

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

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UNIVERSITI MALAYSIA TERENGGANU  
2008



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**By**

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

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## TABLE OF CONTENT

<b>BORANG PENGESAHAN DAN KELULUSAN PROJEK</b>	<b>ii</b>
<b>AKNOWLEDGEMENT</b>	<b>iii</b>
<b>TABLE OF CONTENT</b>	<b>iv</b>
<b>LIST OF TABLES</b>	<b>vii</b>
<b>LIST OF FIGURES</b>	<b>vii</b>
<b>LIST OF ABBREBIATION</b>	<b>ix</b>
<b>LIST OF APPENDICES</b>	<b>x</b>
<b>ABSTRACT</b>	<b>xi</b>
<b>ABSTRAK</b>	<b>xii</b>
<b>1 INTRODUCTION</b>	
1.1 Background of study	1
1.2 Justification of study	3
1.3 Objectives of study	3
<b>2 LITERATURE REVIEW</b>	
2.1 Chlorophyll-a	4
2.2 Diffuse attenuation coefficient ( $K_d$ )	7
2.3 Apparent optical properties (AOP)	8
2.4 Relationship between IOPs and AOPs	9

<b>3</b>	<b>RESEARCH METHODOLOGY</b>	
3.1	Study area	11
3.2	In situ measurement	13
3.2.1	Water sample collection	13
3.2.2	Radiometric measurements	13
3.2.3	Hydrographic measurements	14
3.3	Lab analysis	15
3.3.1	Chlorophyll-a analysis	15
3.3.2	Downwelling diffuse attenuation coefficient	17
3.3.3	Chlorophyll specific absorption coefficient	17
3.4	Data analysis	19
<b>4</b>	<b>RESULT</b>	
4.1	Physical parameter measurements	20
4.2	Chlorophyll-a concentration	23
4.3	Diffuse attenuation coefficient ( $K_d$ )	24
4.4	Relationship between $K_d$ and chlorophyll-a concentration	28
4.5	Relationship between diffuse attenuation coefficients ( $K_d$ ) with chlorophyll-a absorption coefficient ( $a_c^*$ )	34
4.6	Random Mean Square-Root Error (RMSE) analysis	38
<b>5</b>	<b>DISCUSSION</b>	
5.1	Physical parameters	41



5.2	Chlorophyll-a concentration	43
5.3	Detection of chlorophyll-a concentration by diffuse light attenuation coefficient ( $K_d$ )	44
5.4	Chlorophyll specific absorption coefficient and diffuse attenuation coefficient	45
5.5	Diffuse attenuation coefficient ( $K_d$ ) and wavelength	46
<b>6</b>	<b>CONCLUSION</b>	<b>47</b>
	<b>REFERENCES</b>	<b>49</b>
	<b>APPENDICES</b>	<b>52</b>

Figure 4.3(f): Graph $K_d$ vs. wavelength (nm) for station 14, 27, 28, 41, and 42	27
Figure 4.3(g): Graph $K_d$ vs. wavelength (nm) for station 35, 37, 39, 44, and 46	28
Figure 4.4(a): Graph Chlorophyll-a concentration vs. $K_d$ at 413nm	29
Figure 4.4(b): Graph Chlorophyll-a concentration vs. $K_d$ at 443nm	29
Figure 4.4(c): Graph Chlorophyll-a concentration vs. $K_d$ at 439nm	30
Figure 4.4(d): Graph Chlorophyll-a concentration vs. $K_d$ at 489nm	30
Figure 4.4(e): Graph Chlorophyll-a concentration vs. $K_d$ at 509nm	31
Figure 4.4(f): Graph Chlorophyll-a concentration vs. $K_d$ at 533nm	31
Figure 4.4(g): Graph Chlorophyll-a concentration vs. $K_d$ at 556nm	32
Figure 4.4(g): Graph Chlorophyll-a concentration vs. $K_d$ at 559nm	32
Figure 4.4(h): Graph Chlorophyll-a concentration vs. $K_d$ at 663nm	33
Figure 4.4(i): Graph Chlorophyll-a concentration vs. $K_d$ at 716nm	33
Figure 4.5(a): Graph chlorophyll-a absorption vs. $K_d$ at 413nm	34
Figure 4.5(b): Graph chlorophyll-a absorption vs. $K_d$ at 439nm	35
Figure 4.5(c): Graph chlorophyll-a absorption vs. $K_d$ at 443nm	35
Figure 4.5(d): Graph chlorophyll-a absorption vs. $K_d$ at 489nm	36
Figure 4.5(e): Graph chlorophyll-a absorption vs. $K_d$ at 509nm	36
Figure 4.5(f): Graph chlorophyll-a absorption vs. $K_d$ at 533nm	37
Figure 4.5(g): Graph chlorophyll-a absorption vs. $K_d$ at 556nm	37
Figure 4.6(a): Graph of Measured Chl-a concentration vs. Predicted Chl-a concentration at 413nm	38

Figure 4.6(b): Graph of Measured Chl-a concentration vs. Predicted Chl-a concentration at 489nm	38
Figure 4.6(c): Graph of Measured Chl-a absorption vs. Predicted Chl-a absorption at 413nm	39
Figure 4.6(d): Graph of Measured Chl-a absorption vs. Predicted Chl-a absorption at 439nm	39
Figure 4.6(e): Graph of Measured Chl-a absorption vs. Predicted Chl-a absorption at 443nm	40

#### LIST OF ABBREVIATION

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

## LIST OF APPENDICES

### Appendix

1	<i>In situ</i> measurement	52
2	Lab analysis	53

## 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 persisiran 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.