





DISTRIBUTION OF TOTAL DISSOLVED NITROGEN AND ORGANIC  
NITROGEN IN SETIU LAGOON, TERENGGANU, SOUTH CHINA SEA.

By

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PROJEK PENYELIDIKAN I DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

**Distribution of Total Dissolved Nitrogen and Organic Nitrogen in Setiu Lagoon, Terengganu, South China Sea** oleh **Tan Lib Yan, No. Matrik UK 10469** telah diperiksa dan semua pembedaan 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 Terengganu Malaysia.

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## LIST OF ABBREATIONS

Abs	-	Absorbance
ALPHA	-	American Publish Health Association
BOD	-	Biological Oxygen Demand
°C	-	Degree Celsius
cm	-	Centimeter
DO	-	Dissolved Oxygen
GFC	-	Glass Microfibre Filters
GPS	-	Portable Global Positioning System
Max	-	Maximum
mg/L	-	Millie Gram Per Liter
Min	-	Minimum
mL	-	Millie Liter
N	-	Normality
NH <sub>4</sub> <sup>+</sup>	-	Ammonium
NO <sub>2</sub> <sup>-</sup>	-	Nitrite
NO <sub>3</sub> <sup>-</sup>	-	Nitrate
P	-	Phosphorus
p	-	Probability
ppm	-	Part Per Million
PO <sub>4</sub> <sup>3-</sup>	-	Orthophosphate
ST	-	Station
Std.Dev	-	Standard Deviation
TN	-	Total Nitrogen
TP	-	Total Phosphorus
TON	-	Total Organic Nitrogen
μM	-	Micromole
%	-	Percentage
‰	-	Part Per Trillion (ppt) or g/L

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## ABSTRACT

The distribution of nitrogen and organic nitrogen in Setiu Lagoon, Terengganu was studied during Southwest monsoon, Inter-monsoon, and Northeast monsoon. The sampling stations were visited three times from September to December 2006. Fourteen sampling stations were established and the water samples of these stations were taken at mid-depth due to the shallow lagoon area. The first sampling was carried out on 13 September 2006. The mean value of total nitrogen and total organic nitrogen during first sampling were  $54.28 \pm 16.88 \mu\text{M}$  and  $50.60 \pm 16.90 \mu\text{M}$  respectively. The second sampling was conducted on the 12 October 2006. The mean value of total nitrogen and total organic nitrogen during second sampling were  $67.06 \pm 13.57 \mu\text{M}$  and  $59.53 \pm 13.52 \mu\text{M}$  respectively. The third sampling was carried out on 14 December 2006. In general, the mean value of total nitrogen and total organic nitrogen during third sampling were  $76.71 \pm 23.37 \mu\text{M}$  and  $65.65 \pm 22.49 \mu\text{M}$  respectively. Total nitrogen and total organic nitrogen had showed no significant difference ( $p > 0.05$ ) among stations during first, second and third sampling. In the mean time, total nitrogen indicated a significant difference ( $p < 0.05$ ) among first, second and third sampling. Total organic nitrogen had showed no significant difference ( $p > 0.05$ ) among first, second and third sampling. The total nitrogen and total organic nitrogen value had increased from the Southwest monsoon to Inter-Northeast monsoon and then to the Northeast monsoon season. Generally, the nitrogen level is higher than the phosphorus level in the Lagoon. The N:P ratio for the first, second and third samplings were 5:1, 9:1, and 19:1 respectively. The mean N:P ratio of sampling in Setiu Lagoon was 11:1. Because of the normal N:P ratio for

phytoplankton is 16:1 (Redfield, 1963), the limit growth factor for phytoplankton is probably nitrogen during the South-West and inter-monsoon season. While in the North-East monsoon season, the limiting factor was changed to phosphorus. The major source of nitrogen and phosphorus in the Lagoon are probably derived from land runoff and aquaculture wastes.

## ABSTRAK

Kajian projek ini tertumpu kepada taburan nitrogen dan organik nitrogen dan semasa Southwest monsoon, Inter-monsoon, dan Northeast monsoon. Kajian sebanyak 3 kali telah dilakukan dari September hingga Disember, 2006. Sebanyak 14 stesen telah dipilih dan dikategorikan sebagai kawasan lagun dan sample air telah diambil pada kedalaman pertengahan disebabkan kecetekan air lagun. Persampelan pertama telah dijalankan pada 13 September 2006. Purata kepekatan jumlah nitrogen dan jumlah organik nitrogen adalah  $54.28 \pm 16.88 \mu\text{M}$  dan  $50.60 \pm 16.90 \mu\text{M}$  masing-masing. Persampelan kedua pula telah dijalankan pada 12 Oktober 2006. Purata kepekatan jumlah nitrogen dan jumlah organik nitrogen adalah  $67.06 \pm 13.57 \mu\text{M}$  dan  $59.53 \pm 13.52 \mu\text{M}$  masing-masing. Manakala persampelan ketiga telah dijalankan pada 14 Disember 2006. Purata kepekatan jumlah nitrogen dan jumlah organik nitrogen adalah  $76.71 \pm 23.37 \mu\text{M}$  dan  $65.65 \pm 22.49 \mu\text{M}$  masing-masing. Statistik analisis menyatakan bahawa jumlah nitrogen dan organik nitrogen tidak menunjukkan perbezaan yang ketara ( $p > 0.05$ ) di antara stesen. Manakala, jumlah nitrogen menunjukkan perbezaan yang ketara ( $p < 0.05$ ) di antara persampelan pertama, persampelan kedua dan persampelan ketiga. Jumlah organik nitrogen tidak menunjukkan perbezaan yang ketara ( $p > 0.05$ ) di antara persampelan pertama, persampelan kedua dan persampelan ketiga. Kepekatan nitrogen dan organik nitrogen telah meningkat dari Southwest monsoon ke Inter-monsoon serta ke Northeast monsoon. Secara umumnya, kepekatan nitrogen di lagun Setiu, Terengganu adalah lebih tinggi daripada kepekatan fosforus bagi ketiga-tiga persampelan. Nisbah N:P bagi persampelan pertama ialah 5:1 dan

nisbah N:P bagi persampelan yang kedua ialah 9:1 serta nisbah bagi persampelan ketiga ialah 19:1. Purata nisbah N:P bagi persampelan di Lagun Setiu adalah 11:1. Disebabkan nisbah normal N:P bagi fitoplankton ialah 16:1 (Redfield, 1963), faktor pengehad untuk pertumbuhan fitoplankton ialah nitrogen semasa musim South-West dan inter-monsoon. Semasa musim Northeast, faktor pengehad telah tukar kepada fosforus. Punca utama nitrogen dan fosforus di Lagun Setiu ialah sisa kumbuhan dari darat dan sisa dari akuakultur.