

## MAJOR AND TRACE ELEMENTS DISTRIBUTION IN SEDIMENTS OF A SOUTHEASTERN BRAZILIAN COASTAL ENVIRONMENTS

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### Introduction

Piraquê-Açú and Piraquê-Mirim Estuarine System (PAPMES) and adjacent continental shelf are influenced by land-use of this region (Costa et al., 2016). Industrialization, urbanization, petroleum exploration, charcoal production and silviculture of eucalyptus are examples of anthropogenic activities that promotes a pressure on the environment. It is expected to find great concentrations of trace metals and semimetal nearby these activities. In addition, due to high carbonate content of the sediments in this region, the studied elements could be enriched compared to other coastal environments.

### Methods

Surficial sediments were collected in 43 stations covering the PAPMES and adjacent continental shelf. Organic matter percentage, calcium carbonate and trace metals were analyzed in all samples by combustion, HCl digestion and HNO<sub>3</sub> microwave digestion according EPA 3051A followed by ICP-MS analysis, respectively.

### Results

Organic matter and calcium carbonate content in all samples ranged from 0.98 to 27.62 % and from 0.55 to 48.34 %, respectively. Relatively high values of these parameters were found in the continental shelf mainly because the presence of marine bioclastic grains associated with calcareous algae (Dias, 2000). Major and trace elements showed a concentration order as follows in all stations: Fe>Al>Mg>Sr>Mn>V>As>Cr>Zn>Ba>Pb>Ni>Cu.

PAPMES showed a greater concentration of Al, Cr, Fe, Ba and Pb when compared to continental shelf. This showed greater levels of Mg, V, Mn, Ni, Cu, As and Sr. As was the only element that showed sediments quality values above those stipulated by NOAA (National Oceanic and Atmospheric Administration) and Brazilian National Environment Counsel (CONAMA) as possibly harmful to biota. This high As values are possibly associated to calcareous algae detritus which could co-precipitate with Ca and Mg carbonates on the structure formation of this algae (Mirlean et al., 2001).

**Table 1.** Range (minimum and maximum) and mean values for major and trace elements in PAMPES and continental shelf adjacent.

Element		Piraquê-Acú River	Piraquê-Mirim	Continental
Mg	Range	0.20 – 7.40	1.2 – 4.3	1.60 – 13.80
	Mean	4.20	3.2	6.60
Al	Range	2.40 – 23.30	4.5 – 7.3	1.10 – 26.20
	Mean	12.00	6.2	10.60
V	Range	5.52 – 47.45	12.40 – 20.25	23.71 – 133.45
	Mean	26.23	16.33	70.40
Cr	Range	3.00 – 159.02	7.89 – 14.38	6.66 – 66.05
	Mean	80.77	11.17	32.16
Mn	Range	17.23 – 638.17	17.25 – 170.94	160.89 –
	Mean	333.69	113.68	586.94
Fe	Range	5.5 – 82.6	6.00 – 18.60	9.70 – 56.50
	Mean	31.9	14.30	30.60
Ni	Range	0.09 – 8.73	0.32 – 1.67	0.63 – 14.52
	Mean	3.81	0.94	7.46
Cu	Range	0.51 – 10.00	0.51 – 0.86	0.51 – 35.22
	Mean	3.42	0.63	5.28
Zn	Range	3.27 – 33.28	3.97 – 8.07	2.87 – 75.54
	Mean	15.3	5.86	25.06
As	Range	0.23 – 13.77	2.70 – 18.88	5.28 – 185.91
	Mean	6.87	13.34	58.12
Sr	Range	1.31 – 669.54	12.17 – 349.75	36.59 – 4100.42
	Mean	209.39	126.58	706.30
Ba	Range	3.36 – 49,90	0.62 – 16.40	1.84-83.84
	Mean	21.76	6.62	19.15
Pb	Range	0.10 – 28.69	0.21 – 2.94	2.77 – 19.39
	Mean	14.51	1.36	9.95

- Al, Fe and Mg concentrations are expressed in mg/g.
- As, Ba, Cr, Cu, Mn, Ni, Pb, Sr, V, Zn concentrations are expressed in µg/g.

## Conclusion

The concentrations of the elements are not influenced by anthropogenic activities (e.g. Industrialization, urbanization, petroleum exploration, charcoal production and silviculture of eucalyptus). Arsenic was the only element that showed a concentration higher than that stipulated by NOAA and CONAMA but those values possibly have natural occurrence associated with calcareous algae detritus.

## References

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