Distribution of Trace metals in particulate matter in the Estuarine waters of Gowthami Godavari

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Abstract: Godavari is the third largest river on the east coast of India between the Latitudes 16^0 15' N and longitudes 81^0 45' E discharging large quantities of water in to the Bay of Bengal particularly during monsoon season. The author has therefore been taken up the present investigation to assess the spatial and seasonal distribution of particulate trace metals like Iron and Nickel in the estuarine waters of Gowthami Godavari.

Key words: Godavari Estuarine waters, particulate matter, trace metals, Flocculation.

Introduction

The river Godavari receiving the lot of chemicals from the industries located on its banks and also from the agricultural back run off and from the domestic sewage. All these materials are traveled from the head of the river and setting at the river mouth and dispersed into the sea during flood time of the river. Due to anthropogenic input, abnormal concentration of heavy metals in both dissolved and particulate phases result. The author has therefore under taken a systematic study of the distribution of particulate trace metals like Iron and Nickel along with hydrographical and nutrient parameters in the estuarine waters of the Gowthami Godavari.

For this purpose Gowthami-Godavari estuary is divided into 7 stations they are 1.Kotipalli, 2. Dangeru, 3. Yanam, 4. Vrudha Gowthami, 5. Balusutippa, 6. Mangrove forest area, 7. Mouth of the estuary.

Result and Discussion

Numerous studies on the distribution and behaviour of trace metals in various coastal and harbor water in different parts of the world has revealed that individual metals exhibit contrasting behaviour between areas. Factors which have been demonstrated to be important in controlling trace metal behaviour include flushing time.

Particulate Iron: The station-wise summery statistics on particulate Iron in the estuarine waters of the Gowthami-Godavari during the study period was given in table-1. The detailed seasonal dust.

Table 1: Station-wise summery statistics on particulate Iron in the estuarine waters of the Gowthami-Godavari

Station	Surface				Bottom			
	Min.	Max.	Mean	SD±	Min.	Max.	Mean	SD±
Kotipalli	540.50	4788.50	1944.08	1926.87	423.12	2892.25	1207.52	1135.55
Dangeru	282.25	3816.23	1594.79	1515.91	310.27	2058.26	907.69	788.76
Yanam	482.85	3816.23	1594.79	1515.91	310.27	2058.26	907.69	788.76
V.Gowthami	477.26	2265.23	1166.37	784.50	302.65	1987.68	835.01	779.71
Balusutippa	389.25	2823.12	1236.67	1088.73	202.15	1635.29	709.57	639.42
Mangrove area	361.75	2777.27	1199.46	1084.42	200.65	598.85	368.83	186.92
Bhairava palem	343.25	2013.32	915.52	757.60	186.68	1135.26	504.68	430.22

Particulate iron concentrations in the surface waters were in the range of 343.25 to 4788.80 µg/gr with an average of 1442.26 µg/gr where as in the bottom waters, its concentrations ranged from 186.68 to 2892.30 µg/gr with an average of 843.91 µg/gr. Higher concentrations of iron were observed during monsoon season is due to the combined effect of land and river run off along with anthropogenic inputs of Iron. Rain water dissolves more iron from the rocks of earth surface, which contributed more particulate/dissolved iron to the river water. Seasonal variations of iron were also reported by Fang and lin (2002) in the Tanshui estuary in North Taiwan. Raju etal (2013) in the waters of cauvery river basin.

Particulate Nickel:

The station wise summary statistics on particulate Nickel in the estuarine waters of the Gowthami Godavari during the study period were given into table below. The detailed seasonal distribution at seven individual stations are shown in fig. The particulate Nickel concentration in the surface waters were in the range of 3.78 to 34.65 µg/gr with an average of 16.70 µg/gr. Where as in the bottom waters, its concentration ranged from 2.10 to 23.68 µg/gr. With an average of 10.01 µg/gr.

Table 2: The station wise summary statistics on particulate Nickel in the estuarine waters of the Gowthami Godavari

Station	Surface				Bottom			
	Min.	Max.	Mean	SDI	Min.	Max.	Mean	SDI
Kotipalli	12.96	34.65	21.89	9.34	7.96	23.65	13.86	7.01
Dangeru	11.98	33.12	20.85	9.16	7.10	22.79	13.15	6.86
Yanam	9.67	30.15	18.89	8.79	6.35	21.02	11.32	6.66
V.Gowthami	7.25	27.65	16.53	8.55	4.93	19.63	10.12	6.65
Balusutippa	5.38	26.34	14.70	8.86	3.65	17.54	8.38	6.31
Mangrove area	4.15	24.98	13.18	8.89	2.45	15.35	6.86	5.81
Bhairava palem	3.78	12.42	10.90	6.11	3.10	14.63	6.58	5.43

Nickel occurs principally as N_1^{+2} in surface sea waters but oxidation states ranging from N_1^{+1} to N_1^{+4} have been reported from time to time. Under aerobic condition and $P^H<9$, Nickel complexes with hydroxides, Carbonates sulphates and naturally occurring organic ligands. This has been observed both in fresh waters of estuarine waters. Above P^H9 the hydroxide and carbonate complexes preapitate. Seasonally higher concentrations of particulate Nickel were observed due to combined effect of land and river run off along with domestic and industrial effluents are more during this season. Similar variation of Nickel ere also reported by Fang and Lin(2002) in the Tanshui estuary in Northern Talwan zhouetal (2003)

Conclusion: Higher concentrations of all these metals during monsoon season due to the river and land runoff along with domestic and agricultural industrial effluents are more during this season.

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Preferences

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