

Assessment of Pollution and Ecological Risk Index of Heavy Metals in the Surface Sediment of Estuary and the Coastal Environment of Bay of Bengal

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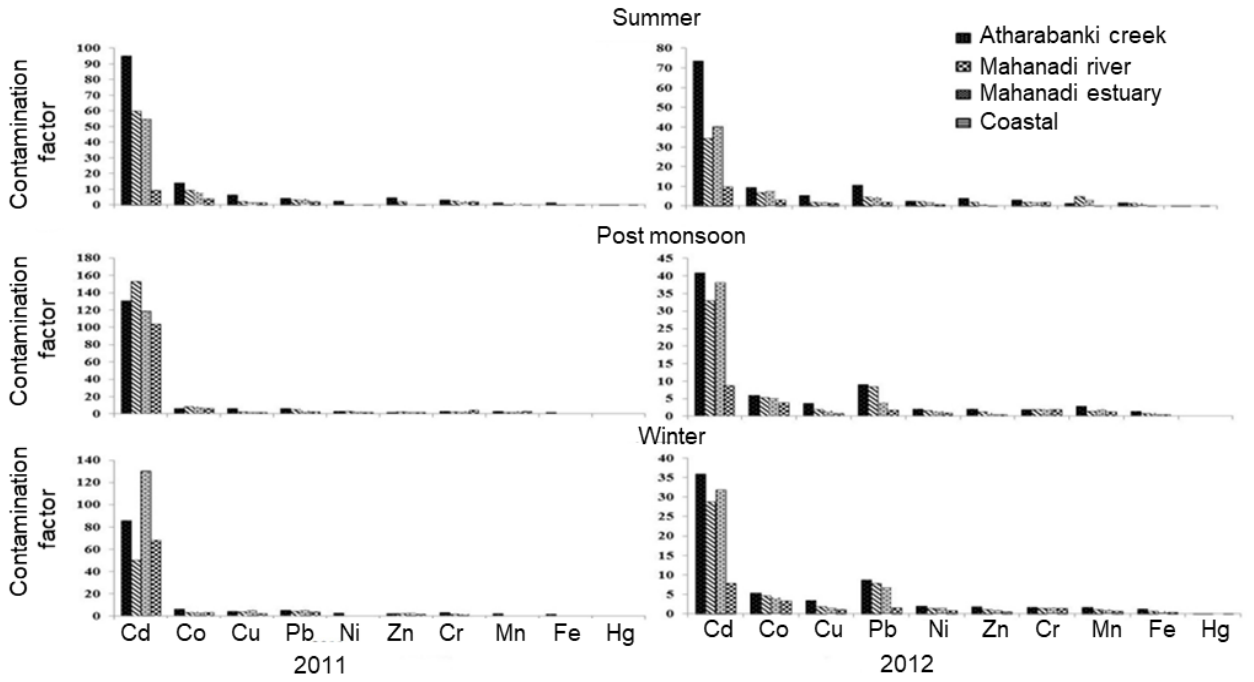


Figure S1. Seasonal and spatial variation of contamination factor (CF) in the study area, Bay of Bengal.

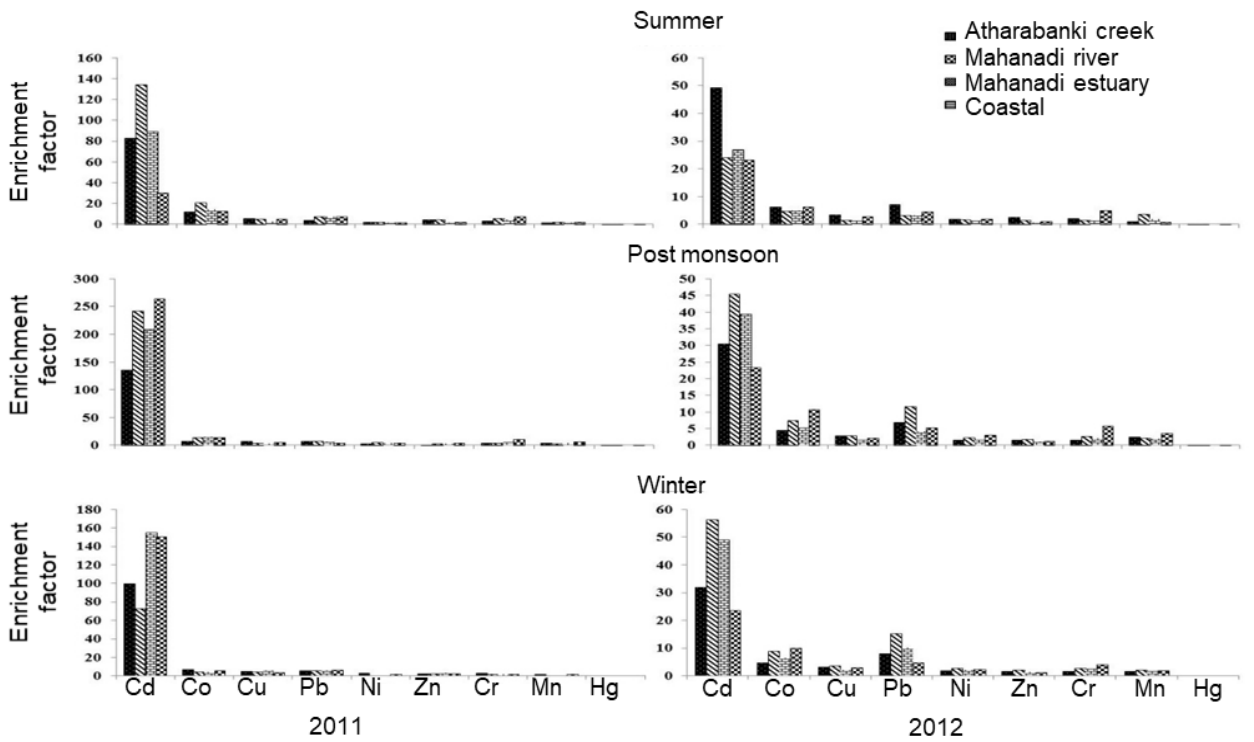


Figure S2. Seasonal and spatial variation of Enrichment Factor (EF) in the study area, Bay of Bengal.

Table S1. Spatial and Seasonal Variation of Texture (%), Organic Carbon (OC) and Organic Matter (OM) in the Mahanadi Estuarine and Coastal Sediments (Mean \pm Standard Deviation) during 2011 (n = 14)

Texture	Seasons	Atharabanki creek Mean \pm SD	Mahanadi River Mean \pm SD	Estuary Mean \pm SD	Coastal Mean \pm SD
SAND	SM	37.57 \pm 43.28	98.21 \pm 0.16	79.82 \pm 7.78	93.70 \pm 5.72
	PM	41.67 \pm 46.64	99.12 \pm 0.12	90.79 \pm 8.47	84.59 \pm 19.78
	WN	37.8 \pm 42.4	99.3 \pm 0.1	79.19 \pm 17.06	73.82 \pm 31.34
SLIT	SM	4.44 \pm 1.04	0.44 \pm 0.17	6.82 \pm 3.54	1.38 \pm 1.70
	PM	7.59 \pm 1.69	0.15 \pm 0.04	0.65 \pm 0.33	5.52 \pm 8.31
	WN	5.1 \pm 0.9	0.2 \pm 0.0	2.92 \pm 2.44	19.52 \pm 24.72
CLAY	SM	57.99 \pm 42.32	1.35 \pm 0.33	13.36 \pm 4.24	4.92 \pm 5.02
	PM	50.74 \pm 45.14	0.74 \pm 0.07	8.57 \pm 8.14	9.89 \pm 11.66
	WN	57.1 \pm 41.7	0.5 \pm 0.1	17.89 \pm 14.62	6.66 \pm 9.90
OC	SM	7.09 \pm 3.39	0.95 \pm 0.01	3.60 \pm 0.52	0.65 \pm 0.09
	PM	6.38 \pm 3.28	0.64 \pm 0.01	3.21 \pm 0.09	0.76 \pm 0.06
	WN	6.8 \pm 3.3	0.9 \pm 0.0	3.55 \pm 0.35	0.73 \pm 0.11
OM	SM	12.21 \pm 5.85	1.64 \pm 0.02	6.20 \pm 0.89	1.12 \pm 0.15
	PM	10.99 \pm 5.66	1.10 \pm 0.02	5.53 \pm 0.15	1.32 \pm 0.10
	WN	11.7 \pm 5.6	1.5 \pm 0.0	6.11 \pm 0.59	1.26 \pm 0.18

SM: Summer, PM: Post monsoon, WN: Winter.

Table S2. Spatial and Seasonal Variation of Texture (%), Organic Carbon (OC) and Organic Matter (OM) in the Mahanadi Estuarine and Coastal Sediments (Mean \pm Standard Deviation) during 2012 (n = 14)

Texture	Seasons	Atharabanki creek Mean \pm SD	Mahanadi river Mean \pm SD	Estuary Mean \pm SD	Coastal Mean \pm SD
SAND	SM	40.42 \pm 44.70	98.21 \pm 0.16	91.65 \pm 2.47	93.70 \pm 5.72
	PM	42.80 \pm 41.35	91.65 \pm 2.47	92.75 \pm 4.03	94.68 \pm 2.64
	WN	49.17 \pm 29.80	99.29 \pm 0.11	79.19 \pm 24.13	81.60 \pm 19.60
SLIT	SM	9.45 \pm 6.63	0.44 \pm 0.17	2.33 \pm 1.27	1.38 \pm 1.70
	PM	15.84 \pm 8.08	2.33 \pm 1.27	2.40 \pm 1.65	1.65 \pm 0.65
	WN	4.56 \pm 0.61	0.94 \pm 0.54	5.73 \pm 2.62	4.93 \pm 5.05
CLAY	SM	50.14 \pm 38.13	1.35 \pm 0.33	6.02 \pm 1.21	4.92 \pm 5.02
	PM	41.36 \pm 33.28	6.02 \pm 1.21	4.86 \pm 2.38	3.67 \pm 2.13
	WN	46.27 \pm 29.46	0.18 \pm 0.13	15.60 \pm 20.76	13.47 \pm 16.02
OC	SM	6.61 \pm 3.20	0.52 \pm 0.01	0.95 \pm 0.04	1.01 \pm 0.09
	PM	5.97 \pm 3.45	0.95 \pm 0.04	4.26 \pm 0.42	1.26 \pm 0.14
	WN	6.81 \pm 2.89	0.98 \pm 0.02	5.44 \pm 1.29	1.15 \pm 0.34
OM	SM	11.39 \pm 5.51	0.89 \pm 0.01	1.64 \pm 0.07	1.74 \pm 0.16
	PM	10.28 \pm 5.95	1.64 \pm 0.07	7.34 \pm 0.73	2.17 \pm 0.23
	WN	11.73 \pm 4.98	1.68 \pm 0.04	9.37 \pm 2.23	1.97 \pm 0.59

SM: Summer, PM: Post monsoon, WN: Winter.

Table S3. Spatial and Seasonal Variation of Heavy Metals ($\mu\text{g}\cdot\text{g}^{-1}$) except Iron (Fe %) in the Mahanadi Estuarine and Coastal Sediments (Mean \pm Standard Deviation) during 2011 (n = 14)

Heavy metals	Seasons	Atharabanki creek Mean \pm SD	Mahanadi river Mean \pm SD	Estuary Mean \pm SD	Coastal Mean \pm SD
Fe	SM	6.24 \pm 2.47	2.11 \pm 0.01	2.87 \pm 0.49	1.67 \pm 0.86
	PM	5.08 \pm 2.69	3.62 \pm 1.50	2.91 \pm 0.72	2.26 \pm 1.15
	WN	4.7 \pm 2.3	3.3 \pm 0.0	3.95 \pm 0.26	2.37 \pm 1.10
Mn	SM	1237 \pm 262	605.50 \pm 2.12	858.50 \pm 238	461.17 \pm 112
	PM	2209 \pm 222	1295 \pm 80	2317 \pm 1002	1950.50 \pm 735
	WN	1130.5 \pm 132.5	527.0 \pm 1.0	829.00 \pm 194	578.67 \pm 261
Zn	SM	448.45 \pm 30.08	183 \pm 21.21	93.00 \pm 0.28	51.83 \pm 13.33
	PM	126.60 \pm 11.96	180 \pm 66.10	153.30 \pm 48	118 \pm 39.65
	WN	143.0 \pm 14.2	148.8 \pm 3.5	2315 \pm 26.49	83.64 \pm 24.22
Cr	SM	272.25 \pm 7.82	207 \pm 109	227 \pm 62.15	184.43 \pm 7.51
	PM	257.38 \pm 27.58	189.70 \pm 21.50	246.5 \pm 74.45	330 \pm 14.30
	WN	213.2 \pm 64.1	85.4 \pm 3.1	97.43 \pm 0.88	67.52 \pm 22.56
Cu	SM	283.63 \pm 29.17	91.20 \pm 8.49	66.85 \pm 20.72	67.80 \pm 12.55
	PM	270.95 \pm 14.78	95.32 \pm 3.20	76.78 \pm 4.45	68.45 \pm 26.17
	WN	171.0 \pm 14.7	129.8 \pm 4.4	211.20 \pm 1.00	63.17 \pm 25.89
Co	SM	265.78 \pm 48.81	175.95 \pm 15.91	161.90 \pm 8.34	74.82 \pm 22.95
	PM	116.05 \pm 15.19	148.35 \pm 19.05	158.0 \pm 10.55	111 \pm 49.13
	WN	106.5 \pm 6.2	50.5 \pm 1.8	65.32 \pm 9.72	45.17 \pm 16.74
Ni	SM	154.81 \pm 10.12	45.30 \pm 4.24	47.45 \pm 3.04	24.56 \pm 7.87
	PM	162.08 \pm 35.00	189.75 \pm 24.55	168.30 \pm 4.00	84.98 \pm 16.58
	WN	142.5 \pm 9.0	41.8 \pm 0.5	50.39 \pm 1.97	33.31 \pm 11.80
Pb	SM	86.20 \pm 7.43	64.00 \pm 2.35	85.12 \pm 3.94	40.56 \pm 6.07
	PM	115.64 \pm 11.78	87.50 \pm 2.13	74.92 \pm 2.62	33.29 \pm 18.96
	WN	90.5 \pm 10.0	68.8 \pm 0.5	93.80 \pm 1.50	58.03 \pm 22.97
Cd	SM	28.55 \pm 1.61	17.92 \pm 7.46	16.47 \pm 5.16	2.82 \pm 1.36
	PM	39.13 \pm 8.54	45.90 \pm 0.40	35.55 \pm 3.05	30.93 \pm 9.41
	WN	25.7 \pm 4.3	15.0 \pm 0.4	39.05 \pm 3.45	20.33 \pm 8.60
Hg	SM	0.46 \pm 0.05	0.16 \pm 0.07	0.13 \pm 0.05	0.07 \pm 0.03
	PM	0.31 \pm 0.01	0.18 \pm 0.06	0.13 \pm 0.01	0.08 \pm 0.03
	WN	0.2 \pm 0.0	0.3 \pm 0.1	0.39 \pm 0.06	0.36 \pm 0.14

Table S4. Spatial and Seasonal Variation of Heavy Metals ($\mu\text{g}\cdot\text{g}^{-1}$) except Iron (Fe %) in the Mahanadi Estuarine and Coastal Sediments (Mean \pm Standard deviation) during 2012 (n = 14)

Heavy metals	Seasons	Atharabanki creek Mean \pm SD	Mahanadi River Mean \pm SD	Estuary Mean \pm SD	Coastal Mean \pm SD
Fe	SM	7.44 \pm 1.88	6.70 \pm 0.28	3.43 \pm 0.32	2.67 \pm 1.52
	PM	6.70 \pm 1.95	3.43 \pm 0.32	4.67 \pm 0.77	2.26 \pm 1.60
	WN	5.52 \pm 1.61	2.43 \pm 0.31	3.06 \pm 0.13	1.62 \pm 0.55
Mn	SM	1201 \pm 126	4137 \pm 192	1194 \pm 26.87	239 \pm 112
	PM	2472 \pm 453	1194 \pm 26.87	1715 \pm 712.76	1002 \pm 771.99
	WN	1363 \pm 895	873 \pm 2.12	887 \pm 2.83	469 \pm 66.12
Zn	SM	357.60 \pm 34.35	187.90 \pm 15.13	112.85 \pm 2.33	40.02 \pm 14.55
	PM	190.00 \pm 5.28	112.85 \pm 2.33	91.20 \pm 0.85	37.52 \pm 16.58
	WN	166.25 \pm 22.87	91.94 \pm 0.55	86.51 \pm 4.03	36.55 \pm 10.68
Cr	SM	264.28 \pm 11.95	180.45 \pm 77.99	166.80 \pm 64.35	173.87 \pm 24.84
	PM	170.70 \pm 9.82	166.80 \pm 64.35	179.80 \pm 36.06	167.25 \pm 5.30
	WN	149.75 \pm 13.53	117.80 \pm 7.78	143.75 \pm 12.09	114.88 \pm 14.90
Cu	SM	241.50 \pm 106.13	86.45 \pm 10.11	87.10 \pm 3.54	56.58 \pm 25.08
	PM	164.88 \pm 28.18	87.10 \pm 3.54	71.20 \pm 1.98	36.05 \pm 14.62
	WN	148.83 \pm 17.47	81.75 \pm 0.78	60.90 \pm 3.25	43.67 \pm 13.71
Co	SM	179.13 \pm 16.72	127.30 \pm 21.21	100.90 \pm 3.68	56.02 \pm 18.54
	PM	111.23 \pm 13.08	100.90 \pm 3.68	97.25 \pm 2.76	71.23 \pm 11.46
	WN	100.00 \pm 15.46	84.72 \pm 0.69	79.62 \pm 0.02	59.86 \pm 9.79
Ni	SM	168.80 \pm 8.03	137.90 \pm 4.81	103.60 \pm 5.66	53.58 \pm 10.88
	PM	141.93 \pm 31.66	103.60 \pm 5.66	96.25 \pm 19.73	63.67 \pm 4.32
	WN	131.73 \pm 29.17	88.50 \pm 0.28	90.75 \pm 6.86	47.16 \pm 16.35
Pb	SM	210.50 \pm 5.96	87.40 \pm 3.11	167.28 \pm 2.79	36.13 \pm 4.33
	PM	181.00 \pm 4.58	167.28 \pm 2.79	79.20 \pm 11.31	34.94 \pm 4.10
	WN	173.58 \pm 5.92	154.45 \pm 1.20	133.80 \pm 91.22	29.98 \pm 8.60
Cd	SM	22.01 \pm 1.09	10.25 \pm 1.35	9.85 \pm 0.35	2.94 \pm 0.41
	PM	12.27 \pm 0.97	9.85 \pm 0.35	11.45 \pm 0.92	2.59 \pm 1.30
	WN	10.76 \pm 1.33	8.61 \pm 0.01	9.56 \pm 0.95	2.31 \pm 1.50
Hg	SM	0.28 \pm 0.15	0.09 \pm 0.01	0.13 \pm 0.01	0.06 \pm 0.03
	PM	0.39 \pm 0.10	0.13 \pm 0.01	0.13 \pm 0.04	0.05 \pm 0.02
	WN	0.37 \pm 0.11	0.10 \pm 0.00	0.12 \pm 0.02	0.33 \pm 0.21

SM: Summer, PM: Post monsoon, WN: Winter.