

GEOCHEMICAL STUDY ON MARINE
SURFICIAL SEDIMENTS ALONG THE EAST
COAST OF PENINSULAR MALAYSIA

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**GEOCHEMICAL STUDY ON MARINE SURFICIAL SEDIMENTS ALONG
THE EAST COAST OF PENINSULAR MALAYSIA**

**By
Darshinee Nadarajan**

**Research Report submitted in partial fulfillment of
the requirements for the degree of
Bachelor of Science (Marine Science)**

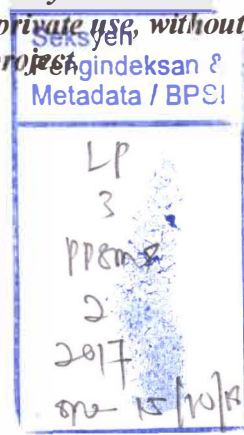
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FINAL YEAR PROJECT REPORT VERIFICATION
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It is hereby declared and verified that this project report titled **Geochemical Study on Marine Surficial Sediments along the East Coast of Peninsular Malaysia** by **Darshinee Nadarajan, UK33623** have been examined and all errors identified have been corrected. This report is submitted to the School of Marine and Environmental Sciences as partial fulfillment towards obtaining the **Bachelor of Science (Marine Science)** from School of Marine and Environmental Sciences, Universiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this dissertation, **Geochemical Study on Marine Surficial Sediments along the East Coast of Peninsular Malaysia** is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at UMT or other institutions. This report is submitted to the School of Marine and Environmental Sciences as partial fulfillment towards obtaining the **Bachelor of Science (Marine Science)** from School of Marine and Environmental Sciences, Universiti Malaysia Terengganu.

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LIST OF ABBREVIATIONS

%	-	Percent
°C	-	Degree Celcius
µm	-	Micrometre
g	-	Gram
km	-	Kilometre
L	-	Litre
m	-	Metre
mg	-	Milligram
mL	-	Milli-litre
ppm	-	Part per million
ms ⁻¹		Metre per second
m ³ /s		Metre cube per second
mm		Millimetre
Ø		Phi
Cu		Copper
Zn		Zinc
Pb		Lead
Cd		Cadmium

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ABSTRACT

Twenty-four marine surficial sediment samples were collected along the east coast of Peninsular Malaysia, in southern South China Sea during the *Ekspedisi Pelayaran Saintifik Kebangsaan (EPSK)* 2016 in August 2016. The sediments were analyzed for heavy metals, Cu, Zn, Pb and Cd contents to determine the areal distribution of the metals along the east coast of Peninsular Malaysia and to associate the relationship between heavy metal concentration in surficial sediment and the grain size of the sediment. The contents of studied metals were measured from the 63 μ m fraction of the dried sediments and analyzed using an Inductively Coupled Plasma Optical Emission Spectrometry after the closed acid digestion process. Results showed that the ranges of heavy metals concentration in the sediments are as follows: 2.127 μ g/g dry weight to 38.7 μ g/g dry weight (Cu), 11.9 μ g/g dry weight to 100 μ g/g dry weight (Zn), 12.99 μ g/g dry weight to 33.9 μ g/g dry weight (Pb) and 0.03 μ g/g dry weight to 0.20 μ g/g dry weight. The current pollution status in marine surficial sediment along the East Coast of Peninsular Malaysia was illustrated by using Pollution Load Index (PLI) and Geoaccumulation Index (I_{geo}) to identify whether the concentration observed represent background or contaminated levels. All metals studied found to have low I_{geo} values while the overall PLI of the study area is stated to be unpolluted. As an overall, the geochemistry of surficial sediments along the east coast of Peninsular Malaysia were influenced by both natural and anthropogenic sources. However, the heavy metals concentration can be considered to be presented slightly above the natural background levels in the marine surficial sediments

KAJIAN GEOKIMIA DALAM SEDIMEN PERMUKAAN MARIN DI SEPANJANG PANTAI TIMUR SEMENANJUNG MALAYSIA

ABSTRAK

Dua puluh empat sampel sedimen permukaan laut telah dikumpulkan dari sepanjang pantai timur Semenanjung Malaysia, di selatan Laut China Selatan ketika Ekspedisi Pelayaran Saintifik Kebangsaan (EPSK) 2016 pada bulan Ogos 2016. Sampel sedimen tersebut telah dianalisis untuk kandungan logam berat, Cu, Zn, Pb dan Cd bagi menentukan taburan luas logam berat di sepanjang pantai timur Semenanjung Malaysia serta untuk mengaitkan hubungan antara kepekatan logam berat yang dikaji dalam sedimen permukaan marin dan saiz butiran sedimen marin. Kandungan logam berat yang dikaji telah diukur daripada bahagian $63\mu\text{m}$ daripada sedimen kering dan dianalisis menggunakan *Inductively Coupled Plasma Optical Emission Spectrometry* selepas proses asid pencernaan tertutup. Hasil kajian menunjukkan bahawa julat kepekatan logam berat yang dikaji dalam sedimen permukaan marin adalah seperti berikut: $2.127\mu\text{g/g}$ berat kering hingga $38.7\mu\text{g/g}$ berat kering (Cu), $11.9\mu\text{g/g}$ berat kering hingga $100\mu\text{g/g}$ berat kering (Zn), $12.99\mu\text{g/g}$ berat kering hingga $33.9\mu\text{g/g}$ berat kering (Pb) dan $0.03\mu\text{g/g}$ berat kering hingga $0.20\mu\text{g/g}$ berat kering. Status pencemaran semasa dalam sedimen surficial marin di sepanjang Pantai Timur Semenanjung Malaysia telah digambarkan dengan menggunakan *Pollution Load Index* (PLI) dan *Geoaccumulation Index* (I_{geo}) untuk mengenal pasti sama ada kepekatan yang diperhatikan mewakili nilai latar belakang atau nilai tahap tercemar. Semua logam berat yang dikaji didapati mempunyai nilai I_{geo} yang rendah manakala keseluruhan nilai PLI di kawasan kajian yang dinyatakannya tidak tercemar. Secara keseluruhannya, sedimen geokimia permukaan marin sepanjang pantai timur Semenanjung Malaysia telah dipengaruhi oleh kedua-dua sumber semula jadi dan antropogenik. Walau bagaimanapun, nilai kepekatan logam berat yang dikaji boleh dibentangkan sedikit tinggi dari nilai latar belakang semulajadi dalam sedimen permukaan marin.