

UNIVERSITI TEKNOLOGI MARA

**ESTIMATION OF COLORED DISSOLVED
ORGANIC MATTER (CDOM) AND
CHLOROPHYLL AROUND MARANG SEA**

MOHAMMAD QUYYUM BIN ABDUL SARAH

Thesis submitted in fulfillment
of the requirements for the degree of
Bachelor of Surveying Science & Geomatics
(AP220)

Faculty of Architecture, Planning and Surveying

July 2018

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Mohammad Quyyum bin Abdul Sarah

Student I.D. No. : 2015249594

Programme : Bachelor in Surveying Science and Geomatics
(Honour) – AP220

Faculty : Faculty of Architecture, Planning and Surveying

Thesis : Estimation of Colored Dissolved Organic Matter
(CDOM) and Chlorophyll around Marang Sea

Signature of Student :

Date : July 2018

ABSTRACT

This project entitled a study of the estimation of colored dissolved organic matter (CDOM) and chlorophyll by satellite imagery. Colored dissolved organic matter is the largest bio reactive inventory of carbon in the global ocean. It also primarily absorbs light in the UV and visible spectral range affecting the intensity and spectral quality of the light field in the water. Phytoplankton use chlorophyll to carry out photosynthesis, absorbing atmospheric carbon dioxide to produce sugars for fuel. Chlorophyll in the water changes the way it reflects and absorbs sunlight, allowing scientists to map the amount and location of phytoplankton. This project utilizes the images that have been downloaded from USGS. The sensor and satellite that is used is Landsat 8 OLI. These projects have been led by taking after the requirement of the project. For the project, there are three objectives. Firstly, to estimate the concentration of the CDOM and chlorophyll at Marang sea using appropriate algorithms. Generally, the images that have been downloaded from the USGS sites demonstrate the whole universe of the CDOM and chlorophyll area. Next objective will be to detect the trend changes of CDOM and chlorophyll concentration from 5 years of satellite imageries. This objective achieved by selecting the study region by utilizing the Erdas Imagine software. After satisfying the two objectives, next will be the creation of the map. The map that is created can be updated into the chlorophyll and CDOM concentration database for further research. An analysis will be done on the relationship and the trend changes between CDOM and chlorophyll for five years data. Result for the entire project can be made as guide for further research and a better oceanography management.

TABLE OF CONTENTS

TITLE	PAGE
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
SUPERRVISOR'S DECLARATION	iv
ABSTRACT	v
ABSTRAK	vi
ACKNOWLEDGEMENT	vii
TABLE OF CONTENTS	viii
LIST OF FIGURES	xii
LIST OF TABLES	xiv
LIST OF EQUATIONS	xv
LIST OF ABBREVIATIONS	xvi
CHAPTER ONE: INTRODUCTION	
1.1 Introduction	1
1.2 Project Background	1
1.2.1 Title of Project	1
1.2.2 Introduction of Project	1
1.2.3 Problem Statement	2
1.2.4 Study Area	3
1.2.5 Data	4

3.2	General Methodology	15
3.3	Data Acquisition	16
3.3.1	Study Area	16
3.3.2	Softwares	17
	3.3.2.1 <i>ERDAS Imagine 2014</i>	17
	3.3.2.2 <i>ArcGIS 10.1</i>	18
3.4	Data Processing Using Erdas Imagine 2014	18
3.4.1	Layer Stacking	18
3.4.2	Image Preprocessing	19
3.4.3	Re-project image	20
3.4.5	Image Subset	20
3.4.6	Indices	21
	3.4.6.1 <i>Colored Dissolved Organic Matter Algorithm</i>	22
	3.4.6.2 <i>CDOM Analysis at Water Area</i>	22
	3.4.6.3 <i>Normalized Difference Chlorophyll Index</i>	24
	3.4.6.4 <i>Chlorophyll Analysis at Water Area</i>	24
3.5	Map Productions Using ArcGIS 10.1	26
3.5.1	Clip	26
3.5.2	Map Interface	26

CHAPTER FOUR: RESULT AND ANALYSIS

4.1	Introduction	27
4.2	Colored Dissolved Organic Matter (CDOM) at Marang Sea	28