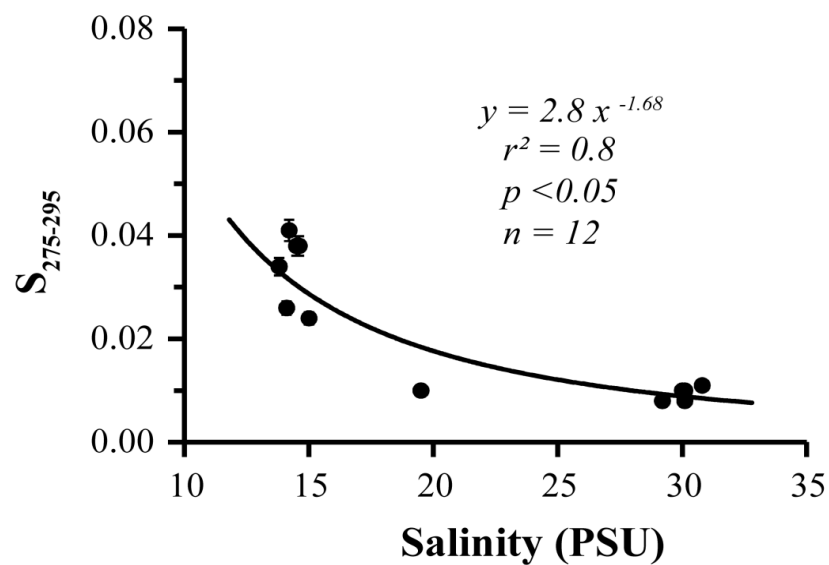
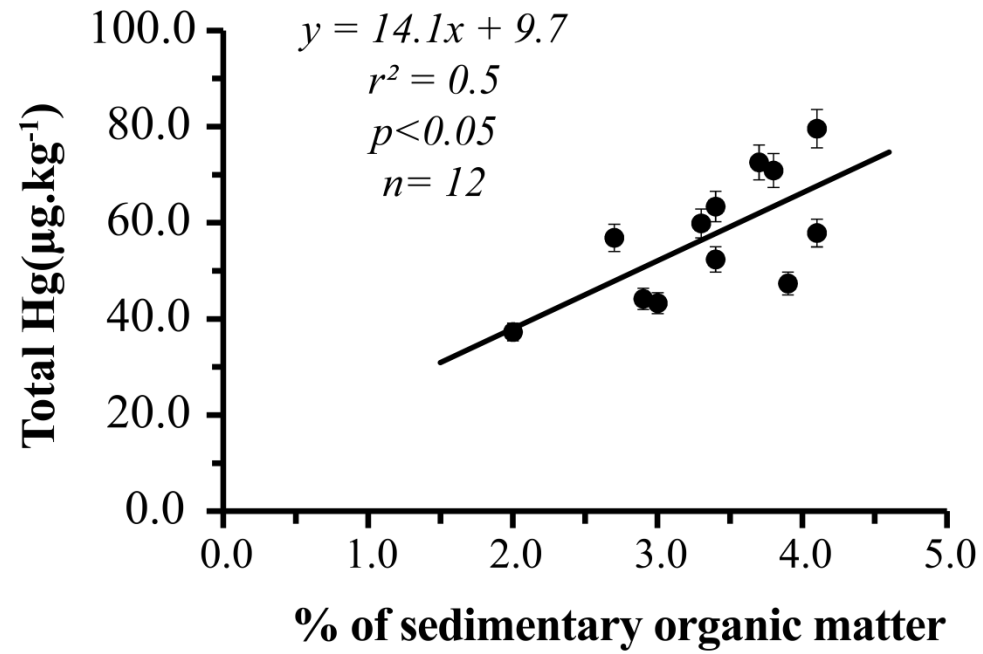


**Figure SM 4:** The variation of SOM concentration as a function of TN in the sediment.



**Figure SM5:** Variation of spectral slope parameters of sedimentary organic matter with varying salinity and pH. a)  $S_{275-295}$  v/s salinity b)  $S_{275-295}$  vs pH c) ratio of spectral slopes,  $S_R$  vs salinity and d) ratio of spectral slopes,  $S_R$  vs pH



**Figure SM6:** Variation in sedimentary  $\text{Hg}_T$  concentration with vs sedimentary organic matter from the mangrove sediment system of Sancoale, Zuari estuary, West coast of India.

**Table SM 1: Pearson Correlation** matrix of different parameters in 12 sediment samples

	pH	Salinity (PSU)	TC (%)	TIC (%)	TOC (%)	TN (%)	Molar C/N ratio	Sand (%)	Silt+Clay (%)	S <sub>275-295</sub>	S <sub>R</sub>	Fr1+Fr 2 (%)	Fr 3 (%)	Fr 4 (%)	Hg <sub>L-Cys</sub> (µg/kg)
pH	1														
Salinity (PSU)	0.78	1													
TC (%)	0.42	0.45	1												
TIC (%)	0.14	0.05	0.06	1											
TOC (%)	0.35	0.39	0.95	-0.27	1										
TN (%)	0.69	0.72	0.75	-0.24	0.79	1									
Molar C/N ratio	-0.76	-0.83	-0.24	0.29	-0.30	-0.67	1								
Sand (%)	0.48	0.37	0.01	0.34	-0.12	0.06	-0.31	1							
Silt+Clay (%)	-0.48	-0.37	-0.01	-0.34	0.12	-0.06	0.31	-1.00	1						
S <sub>275-295</sub>	-0.83	-0.87	-0.53	0.04	-0.51	-0.74	0.89	-0.32	0.32	1					
S <sub>R</sub>	-0.84	-0.87	-0.56	0.05	-0.54	-0.79	0.90	-0.30	0.30	0.99	1				
Fr1+Fr2(%)	-0.33	-0.14	-0.01	-0.05	0.01	0.05	0.25	0.05	-0.05	0.28	0.27	1			
Fr 3(%)	-0.74	-0.81	-0.65	0.06	-0.63	-0.80	0.77	-0.35	0.35	0.94	0.93	0.01	1		
Fr 4(%)	0.80	0.82	0.63	-0.04	0.60	0.76	-0.80	0.32	-0.32	-0.98	-0.97	-0.28	-0.96	1	
Hg <sub>L-Cys</sub> (µg/kg)	0.05	0.00	-0.18	0.16	-0.23	0.05	-0.17	0.07	-0.07	-0.08	-0.10	0.33	-0.03	-0.06	1