A STUDY ON PRIMARY PRODUCTIVITY FROM SATELLITE IMAGERY (MODIS DATA) AND GROUND DATA (C14-METHOD) NEAR BIDONG ISLAND

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SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU

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PUSAT PEMBELAJARAN DIGITAL SULTANAH NUR ZAHIRAH

A Study on Primary Productivity from satellite imagery (MODIS Data) and Ground data (^{14}C- method) near Bidong Island

By

Nurzahirah binti Mohd Zulkifli

Research Report submitted in partial fulfilment of

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DECLARATION AND VERIFICATION REPORT

FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled A study on Primary Productivity from satellite imagery (MODIS Data) and Ground data (C^{14} - method) near Bidong Island by Nurzahirah Binti Mohd Zulkifli, Matric Number UK25624 have been examined and all errors identified have been corrected. This report is submitted to the School of Marine Science and Environmnet as partial fulfilment towards obtaining Degree of Bachelor of Science (Marine Biology), Universiti Malaysia Terengganu.

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LIST OF ABBREVIATIONS

m^3	-	meter cubic
mg	-	milligram
µl	-	microliter
ml	-	milliliter
M	-	molarity
nm	-	nanometer
rpm	-	rotation per minute
L	-	litre
g	-	gram
h	-	hour
C	-	carbon
Dpm	-	disintegrated per minute

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ABSTRACT

Primary productivity is a process which involved during the photosynthesis occurs and is highly related to the chlorophyll-a concentration. The objective of this study is to determine the primary productivity from the ground data survey using the carbon 14 techniques and satellite imagery (MODIS). Thus, the relation between ground data and satellite data of primary production can be determined. Carbon 14 techniques were used in determining the primary production of sampling site using in-situ and incubator incubation which act as ground data. A sampling chlorophyll-a also have been done. Then, chlorophyll-a concentration data from the satellite is obtained from the Ocean Color Web using the MODIS method. Thus, the data analyse will be correlated between the primary production with chlorophyll-a concentration ground data and satellite data. The primary production rate on the sampling site at 5' 37.655'E and 103' 02.081'N of in-situ on water sampled were ranged from13 – 25mg C/Lh while filtered sampled ranged from 0.05-0.089mg C/Lh. The productions for incubator incubation results of water sampled are ranging from 0.033-0.101mg C/Lh while the filtered sampled are ranging from 0.032-0.079mg C/Lh. The primary productivity for the sampling site increases as the depth increases for both in-situ and incubator incubation. The chlorophyll-a concentration, the results shows high concentration at depth 15m. The concentrations are ranging from 0.006-0.008mg/m3 throughout the water column. The satellite data from MODIS shows that the chlorophyll-a concentration is ranging 0.1 – 0.3 mg/m3 which were taken from the 3-days composite. The satellite data could not be taken from 1-day composite due to the cloud cover which shows NaN reading values. Thus, the correlation could not be

correlated between the in-situ and satellite data due to cloud cover and insufficient data.

Penyempalan Produktiviti Primer Menggunakan Data Imej Satelit (MODIS) and Data di Tempat Penyempelan Menggunakan Kaedah ^{14}C berdekatan Pulau Bidong

ABSTRAK

Produktiviti primer adalah proses yang melibatkan fotosintesis dan sangat berkait dengan kepekatan klorofil-a . Tujuan dari penelitian ini adalah untuk mengetahui produktiviti primer dari data survei tanah menggunakan teknik karbon 14 dan citra satelit (MODIS). Dengan demikian, hubungan antara data kawasan kajian dan data satelit dari produksi primer dapat ditentukan. Teknik karbon 14 yang digunakan dalam menentukan produksi primer dari lokasi pengambilan sampel menggunakan in-situ dan inkubator inkubasi yang bertindak sebagai data dasar. Penyempalan kepekatan klorofil-a juga telah dilakukan. Kemudian, data kepekatan klorofil-a dari satelit yang diperoleh dari Ocean Color Web menggunakan kaedah daripada MODIS. Dengan demikian, data analisis diantara klorofil-a dikawasan kajian dengan data satelit dan produktiviti primer dapat ditentukan kolerasinya. Takat produksi primer di lokasi pengambilan sampel pada 5 '37,655' E dan 103 '02,081' N dari di atas air sampel yang berkisar daripada 13 - 25mg C / Lh sementara disaring sampel berkisar antara 0,05-0.089mg C / Lh. Produksi hasil inkubasi inkubator air sampel berkisar antara 0.033-0.101mg C / Lh sementara disaring sampel berkisar antara 0.032-0.079mg C / Lh. Produktiviti primer untuk lokasi pengambilan sampel meningkat dengan meningkatnya kedalaman untuk kedua in-situ dan inkubator inkubasi. Klorofil-a konsentrasi, hasil menunjukkan konsentrasi tinggi pada kedalaman 15m. Konsentrasi berkisar antara 0.006-0.008mg/m3 seluruh kolum air. Data satelit dari MODIS menunjukkan bahwa klorofil-a konsentrasi berkisar 0,1-0,3 mg/m3 yang diambil dari 3-hari komposit. Data satelit tidak boleh diambil dari 1 hari komposit

kerana penutupan awan yang menunjukkan nilai-nilai membaca NaN. Dengan demikian, korelasi tidak dapat dikorelasikan antara data in-situ dan satelit kerana tutupan awan dan data yang tidak cukup.