# A PRELIMINARY STUDY OF SPECTRAL LIGHT ATTENUATION AND CHLOROPHYLL ABSORPTION AND CHLOROPHYLL CONCENTRATION IN KUALA TERENGGANU COASTAL WATERS

NURUL AISYAH BINTI YASIN

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU
2008

A preliminary study of spectral light attenuation and chlorophyll absorption and chlorophyll concentration in Kuala Terengganu coastal waters / Nurul Aisyah Yasin.

# A PRELIMINARY STUDY OF SPECTRAL LIGHT ATTENUATION AND CHLOROPHYLL ABSORPTION AND CHLOROPHYLL CONCENTRATION IN KUALA TERENGGANU COASTAL WATERS

By

NURUL AISYAH BINTI YASIN.

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Faculty of Maritime Studies and Marine Sciences
UNIVERSITY MALAYSIA TERENGGANU.
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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:

A Preliminary Study of Spectral Light Attenuation and Chlorophyll Absorption and Chlorophyll concentration in Kuala Terengganu Coastal Waters oleh Nurul Aisyah Bt. Yasin, No.Matrik UK 11931 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Marin sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains (Sains Samudera), Fakulti Pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

Disahkan oleh:

.....

Penyelia Utama

Nama: MOHD SUFFIAN IDRIS

Cop Rasmi: Pensyarah
Institut Oseanografi
Universiti Malaysia Terengganu (UMT)
21030 Kuala Terengganu, Terengganu.

Tarikh: 29.04.08

.....

Penyelia Kedua

Nama: **DR. RAZAK ZAKARIYA**

Cop Rasmi: Ketua Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu
(UMT)

Tarikh: 29/4/08.

.....

Ketua Jabatan Sains Marin

Nama: **DR. RAZAK ZAKARIYA**

Cop Rasmi: Ketua Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu
(UMT)

Tarikh: 1/5/08.

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**NURUL AISYAH BINTI YASIN**

**UK 11931**

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**LIST OF ABBREBIATION**

IOPs = Inherent Optical Properties

AOPs = Apperent Optical Properties

Chl-a = Chlorophyll-a

$K_d$ = Diffuse Light Attenuation Coefficient

$a_{ph}$ = Particulate Absorption

$a_d$ = Detritus absorption

$a_c^*$ = Chlorophyll specific absorption coefficient

$a_c$ = Chlorophyll absorption

CDOM = Colored Dissolved Organic Matter

TSS = Total Suspended Solid

Rrs = Remote sensing reflectance

GPS = Global Positioning System

$E_d$ = spectral downwelling irradiance

$E_u$ = upwelling irradiance

$L_u$ = upwelling radiance

$MgCO_3$ = Magnesium carbonate

Nm = nano meter

$R^2$ = Coefficient of determination

RMSE = Random mean square-root error

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## ABSTRACT

Chlorophyll a concentration, absorption and diffuse light attenuation coefficients ($K_d$) were measured at 30 stations in the Kuala Terengganu coastal water during October 2007. The sampling activities involved three types of measurements such as water sample collection, radiometric data collection and hydrographic measurement. The general distribution of chlorophyll-a showed high concentration near to the coastal area and this could be due to phytoplankton dominated out flowing freshwater from Terengganu estuary. The relationship between diffuse light attenuation coefficient ($K_d$) and the concentration of chlorophyll-a and chlorophyll absorption was test at different wavelengths. But all the wavelength does not significantly correlated with chlorophyll-a concentration and chlorophyll absorption. The RMS error between predicted and measured chlorophyll-a concentration and chlorophyll absorption has relatively low $R^2$ value. The absorption of diffuse light attenuation was directly proportional with chlorophyll-a absorption coefficient, phytoplankton dominated waters and chlorophyll-a concentration.

## ABSTRAK

Kajian tentang kepekatan klorofil-a, penyerapan dan kadar pelemahan cahaya ($K_d$) telah dijalankan di 30 stesyen di perairan Kuala Terengganu pada Oktober 2007. Aktiviti penyampelan melibatkan tiga jenis pengukuran iaitu mengambil sampel air, pengumpulan data radiometrik serta pengukuran hidrografi.Taburan klorofil-a menunjukkan kepekatan yang tinggi di kawasan yang hampir dengan persisisran pantai dan ini disebabkan oleh pengaliran masuk air tawar dari muara Terengganu yang mengandungi banyak fitoplankton. Hubungan di antara kadar pelemahan cahaya ($K_d$) dan kepekatan klorofil-a serta penyerapan klorofil telah diuji pada panjang gelombang yang berbeza. Tetapi semua panjang gelombang yang diguna menunjukkan hubungan yang lemah dengan kepekatan klorofil-a dan penyerapan klorofil. RMSE di antara nilai klorofil yang dikira dan dijangka menunjukkan nilai $R^2$ yang rendah. Kadar pelemahan cahaya mempunyai hubungan yang berkadar langsung dengan kadar penyerapan klorofil-a, kawasan yang didominasi oleh fitoplankton dan kepekatan klorofil-a.