

THE EFFECTS OF MONSOON ON DISTRIBUTION OF ORTHOPHOSPHATE AND
TOTAL PHOSPHORUS IN WATER AT SETIU LAGOON, TERENGGANU,
SOUTH CHINA SEA

NUR SYAHIRAH BINTI YAAKUB

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU
2008

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SOUTH CHINA SEA**

**By
NUR SYAHIRAH BINTI YAAKUB**

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

**Department of Marine Science
Faculty of Maritime Studies and Marine Science
Universiti Malaysia Terengganu
2008**

This project should be cited as :

Nur Syahirah, Y. 2008. A study on the distribution of Orthophosphate and Total Phosphorus in water at Setiu Lagoon, Terengganu, South China Sea. Undergraduate thesis, Bachelor of Science in Marine Science. Faculty of Maritime Studies and Marine Science. Universiti Malaysia Terengganu, Terengganu. 87 p.

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JABATAN SAINS MARIN
FAKULTI PENGAJIAN MARITIM DAN SAINS MARIN
UNIVERSITI MALAYSIA TERENGGANU

PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk :

**The Effects Of Monsoon On Distribution Of Orthophosphate And
Total Phosphorus In Water At Setiu Lagoon, Terengganu, South China Sea**

oleh **Nur Syahirah Binti Yaakub**

No. Matrik: **UK 11150**

telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Marin sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains (Sains Samudera), Fakulti pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

Disahkan oleh:

Penyelia Utama

Nama : Prof. Madya Dr. Mohd Kamil bin Abd. Rashid

Cop Rasmi : **PROF. MADYA DR. MOHAMED KAMIL ABDUL RASHID**
Timbalan Dekan (Siswazah & Penyelidikan)
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu (UMT)
21030 Kuala Terengganu.

Tarikh: **13.5.2008**

Penyelia Kedua

Nama : Mr. Yong Jaw Chun

Cop Rasmi : **YONG JAW CHUN**
Ketua Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu (UMT)
21030 Kuala Terengganu.

Tarikh:

Ketua Jabatan Sains Marin

Cop Rasmi : **DR. RAZAK ZAKARIYA**
Ketua Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu
(UMT)

Tarikh: **12/5/08**

ACKNOWLEDGEMENTS

Firstly, I would like to thank my first supervisor, Prof. Dr. Law Ah Theem for all his courage, taught, advice in guiding me throughout this final year project. Also, special thanks to Prof. Madya Dr. Mohd Kamil bin Abdul Rashid and Dr. Nor Antonina binti Abdullah, for the support and guidance in completing my study. Thank you so much to both of them for the successful outcome of this project.

I also would like to express my special thanks to the talented postgraduate student, Mr. Chuah Lai Fatt for his patient in supporting me doing my laboratory work and conducting the analysis from the beginning of this study. Not forgotten to Mr. Yong Jaw Chuen for his positive ideas, support and correction for mistakes I had done. Special thanks also for Mr. Yew Wooi Meng, Mr. Suliman and all laboratory assistants who were always there to be asked during analysis made in Oceanography Laboratory.

I also would like to take this golden opportunity to thank all final year project students under Prof. Dr. Law Ah Theem for their cooperation in completing this study. Special thanks to Miss Maisarah, Miss Bazilah Mohd Zin, Miss Yip Li Voon, Miss Nor Asyikin, Mr. Mohd Sobri Amri and Mr. Mohd Haikel Hilmi for all the moral supports, information, and helping me in order to solve problems during samplings, analysis and completing this projects.

And last but not least, special thanks to my family for their support and to all individuals who have contributed to the successful of this project.

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LIST OF ABBREVIATIONS

%	-	percentage
°C	-	degree centigrade
ppm	-	part per million
ppt or ‰	-	part per thousand
mg/L	-	milligram per liter
mm/day	-	millimeter per day
μM	-	micromolarity
μg-at P.L ⁻¹	-	microgram atom phosphorus per liter
μg-at N.L ⁻¹	-	microgram atom nitrogen per liter
cm	-	centimeter
g	-	gram
mg	-	milligram
kg	-	kilogram
L	-	liter
mL	-	milliliter
M	-	molarity
N	-	normality
TN	-	total nitrogen
TP	-	total phosphorus
P	-	phosphorus
Ave.	-	average
w/v	-	weight per volume
Std. Dev	-	standard deviation

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ABSTRACT

This study focused on the distribution of orthophosphate and total phosphorus in Setiu Lagoon, Terengganu involving 14 sampling stations which occupied the area of lagoon, estuarine and river. Water sample was taken at every station except for stations 7, 8, 9 and 10 where two water samples were taken due to the depth of water level which was more than one meter. Three samplings had been done due to the monsoon. First sampling was on 8th September 2007 during South West monsoon season while second sampling was done on 21st October 2007 during inter-monsoon and the third sampling was done on 29th December 2007 during North East monsoon. Statistic showed that there were a significant different of orthophosphate between the stations ($p=0.007$) and also between the sampling periods ($p=0.000$). For total phosphorus, there is no significant different between stations ($p=0.267$) but there was a significant different between sampling periods ($p=0.000$). The N:P ratio for samplings in Setiu Lagoon is 19:1 indicated that phosphorus is the growth limiting factor that limits the primary productivity in aquatic system in Setiu Lagoon. For the first sampling, the average value of orthophosphate was $0.33 \pm 0.26 \mu\text{M}$ and $1.82 \pm 0.70 \mu\text{M}$ for total phosphorus. For second sampling, the average value of orthophosphate and total phosphorus were $1.73 \pm 0.24 \mu\text{M}$ and $9.54 \pm 2.01 \mu\text{M}$ respectively. For third sampling, the average value of orthophosphate was $1.47 \pm 0.35 \mu\text{M}$ and the average value of total phosphorus was $3.58 \pm 0.63 \mu\text{M}$. The average value of total phosphorus during the second and third sampling were over the safety level declared by the Department of Environment Malaysia that is between $1.6 \mu\text{M}$ to $3.2 \mu\text{M}$. This indicated that the Setiu Lagoon area was slowly contaminated with overloaded phosphorus

Pengaruh Monsun Terhadap Taburan Ortofosfat dan Jumlah Fosforus Dalam Air di
Lagun Setiu, Terengganu, Laut China Selatan

ABSTRAK

Kajian ini memberi tumpuan kepada taburan ortofosfat dan jumlah fosforus di Setiu Lagoon, Terengganu. Sebanyak 14 stesen penyampelan telah dipilih yang meliputi kawasan lagun, muara dan sungai. Satu sampel air diambil dari setiap stesen kecuali di stesen 7, 8, 9, 10 di mana, dua sampel air telah diambil iaitu di permukaan dan pertengahan air berikutan kedalaman air di kawasan stesen tersebut melebihi satu meter. Penyampelan telah dijalankan sebanyak tiga kali mengikut Monsun, iaitu penyampelan pertama pada 8 September 2007 ketika Monsun Barat Daya, penyampelan kedua pada 21 Oktober 2007 ketika musim peralihan dari Monsun Barat Daya ke Monsun Timur Laut manakala penyampelan ketiga pada 29 Disember 2007 ketika musim Timur Laut. Statistik menunjukkan terdapat perbezaan ketara bagi ortofosfat antara stesen ($p=0.007$) juga antara penyampelan ($p=0.000$). Manakala jumlah fosforus menunjukkan tiada perbezaan ketara antara stesen ($p=0.267$) namun terdapat perbezaan ketara antara penyampelan ($p=0.000$). Purata nisbah N:P bagi penyampelan di Setiu Lagun adalah 19:1. membuktikan bahawa fosforus menjadi faktor pengehad yang mengawal produktiviti primer bagi sistem akuatik di Setiu Lagun. Pada penyampelan pertama, purata ortofosfat ialah $0.33 \pm 0.26 \mu\text{M}$ dan purata jumlah fosforus adalah $1.82 \pm 0.70 \mu\text{M}$. Penyampelan kedua menunjukkan purata ortofosfat adalah $1.73 \pm 0.24 \mu\text{M}$ manakala purata jumlah fosforus adalah $9.54 \pm 2.01 \mu\text{M}$. Pada penyampelan ketiga, purata ortofosfat adalah $1.47 \pm$

0.35 μM dan purata jumlah fosforus adalah $3.58 \pm 0.63 \mu\text{M}$. Purata jumlah fosforus pada penyampelan kedua dan ketiga adalah melebihi paras selamat yang telah ditetapkan oleh Jabatan Alam Sekitar Malaysia, iaitu antara 1.6 μM hingga 3.2 μM . Ini menunjukkan kawasan Setiu Lagun telah mulai dicemari oleh kandungan fosforus yang berlebihan.