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Heavy metals and organic carbon contents of Kuala Ibai river  
estuarine sediments / Sharifah Nur Faizah Syed Nooh.

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HEAVY METALS AND ORGANIC CARBON CONTENTS OF KUALA IBAI RIVER  
ESTUARINE SEDIMENTS

By

SHARIFAH NUR FAIZAH BINTI SYED NOOH

Research report submitted in partial fulfillment of the requirement of degree of Bachelor  
of Science (Marine Science)

FACULTY OF MARITIME AND MARINE SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU  
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**DEDICATED TO:**

**MY DEAREST FATHER, MOTHER AND FAMILY  
THANKS FOR YOUR SUPPORT AND ENCOURAGEMENT**



**DEPARTMENT OF MARINE SCIENCE  
FACULTY OF MARITIME AND MARINE SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU**

**APPROVAL AND CERTIFICATION FORM  
RESEARCH PROJECT I AND II**

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## TABLE OF CONTENTS

<b>CONTENTS</b>	<b>PAGE</b>
ACKNOWLEDGEMENT	ii
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	xii
LIST OF APPENDICES	xiv
ABSTRAK	xv
ABSTRACT	xvi
<b>CHAPTER 1 INTRODUCTION</b>	
1.0 Introduction	1
1.1 Objective	3
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Previous Study	4
2.2 Background of Heavy Metals Research	5
2.3 Inputs of Heavy Metals	6
2.4 Distribution of Heavy Metals	7
2.5 Physical Parameters	8
2.6 Organic Carbon	9
2.7 The Relationship between the Concentrations of Heavy Metals with Organic Carbon Contents and also with Particle Size	9
2.8 Features of Individual Elements	
2.8.1 Aluminum (Al)	10



2.8.2 Cadmium (Cd)	10
2.8.3 Chromium (Cr)	11
2.8.4 Copper (Cu)	11
2.8.5 Ferum (Fe)	11
2.8.6 Manganese (Mn)	11
2.8.7 Nickel (Ni)	12
2.8.8 Zinc (Zn)	12
2.9 Mineralogical Analysis	12
2.9.1 Scanning Electron Microscope	13

## **CHAPTER 3 METHODOLOGY**

3.1 Research Location	14
3.2 Apparatus and Sampling Equipment Preparation	14
3.3 Sampling Sediment of Kuala Ibai	17
3.4 Physical Parameter Measurement	17
3.5 Sample Preparation	17
3.6 Total Digestion	18
3.6.1 Procedure for Digestion	18
3.6.2 Calculation of Heavy Metals Concentration	19
3.6.3 Determination of Heavy Metals Content in Sediments	19
3.6.4 Accuracy Test Analysis (Recovery Test)	20
3.7 Organic Carbon Analysis	
3.7.1 Sample Preparation	20
3.7.2 Determination of Organic Carbon Content	20
3.7.3 Analysis Method	21

3.7.4 Calculation of Organic Carbon Contents in Sediment	22
3.7.5 Accuracy Test Analysis	22
3.8 Sediment Size Analysis	
3.8.1 Dry Sieving Method	23
3.8.2 Particle Size Analysis	23
3.8.3 Calculation of Sedimentological Parameters	25
3.9 Procedure for Scanning Electron Microscope (SEM)	28
3.10 Normalization of metals to Al and their comparisons to the earth's crust values	29

## **CHAPTER 4 RESULTS**

4.1 Physical parameters	
4.1.1 pH	30
4.1.2 Salinity	31
4.1.3 Temperature	32
4.2 Particle Size Analysis	
4.2.1 Dry Sieve Method	33
4.2.2 Laser Diffraction Method	38
4.3 Percentage of Organic Carbon	39
4.4 Scanning Electron Microscope (SEM)	40
4.5 Heavy Metals Content	
4.5.1 Analysis of Recovery Rates for Metals and Organic Carbon	46
4.5.2 Concentrations of Heavy Metals	47

<b>CHAPTER 5 DISCUSSION</b>	
5.1 Scanning Electron Microscope (SEM)	57
5.2 Percentage of Organic Carbon	58
5.2.1 Relation of Heavy Metals with Percentage of Organic Carbon	58
5.3 Sediment Particle Size and Texture	67
5.3.1 Relation of Heavy Metals with Mean Particle Size	67
5.3.2 Relation of Organic Carbon Percentage with Mean Particle Size	76
5.4 Normalization	77
5.5 Heavy Metals Concentrations in Sediments	84
<b>CHAPTER 6 CONCLUSION</b>	87
<b>REFERENCES</b>	88
<b>APPENDICES</b>	92
<b>CURICULUM VITAE</b>	98

## LIST OF TABLES

<b>TABLE</b>		<b>PAGE</b>
<b>3.1</b>	The coordinates of sampling site in Kuala Ibai Estuary.	16
<b>3.2</b>	Particle sizes classification from U.S. Department System.	24
<b>4.1</b>	The value of the sedimentological characteristics during both seasons.	33
<b>4.2</b>	Value of mean particle size, percentage of sand, silt and clay and the type of sediment during the pre monsoon.	38
<b>4.3</b>	Value of mean particle size, percentage of sand, silt and clay and the type of sediment during the monsoon season.	38
<b>4.4</b>	The value of recovery test of the standard sample (NBS 1646a) and recoveries for total organic carbon analyses.	47
<b>4.5</b>	The concentration value for heavy metals detected in the study area during the pre monsoon.	48
<b>4.6</b>	The concentration value for heavy metals detected in the study area during the monsoon season.	48

## LIST OF FIGURES

FIGURE	PAGE	
3.1	General map of Terengganu.	15
3.2	Sampling stations in the study area.	16
4.1	The value pH at each station during both seasons.	30
4.2	The value of salinity (‰) at each station during both seasons.	31
4.3	The value of temperature (°C) at each station during both seasons.	32
4.4	Graph showing mean size for each station during both seasons.	34
4.5	Graph showing sorting value for each station during both seasons.	35
4.6	Graph showing skewness value for each station during both seasons.	36
4.7	Graph showing kurtosis value for each station during both seasons.	37
4.8	Graph showing the mean particle size ( $\phi$ ) of sediment collected in each station during both seasons.	39
4.9	Graph showing the percentage of organic carbon in sediment in the study area.	40
4.10	Graph showing the percentage of element in the study area during both seasons (Station 1)	41
4.11	Graph showing the percentage of element in the study area during both seasons (Station 2).	42
4.12	Graph showing the percentage of element in the study area during both seasons (Station 3).	42
4.13	Graph showing the percentage of element in the study area during both seasons (Station 4).	43
4.14	Graph showing the percentage of element in the study area during both seasons (Station 5).	43

<b>4.15</b>	Graph showing the percentage of element in the study area during both seasons (Station 6).	44
<b>4.16</b>	Graph showing the percentage of element in the study area during both seasons (Station 7).	44
<b>4.17</b>	Graph showing the percentage of element in the study area during both seasons (Station 8).	45
<b>4.18</b>	Graph showing the percentage of element in the study area during both seasons (Station 9).	45
<b>4.19</b>	Graph showing the percentage of element in the study area during both seasons (Station 10).	46
<b>4.20</b>	The concentration of Al (%) during the pre and monsoon season.	49
<b>4.21</b>	The concentration of Cd ( $\mu\text{g/g}$ ) during the pre and monsoon season.	50
<b>4.22</b>	The concentration of Cr ( $\mu\text{g/g}$ ) during the pre and monsoon season.	51
<b>4.23</b>	The concentration of Cu ( $\mu\text{g/g}$ ) during pre and during monsoon season.	52
<b>4.24</b>	The concentration of Fe (%) during the pre and monsoon season.	53
<b>4.25</b>	The concentration of Mn ( $\mu\text{g/g}$ ) during the pre and monsoon season.	54
<b>4.26</b>	The concentration of Ni ( $\mu\text{g/g}$ ) during the pre and monsoon season.	55
<b>4.27</b>	The concentration of Zn ( $\mu\text{g/g}$ ) during the pre and monsoon season.	56
<b>5.1</b>	Al concentration (%) with organic carbon (%) during pre monsoon.	59
<b>5.2</b>	Al concentration (%) with organic carbon (%) during monsoon.	59
<b>5.3</b>	Cd concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during pre monsoon.	60
<b>5.4</b>	Cd concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during monsoon.	60
<b>5.5</b>	Cr concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during pre monsoon.	61
<b>5.6</b>	Cr concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during monsoon.	61
<b>5.7</b>	Cu concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during pre monsoon.	62

<b>5.8</b>	Cu concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during monsoon.	62
<b>5.9</b>	Fe concentration (%) with organic carbon (%) during pre monsoon.	63
<b>5.10</b>	Fe concentration (%) with organic carbon (%) during monsoon.	63
<b>5.11</b>	Mn concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during pre monsoon.	64
<b>5.12</b>	Mn concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during monsoon.	64
<b>5.13</b>	Ni concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during pre monsoon.	65
<b>5.14</b>	Ni concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during monsoon.	65
<b>5.15</b>	Zn concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during pre monsoon.	66
<b>5.16</b>	Zn concentration ( $\mu\text{g/g}$ ) with organic carbon (%) during monsoon.	66
<b>5.17</b>	Concentration of Al (%) in relation to mean size ( $\emptyset$ ) during pre monsoon.	68
<b>5.18</b>	Concentration of Al (%) in relation to mean size ( $\emptyset$ ) during monsoon.	68
<b>5.19</b>	Concentration of Cd ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during pre monsoon.	69
<b>5.20</b>	Concentration of Cd ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during monsoon.	69
<b>5.21</b>	Concentration of Cr ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during pre monsoon.	70
<b>5.22</b>	Concentration of Cr ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during monsoon.	70
<b>5.23</b>	Concentration of Cu ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during pre monsoon.	71
<b>5.24</b>	Concentration of Cu ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during monsoon.	71
<b>5.25</b>	Concentration of Fe (%) in relation to mean size ( $\emptyset$ ) during pre monsoon.	72
<b>5.26</b>	Concentration of Fe (%) in relation to mean size ( $\emptyset$ ) during monsoon.	72
<b>5.27</b>	Concentration of Mn ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during pre monsoon.	73
<b>5.28</b>	Concentration of Mn ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during monsoon.	73

<b>5.29</b>	Concentration of Ni ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during pre monsoon.	74
<b>5.30</b>	Concentration of Ni ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during monsoon.	74
<b>5.31</b>	Concentration of Zn ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during pre monsoon.	75
<b>5.32</b>	Concentration of Zn ( $\mu\text{g/g}$ ) in relation to mean size ( $\emptyset$ ) during monsoon.	75
<b>5.33</b>	Total organic carbon in relation with mean size during pre monsoon.	76
<b>5.34</b>	Total organic carbon in relation with mean size during monsoon season.	76
<b>5.35</b>	Graph of Cd ( $\mu\text{g/g}$ ) during the pre monsoon.	78
<b>5.36</b>	Graph of Cd ( $\mu\text{g/g}$ ) during monsoon season.	79
<b>5.37</b>	Graph of Cr ( $\mu\text{g/g}$ ) during the pre monsoon.	79
<b>5.38</b>	Graph of Cr ( $\mu\text{g/g}$ ) during monsoon season.	80
<b>5.39</b>	Graph of Cu ( $\mu\text{g/g}$ ) during the pre monsoon.	80
<b>5.40</b>	Graph of Cu ( $\mu\text{g/g}$ ) during monsoon season.	81
<b>5.41</b>	Graph of Mn ( $\mu\text{g/g}$ ) during the pre monsoon.	81
<b>5.42</b>	Graph of Mn ( $\mu\text{g/g}$ ) during monsoon season.	82
<b>5.43</b>	Graph of Ni ( $\mu\text{g/g}$ ) during the pre monsoon	82
<b>5.44</b>	Graph of Ni ( $\mu\text{g/g}$ ) during monsoon season.	83
<b>5.45</b>	Graph of Zn ( $\mu\text{g/g}$ ) during the pre monsoon.	83
<b>5.46</b>	Graph of Zn ( $\mu\text{g/g}$ ) during monsoon season.	84



## LIST OF ABBREVIATIONS

AAS	-	Atomic Absorption Spectrometry
Ag	-	Argentum
Al	-	Aluminum
As	-	Arsenic
$C_6H_5.2H_2O$	-	Diphynelamina
C	-	Carbon
Cd	-	Cadmium
Cl	-	Chlorine
Cr	-	Chromium
Cu	-	Copper
DM	-	During-monsoon
Fe	-	Ferum
$FeSO_4$	-	Ferum sulphate
HCl	-	Hydrochloric acid
HF	-	Hydrofluoric acid
$HNO_3$	-	Nitric acid
$H_2O_2$	-	Hydrogen peroxide
$HSO_4$	-	Sulphuric acid
In	-	Indium
K	-	Potassium
$K_2Cr_4O_2$	-	Potassium dichromate
Mg	-	Magnesium
Mn	-	Manganese
Mo	-	Molybdenum

Na	-	Sodium
Na(PO <sub>3</sub> ) <sub>6</sub>	-	Sodium heksametaphosphate
Ni	-	Nickel
P	-	Phosphorus
PM	-	Pre-monsoon
Rb	-	Rubidium
Se	-	Selenium
SEM	-	Scanning Electron Microscope
Si	-	Silica
SRM	-	Standard Reference Material
Ti	-	Titanium
TOC	-	Total Organic Carbon
V	-	Vanadium
Zn	-	Zinc

## LIST OF APPENDICES

APPENDIX		PAGE
1	Apparatus and Chemicals Needed in the Study.	92
2	Summary of Analysis Technique.	93
3	Worksheet for sediment dry sieving.	94
4	Sedimentological characteristics.	95
5	Wenworth sediment grain size classification grade.	96
6	Metal concentration in the earth's crust.	97

## ABSTRACT

Study of heavy metals and organic carbon contents of sediment had been done at Kuala Ibai River. Two times sampling has been doing on pre monsoon and during monsoon season. The sediments were analyzed for their sedimentological characteristics (mean size, sorting, skewness and kurtosis), using dry sieve method and laser diffraction techniques. The percentage of organic carbon was used 'dichromate acid oxidation' method and detection the concentration of heavy metals are using an Atomic Absorption Spectrophotometer (AAS). Element of heavy metals studied in this project are Al, Cu, Mn, Fe, Ni, Cr, Zn and Cd. The mean concentration during the pre and during the monsoon season respectively, **Al** are range from 1.506 and 1.257%, **Cd** range from 0.72 and 0.35 $\mu\text{g/g}$ , **Cr** range from 43.95 and 34.50  $\mu\text{g/g}$ , **Cu** range from 3.76 and 1.24 $\mu\text{g/g}$ , **Fe** range from 0.847 and 0.823%, **Mn** range from 160.1 and 161.05 $\mu\text{g/g}$ , **Ni** range from 19.28 and 13.83 $\mu\text{g/g}$ , **Zn** range from 21.58 and 15.11 $\mu\text{g/g}$ . Most of the concentrations of heavy metals are low during the monsoon season compare to during the pre monsoon due to the water inflow results from the raining season. Generally, Kuala Ibai estuarine river are not polluted by the anthropogenic activities because the concentration of heavy metals at the study area are low compare to the concentration of heavy metals in the earth's crust.

## ABSTRAK

Kajian bagi kepekatan logam berat dan jumlah organik karbon di dalam tanah telah dijalankan di sungai Kuala Ibai. Aktiviti penyampelan telah dilakukan sebanyak dua kali iaitu pada sebelum monsun dan semasa monsun. Sampel dianalisis untuk mengkaji ciri-ciri sedimen (saiz min, pengisihan, kepencongan dan kurtosis) menggunakan kaedah ayak kering dan teknik laser. Peratusan organik karbon menggunakan kaedah 'dichromate acid oxidation' dan kepekatan logam berat dikesan menggunakan AAS. Antara elemen logam berat yang dikaji ialah Al, Cd, Cr, Cu, Fe, Mn, Ni dan Zn. Min kepekatan bagi setiap logam berat sebelum dan semasa monsun bagi Al ialah daripada 1.506 dan 1.257%, Cd daripada 0.72 dan 0.35 $\mu\text{g/g}$ , Cr daripada 43.95 dan 34.50  $\mu\text{g/g}$ , Cu daripada 3.76 dan 1.24 $\mu\text{g/g}$ , Fe daripada 0.847 dan 0.823%, Mn daripada 160.1 dan 161.05 $\mu\text{g/g}$ , Ni daripada 19.28 dan 13.83 $\mu\text{g/g}$ , dan Zn daripada 21.58 $\mu\text{g/g}$  dan 15.11 $\mu\text{g/g}$ . Kebanyakan kepekatan logam berat adalah rendah semasa monsun berbanding dengan sebelum monsun. Ini disebabkan kemasukan air tawar ke kawasan muara pada musim hujan. Secara amnya, muara Kuala Ibai tidak dicemari oleh aktiviti manusia kerana kepekatan logam berat di kawasan kajian adalah rendah berbanding dengan kepekatan logam berat di dalam kerak bumi.