

DETERMINATION OF SEA SURFACE TEMPERATURE FOR
KUALA TERENGGANU COASTAL WATERS USING MODIS
SATELLITE IMAGERY

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TERENGGANU COASTAL WATERS USING MODIS SATELLITE IMAGERY**

By

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**Research Report submitted in partial fulfillment of the requirement for the degree
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**DEPARTMENT OF MARINE SCIENCE
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**RESEARCH PROJECT FINAL YEAR FINAL DRAFT APPROVAL AND
VALIDATION FORM I AND II**

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Determination of Sea Surface Temperature for Kuala Terengganu Coastal Waters Using MODIS Satellite Imagery by Rosmuna Bt Ahmad, Matric. No UK 10033 has been read and all the alteration and correction recommended by examiners have been done. This final draft submitted to Marine Science Department has been accepted as fulfillment of the requirement for Bachelor of Science (Marine Science) under the faculty of Maritime Studies and Marine Science, University Malaysia Terengganu.

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LIST OF ABBREVIATION

%	percentage
°C	degree
MODIS	Moderate-resolution Imaging Spectroradiometer
cm	centimeter
TDS	Total dissolved Solid
g/L	gram per liter
DO	dissolved oxygen
mg/L	milligram per liter
NTU ⁺	turbidity
Long	Longitude
Lat	Latitude
SST	Sea Surface Temperature
vs	versus
μm	micrometer
CO ₂	carbon dioxide
CH ₄	methane
NO ₂	nitrogen dioxide

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ABSTRACT

Moderate Resolution Imaging Spectroradiometer (MODIS) is one of the recent satellites that useful for sea surface temperature (SST) determination and chosen in this study. This study demonstrated that MODIS data can successfully be used to obtain SST in Kuala Terengganu coastal waters. The objectives of this study are to determine the sea surface temperature along Kuala Terengganu coastal waters, to develop the sea surface temperature map for MODIS data by developing new algorithm for SST in Kuala Terengganu coastal waters. In this study, there were 10 sampling stations and the SST that determined in all stations was between 29.90 °C to 30.28°C. The highest temperature is in station 3 which is around 30.28 °C while the lowest temperature is in station 10 which is 29.90°C. MODIS data (Terra and Aqua satellites) had been analyzed for extract value of SST using ERDAS 8.7 software. By using Terra spectral radiance, band 22 shows the highest regression which is 0.9416. By using Aqua spectral radiance, band 32 that show a strong regression which is 0.7192. Both of bands 22 and 32 were chosen to develop a map of SST in Kuala Terengganu by using the developed algorithm. From the developed map, the strong regression had shown from the graph of temperature obtained from in-situ data vs. temperature obtained from MODIS data which is 0.8299 for Terra and 0.727 for Aqua. It shows that data from MODIS and in-situ data had high correlation. The conclusion is the SST determined in Kuala Terengganu coastal waters is between 29.90 °C to 30.28 °C and MODIS Satellite Imagery suitable in determining the SST in Kuala Terengganu coastal waters because it accurate with in-situ data.

ABSTRAK

Moderate Resolution Imaging Spectroradiometer (MODIS) ialah antara satelit terkini yang berguna untuk penentuan suhu permukaan air laut (SST) dan digunakan dalam kajian ini. Kajian ini membuktikan bahawa data MODIS sesuai digunakan untuk mendapatkan SST di perairan Kuala Terengganu. Objektif kajian ini ialah untuk menentukan SST di perairan Kuala Terengganu, membuat peta taburan SST dari data MODIS dengan menggunakan algoritma baru yang diperoleh untuk perairan Kuala Terengganu. Dalam kajian ini, terdapat 10 stesen kajian dan SST yang direkodkan di semua stesen ialah di antara 29.90 °C hingga 30.28°C. Suhu tertinggi ialah di stesen 3 iaitu 30.28 °C di mana suhu terendah ialah di stesen 10 iaitu 29.90 °C. Data MODIS (satelit Terra dan Aqua) dianalisis untuk mengekstrak nilai SST menggunakan perisian ERDAS 8.7. Dengan menggunakan pancaran spectrum dari Terra satelit, band 22 menunjukkan regrasi tertinggi iaitu 0.9416. Dengan menggunakan pancaran spectrum dari Aqua satelit, band 32 menunjukkan regrasi tertinggi iaitu 0.7192. Kedua-dua band iaitu band 22 dan 32 digunakan untuk membuat peta taburan SST di Kuala Terengganu dengan menggunakan algoritma yang diperoleh. Dari peta yang dibuat, nilai regrasi yang tinggi ditunjukkan daripada graf suhu dari *in-situ* melawan suhu dari data MODIS ialah 0.8299 untuk Terra dan 0.727 untuk Aqua. Ini menunjukkan bahawa data dari MODIS dan data dari *in-situ* mempunyai hubungan perkaitan yang tinggi. Kesimpulannya, nilai SST yang di perairan Kuala Terengganu ialah dianantara 29.90 °C to 30.28 °C dan MODIS Satellite Imagery sesuai dalam menentukan SST di perairan Kuala Terengganu kerana ia bertepatan dengan data *in-situ*.