MAPPING CORAL REEF DISTRIBUTION AT BIDONG ISLAND BY QUICKBIRD SATELLITE IMAGINERY

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MAPPING CORAL REEF DISTRIBUTION AT BIDONG ISLAND BY QUICKBIRD SATELLITE IMAGINERY

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Research Report submitted in partial fulfillment of the requirements for the degree of Bachelor of Science (Marine Science)

Department of Marine Science
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FACULTY OF MARITIME STUDIES AND MARINE SCIENCE

DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled:

Mapping coral reef distribution at Bidong Island by Quickbird satellite imaginary by **Azreen Bin Awang** Matric No. **UK 17456** have been examined and all errors identified have been corrected. This report is submitted to the Department of Marine Science as partial fulfillment towards obtaining the Degree **Bachelor of Science (Marine Science)**, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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LIST OF ABBREAVIATIONS

π	3.142
%	Percentage
^0C	Degree Celsius
ρ	Satellite reflectance
$\Delta\lambda_{Band}$	Effective bandwidth of each band
absCalFactorBand	Absolute radiometric calibration factor ($Wm^{-2}sr^{-1}count^{-1}$)
d^2	The square of the earth sun distance in astronomical units
DN	Digital number
$Ed(\lambda,0^+)$	Downward irradiance
EMR	Electromagnetic radiation
ENVI	Environment for Visualizing Images
ESUN	Mean solar irradiance
$Eu(\lambda,0^-)$	Upwelling irradiance
FLAASH	Fast Line of sight Atmospheric analysis of spectral hypercube
Km	Kilometer
$Kd(\lambda)$	Diffuse attenuation coefficient
K_i / K_j	Ratio attenuation coefficient
L	Satellite radiance
L_i	Atmospheric corrected image of b1
$Lu(\lambda,z)$	Vertical profiling of upward radiance
$q_{pixel,Band}$	Digital value
RGB	Red, green ,blue
ROI	Region of interest
SZ	Sun zenith angle
X_i	Normalized image in b_i

ABSTRACT

This study is an attempt to investigate the applicability of Optical satellite image for coral Mapping. The aim is to determine the coral reef distribution at Bidong Island. Mapping of coral reef using 2.4 m high resolution Quickbird satellite imagery is done at Bidong Island that consist of Karah Island and Tengkarah Island which is location in the South China Sea. The Island is actually a Coral Reef atoll with no land insight. The image processing process consists of 6 step which are, geometric correction, atmospheric correction, water column correction, and classification and accuracy assessment. The types of substrate classification are life coral, dead coral with algae, rubble coral and sand. The reliability of reef classification has been tested using kappa statistic of 0.2061 %. The overall accuracy of the supervised map is 41.3793% indicated the map of coral reef achieved in this study is reliable.

ABSTRAK

Penyelidikan ini adalah untuk menyiasat kebolehan Imej Satelit Optik untuk pemetaan terumbu karang. Tujuan kajian ini dijalankan adalah untuk menentukan taburan terumbu karang di kawasan pulau bidong. Pemetaan terumbu karang mengunakan imej satelit Quickbird yang mempunyai resolusi tinggi berukuran 2.4 meter telah dilakuakan di kawasan pulau bidong dan ianye meliputi pulau karah dan pulau tengkarah yang dikelilingi Laut Cina Selatan yang sangat terkenal dengan keindahan Terumbu karangnya. Teknik pemprosesan imej satellite merangkumi 6 langkah iaitu pembetulan geometric, pembentulan atmosfera, pembetulan medan air, penopengan imej,klasifikasi dan ketepatan penilaian. Jenis klasifikasi substrat ialah karang hidup, karang mati dengan alga, serpihan karang dan pasir .Tahap kebolehgunaan pengkelasan terumbu diuji menggunakan "kappa statistic" dengan keputusan 0.2061 %. Keseluruhan kejituan iaitu 41.3793% dan ia menunjukkan bahawa peta terumbu bagi kawasan ini boleh diguna pakai.