

ESTIMATION OF CHLOROPHYLL-*a* CONCENTRATION FROM IN
SITU SPECTRAL SIGNATURES (REMOTE SENSING REFLECTANCE,
R_{rs} AND NORMALIZED WATER LEAVING RADIANCE, *L_w*) IN
KUALA TERENGGANU COASTAL WATERS

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**JABATAN SAINS MARIN
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**PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

Estimation of Chlorophyll-a Concentration from In-Situ Spectral Signatures (remote sensing reflectance, R_{rs} and normalized water leaving radiance, L_{wn}) in Kuala Terengganu Coastal Waters oleh Nadzirah Bt Md Nor, No.Matrik UK 12197 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.

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LIST OF ABBREVIATION

R_{rs}	: Remote sensing reflectance
L_{wn}	: Normalized water leaving radiance
L_w	: Water leaving radiance
Rmse	: Random mean square-root error
R^2	: Regression
Chl-a	: Chlorophyll-a
$E_d(0^+, \lambda)$: Incident irradiance on surface
$E_d(0^-, \lambda)$: Downwelling irradiance just below the surface
$L_u(0^+, \lambda)$: Upwelling radiance just above the surface
$L_u(0^-, \lambda)$: Upwelling radiance just below the surface
p	: Fresnel reflectance index seawater (0.021)
η_w	: Fresnel reflectance index of seawater (1.345)
α	: Fresnel reflectance albedo of sun and sky (0.043)
TSS	: Total suspended sediment
CDOM	: Colored dissolved organic matter
AOPs	: Apparent Optical Properties
IOPs	: Inherent Optical Properties
K_d	: Downwelling irradiance

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ABSTRAK

Kajian tentang penilaian ciri-ciri optik nyata dan hubungannya dengan Klorofil-a telah dijalankan di sekitar perairan Kuala Terengganu. Kajian ini dijalankan bagi mengetahui ataupun menganggar kepekatan klorofil dan hubungkaitnya dengan parameter radiometer iaitu Rrs dan Lwn. 28 buah stesen telah dikaji di sepanjang perairan Kuala Terengganu iaitu bermula pada 23 Oktober 2007 hingga 27 Oktober 2007. Dalam kajian, parameter radiometer AOP seperti sinaran pusuan naik dan pekali pelemahan peresapan diukur di kawasan lapangan. Kepekatan klorofil yang paling tinggi di kawasan kajian adalah 0.4741 mg/m^3 iaitu pada stesen 28. Didapati juga klorofil-a dapat diukur dengan menggunakan nilai Rrs pada panjang gelombang 673 melalui hubungan polinomial dengan nilai regresi 0.7333 manakala dapat juga dilihat klorofil-a juga dapat diukur dengan menggunakan nilai Lwn pada panjang gelombang 656 melalui hubungan polinomial dengan nilai regresi 0.6264.

ABSTRACT

The study of the apparent optical properties and its relationship with chlorophyll-a were conducted in coastal water of Kuala Terengganu. This study was carried-out in order to estimate the the chlorophyll concentration from in situ spectral signature (R_{rs} and water leaving radiance, L_{wn}) around Kuala Terengganu coastal waters. Twenty eight stations are visited. The ground sampling was conducted from 23 October 2007 until 27 October 2007. In this study, AOP radiometric parameter such as upwelling radiance, remote sensing reflectance and water leaving radiance have been measured during in situ. Highest concentration of chlorophyll-a was observed in the study area was 0.4741 mg/m^3 at station 28. The study found that chlorophyll-a can be estimated using the R_{rs} at 673nm wavelength through polynomial relationship with regression 0.7333 while study also revealed that chlorophyll-a can be estimated using the L_{wn} at 656nm wavelength through polynomial relationship with regression 0.6264.