

SEDIMENTOLOGI DAN AKRESI BAHASA
MANGROVE SETIAU TERBUKA

MUR NEANTY HANON

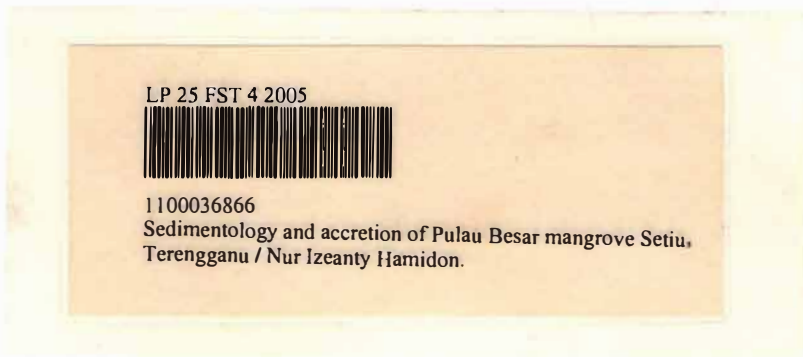
FAKULTAS SAINS DAN TEKNOLOGI
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
2005

12105

Perustakaan

Kolej Universiti Sains Dan Teknologi Malaysia (KUSTEM)

1100036866



PERPUSTAKAAN
KOLEJ UNIVERSITI SAINS & TEKNOLOGI MALAYSIA
21030 KUALA TERENGGANU

1100036866

1100036866		

Lihat sebelah

HAK MILIK
PERPUSTAKAAN KUSTEM

SEDIMENTOLOGY AND ACCRETION RATE OF PULAU BESAR
MANGROVE, SETIU, TERENGGANU

By

Nur Izeanty Hamidon

Research Report submitted in partial fulfillment of
the requirements for the degree of
Bachelor of Applied Science (Biodiversity Conservation and Management)

Department of Biological Sciences
Faculty of Science and Technology
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
2005

This project should be cited as:

Nur-Izeanty, H. 2005. Sedimentology and accretion rate of Pulau Besar mangrove, Setiu, Terengganu. Undergraduate thesis, Bachelor of Applied Science in Biodiversity Conservation and Management, Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia, Terengganu. 107p.

No part of this project report may be produced by any mechanical, photographic, or electronic process, or in the form of phonographic recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from author and the supervisor(s) of the project.



**JABATAN SAINS BIOLOGI
FAKULTI SAINS DAN TEKNOLOGI
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA**

**PENGAUKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **SEDIMENTOLOGY AND ACCRETION RATE OF PULAU BESAR MANGROVES, SETIU, TERENGGANU** oleh **NUR IZEANTY HAMIDON**, no. matrik: **UK 6982** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh ijazah **SAINS GUNAAN (PEMULIHARAAN DAN PENGURUSAN BIODIVERSITI)**, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

Disahkan oleh:

Penyelia Utama **PROF. DR. MOHD LOKMAN HUSAIN**
Pegawai
Nama: **Institut Oseanografi**
Kolej Universiti Sains dan Teknologi Malaysia
Cop Rasmi **21030 Kuala Terengganu, Terengganu.**

Tarikh: **20.4.2005**

Penyelia Kedua (jika ada)
Nama: **PROF. MADYA SULONG BIN IBRAHIM**
Fellow
Cop Rasmi **Institut Oseanografi**
Kolej Universiti Sains dan Teknologi Malaysia
Mengabang Telipot
21030 Kuala Terengganu.

Tarikh: **26/04/05**

Ketua Jabatan Sains Biologi

Nama:

Cop Rasmi:

PROF. MADYA DR. NAKISAH BT. MAT
Ketua
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Kolej Universiti Sains dan Teknologi
(KUSTEM)
21030 Kuala Terengganu.

Tarikh: **19/04/05**

ACKNOWLEDGEMENTS

First of all, I would like to express my gratitude to my first supervisor Professor Dr. Mohd Lokman Husain for his support in guiding me through my thesis. I am also grateful to my second supervisor Mr. Kasawani Ibrahim.

The help of various staff and students at INOS (Institute of Oceanography) are gratefully acknowledged, including Mr. Nasir, Mr. Fathy, Mr. Habir and Karhigeyan.

To members of my housemate, I wish to extend my sincere gratitude: Miss Nurhanis, Imi, Siti Mariam, Noraziah, Zalila and Hartini. I also would like to acknowledge my sediment group member's Mohd Hilmi, Nur Saifullah and again to Miss Nurhanis. I would also like to express my gratefulness and deep appreciation to Nasrul Hadi.

I am should especially dedicating like to deserve my gratitude to my parents, Mr. Hamidon Hj Urip and Mrs. Junainah Md. Rawi, to whom this thesis is dedicated. Without their love, support and encouragement, the thesis would never have been finished.

Last but not least my gratitude to all others who have directly or indirectly helped and encouraged me.

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENTS	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS / SYMBOLS	xi
LIST OF APPENDICES	x
ABSTRACT	xii
ABSTRAK	xiii
CHAPTER 1 INTRODUCTION AND OBJECTIVES	
1.1 Introduction	1
1.2 General objectives	3
1.2.1 Specific objectives	3
CHAPTER 2 LITERATURE RIVIEW	
2.1 Mangrove special characteristic	4
2.2 Mangroves root's vegetation	5
2.3 Function of mangroves	
2.3.1 As a shore line resource	6
2.3.1 Water transport resource	7

2.3.3	Mangroves as a sediment sink	7
2.3.1a	Mangroves as a carbon source	8
2.3.1b	Mangroves – A heavy metal sink	9
2.4	Commercial values from mangroves	
2.4.1	Wood products	10
2.4.2	Fisheries	11
2.5	Destruction and their losses	12
CHAPTER 3 METHODOLOGY		
3.1	Study area	14
3.2	Transect lines	18
3.2.1	Study area profile	23
3.2.2	Surface sediment collection	28
3.2.3	Accretion rate	28
3.3	Sampling preparation	
3.3.2	Dry sieving	31
3.3.2	Moment method	
3.2.2a	Mean ($X\bar{\theta}$)	34
3.2.2b	Sorting ($Sd\bar{\theta}$)	35
3.2.2c	Skewness (Sk)	35
3.3.2d	Kurtosis ($K\bar{\theta}$)	36
CHAPTER 4 RESULTS		
4.1	Mean ($X\bar{\theta}$)	37
4.2	Sorting ($Sd\bar{\theta}$)	42

4.3	Skewness (Sk)	45
4.4	Kurtosis ($K\emptyset$)	48
4.5	Accretion rate	51
CHAPTER 5 DISCUSSION		56
CHAPTER 6 CONCLUSION		67
REFERENCES		70
APPENDICES		72
CURRICULUM VITAE		107

LIST OF TABLES

	PAGE
3.2 GPS readings at first station each transect	18
4.4a The percentage of accretion rate at Pulau Besar along 6 month sampling	51
4.5 Accretion rate depends on temporal before and monsoon season	52

LIST OF FIGURES

	PAGE	
3.1a	Location of Setiu Wetland	16
3.1b	Study area during low tide	17
3.1c	Study area during high tide	17
3.2a	Transect line	19
3.2b	Field site	20
3.2c	Sampling site at the front area	21
3.2d	Sampling site at the middle area	22
4.2a	Contour at Pulau Besar for TR 1	24
4.2b	Profile at Pulau Besar for TR 1	25
4.2c	Contour at Pulau Besar for TR 2 and TR 3	26
4.2d	Profile at Pulau Besar for TR 2 and TR 3	27
3.2.2	Surface sediment collected	29
3.2.3a	Accretion plate or perspex	29
3.2.3b	The plate was buried	30
3.2.3c	Data of accretion rate collected	30
3.3.1a	Samples are air dried	32
3.3.1b	Balance for weighed samples	33
3.3.1c	Sieve shaker	33
4.1a	Percentage of mean grain size for TR 1	39

4.1b	Percentage of mean grain size for TR 2	40
4.1c	Percentage of mean size for TR 3	41
4.2a	Percentage of sorting types for both sampling periods for TR 1	43
4.2b	Percentage of sorting types for both sampling period for TR 2	43
4.2c	Percentage of sorting types for both sampling periods for TR 3	44
4.3a	Percentage of skewness types for all samples of TR 1	46
4.3b	Percentage of skewness types for all samples of TR 2	46
4.3c	Percentage of skewness types for all samples of TR 3	47
4.4a	Percentages and types of kurtosis for TR 1	49
4.4b	Percentages and types of kurtosis for TR 2	49
4.4c	Percentages and types of kurtosis for TR 3	50
4.5a	Temporal variability in accretion rates	53
4.5b	Spatial variability in accretion rates for TR 1 and TR 2	54
4.5c	Spatial variability in accretion rates for TR 3	55

LIST OF ABBREVIATIONS / SYMBOLS

GPS	Global Positioning System
ha	Hectare
PSA	Particle size analysis
TR	Transect
ST	Station
y ⁻¹	Per year
Ø	Phi
µm	Micron metre
°N	North in degree
°E	East in degree
p>0.05	No significant differences
p<0.05	Significant differences

LIST OF APPENDICES

	PAGE
A : Flow chart of methodology	72
B.1 : Accretion rate using two-ways ANOVA	73
B.2 : Mean using two-ways ANOVA	74
B.3 : Sorting using two-ways ANOVA	75
B.4 : Skewness using two-ways ANOVA	76
B.5 : Kurtosis using two-ways ANOVA	77
C.1.1 : Difference of accretion rate for ST 1 and 3 at TR 1	78
C.1.2 : Accretion data for ST 1 and 3 at TR 1	79
C.12.1 : Difference of accretion rate for ST 6 and 9 at TR 1	80
C.2.2 : Accretion data for ST 1 and 3 at TR 1	81
C.3.1 : Difference of accretion rate for ST 13 at TR 1	82
C.3.2 : Accretion data for ST 13 at TR 1	83
C.4.1 : Difference of accretion rate for ST 1 and 4 at TR 2	84
C.4.2 : Accretion data for ST 1 and 4 at TR 2	85
C.5.1 : Difference of accretion rate for ST 8 and 12 at TR 2	86
C.5.2 : Accretion data for ST 8 and 12 at TR 2	87
C.6.2 : Difference of accretion rate for ST 16 at TR 2	88
C.6.2 : Accretion data for ST 16 at TR 1	89

C.7.1	: Difference of accretion rate for ST 1 and 4 at TR 3	90
C.7.2	: Accretion data for ST 1 and 3 at TR 1	91
C.8.2	: Difference of accretion rate for ST 7 and 9 at TR 3	92
C.8.2	: Accretion data for ST 7 and 9 at TR 1	93
C.9.1	: Difference of accretion rate for ST 11 at TR 3	94
C.9.2	: Accretion data for ST 11 at TR 3	95
D.1.1	: Dry siever analysis for TR 1 on June 2004	96
D.1.2	: Dry siever analysis for TR 2 on June 2004	97
D.1.3	: Dry siever analysis for TR 3 on June 2004	98
D.2.1	: Dry siever analysis for TR 1 on November 2004	99
D.2.2	: Dry siever analysis for TR 2 on November 2004	100
D.2.3	: Dry siever analysis for TR 3 on November 2004	101
E.1	: Particle size classified according to Wentworth scale	102
E.2	.: Types and range of sorting, skewness and kurtosis.	103
F.1	: Textural and grain size parameter of sediment for (TR1)	104
F.2	: Textural and grain size parameter of sediment for (TR2)	105
F.3	: Textural and grain size parameter of sediment for (TR3)	106

ABSTRACT

Mangroves are diverse ecosystem with utilizable natural resources, dynamic and worthy of protection but are little understood in terms of their physical abilities and characteristics. Surface sediment samples from 3 transects, of Pulau Besar were analyzed for sedimentology and accretion rate. In this study, the average of accretion rates was 0.1667 cm per month determined using perspex as base markers. The high sedimentation was probably caused by the geographical position of the study area, which was located close to the mouth of the estuary. Sedimentological characteristics of Pulau Besar were as follows: the mean sediment size in June ranged from 1.190Ø to 2.50Ø for TR 1, 1.72Ø to 2.64Ø for TR 2 and for TR 3 was 2.130Ø to 2.84Ø. However in November, the mean ranged from 0.0Ø to 2.36Ø for TR 1 while for TR 2 and TR 3 1.45Ø to 2.708Ø and 1.18Ø to 2.56Ø, respectively were recorded. The other sediment characteristics in June for TR 1, TR 2 and TR 3 were mostly poorly sorted (except TR 3; which was moderately sorted), very negatively skewed and extremely leptokurtic. However these characteristics types for three transects changed in November to moderately sorted (except TR 3 was moderately well sorted), very negatively skewness, extremely leptokurtic (except TR 1 was very leptokurtic). The variation in temporal and spatial accretion induced changes in the sediment characteristics of the mangrove surface.

KAJIAN CIRI-CIRI SEDIMEN PERMUKAAN DAN KADAR PEMENDAPAN KAWASAN HUTAN PAYA BAKAU DI PULAU BESAR, SETIU, TERENGGANU

ABSTRAK

Paya bakau mempunyai kepelbagaian ekosistem dengan sumber semulajadi yang boleh digunakan, bersifat dinamik dan memberi perlindungan namun hanya sedikit kajian mengenai ciri-ciri dan keupayaannya secara fizikal. Sample permukaan sediment dari 3 transek dari Pulau Besar telah dianalisa ciri-ciri sedimen dan kadar pemendapannya.. Daripada kajian ini, purata kadar pemendapan adalah 0.1667 cm per bulan dan telah ditentukan dengan menggunakan perpex sebagai penanda. Kadar sedimentasi yang tinggi didapati berkemungkinan disebabkan oleh kedudukan geografi kawasan kajian, yang berdekatan dengan mulut muara. Ciri-ciri sediment di Pulau Besar adalah seperti berikut: Purata size sediment bagi Jun berjulat dari 1.190Ø hingga 2.50Ø untuk TR 1, 1.72Ø hingga 2.64Ø untuk TR 2 dan TR 3 adalah 2.130Ø to 2.84Ø. Walau bagaimanapun bagi November nilai min adalah berjulat dari 0.0Ø hingga 2.36Ø untuk TR 1 serta untuk TR 2 dan TR 3 masing-masing adalah 1.45Ø hingga 2.708Ø dan 1.18Ø hingga 2.56Ø. Di antara ciri-ciri sediment yang lain bagi June untuk TR 1, TR 2 dan TR 3 adalah kebanyakannya adalah sisihan tidak sempurna (kecuali TR 3; di mana ianya adalah sisihan sederhana sempurna), kepencongan sangat negatif dan paling leptokurtik (kecuali TR1 yang sangat leptokurtik).Perbezaan masa dan tempat telah mendorong kepada perubahan ciri-ciri sediment di permukaan paya bakau.