CHANGES IN SEA SURFACE TEMPERATURE FROM YEAR 2005 TO 2009 IN TERENGGANU WATERS USING MODIS

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Lihat Sebelah

CHANGES IN SEA SURFACE TEMPERATURE FROM YEAR 2005 TO 2009 IN TERENGGANU WATERS USING MODIS

By

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

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DECLARATION AND VERIFICATION REPORT

RESEARCH PROJECT I AND II

It is hereby declared and verified that this research report entitled:
Changes in Sea Surface Temperature from Year 2005 to 2009 in Terengganu Waters Using MODIS by FATIMAH SYAHIRAH BT. AHMAD JAZULI, Matric No. UK 15994 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 of Bachelor of Science (Marine Science), Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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LIST OF ABBREVIATION

CO_2	Carbon Dioxide
Diff	Difference
EOS	Earth Observing System
GCMs	Global Circulation Models
GPS	Global Positioning System
IR	Infrared
Km	Kilometer
Long	Longitude
Lat	Latitude
LWIR	Long-wave Infrared
MODIS	Moderate Resolution Imaging Spectroradiometer
NASA	National Aeronautics and Space Administration
SST	Sea Surface Temperature
SWIR	Short-wave Infrared
Vs	Versus
%	Percentage
°C	Degree Celsius
μm	micrometer

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ABSTRACT

The study on sea surface temperature (SST) is very important in Terengganu due to the presence of marine parks in its waters. Any drastic changes of SST will affect coral reefs in the area. The objectives of this study is to determine the SST changes from 2005 to 2009 in Terengganu waters using Moderate Resolution Imaging Spectroradiometer (MODIS) and to determine the relationship between in situ SST measurement and MODIS SST. From this study, 60 scenes of MODIS monthly SST maps from 2005 to 2009 were analyzed. In situ SST measurements were used as comparison to the MODIS Level 3 data. The study was conducted at 32 sampling stations from Pulau Kapas to Pulau Perhentian waters for in situ sampling in May and July 2009. The study observed no dramatic changes in SST from 2005 to 2009. The 2009 SST was found to be warmer than mean SST while SST 2008 was found to be cooler with 0.26 °C and -0.13 °C difference respectively. The range of MODIS SST in 2005 is between 27.05 °C to 31.57 °C; 26.33 °C to 31.56 °C in 2006; 26.42 °C to 32.25 °C in 2007; 24.88 °C to 31.51 °C in 2008 and between 25.68 °C to 32.09 °C in 2009. The comparison between Level 3 MODIS SST and in-situ measurement revealed the average difference of 0.92°C in May and 1.10°C in July. MODIS Level 3 SST was found to be warmer than in situ measurement. This study demonstrated that MODIS Level 3 data from Terra satellite can successfully be used to obtain SST in Terengganu waters.

ABSTRAK

Ukuran suhu permukaan laut (SST) amat penting di perairan Terengganu kerana di kawasan ini terdapat banyak taman laut. Kajian ini dapat membantu dalam pengurusan taman laut yang lebih baik di kawasan tersebut. Objektif kajian ini ialah untuk mengkaji perubahan suhu di perairan Terengganu dari tahun 2005 sehingga 2009 menggunakan Moderate Resolution Imaging Spectroradiometer (MODIS) serta mengkaji hubungan di antara nilai SST in-situ dan nilai SST dari MODIS. Daripada kajian ini, 60 peta MODIS SST bulanan dari tahun 2005 hingga 2009 telah dihasilkan. Pengukuran SST in-situ digunakan sebagai perbandingan kepada data MODIS Level 3. Kajian ini telah dilakukan di 32 stesyen dari perairan Pulau Kapas sehingga perairan Pulau Perhentian semasa penyampelan in-situ pada bulan Mei dan Julai 2009. Julat MODIS SST pada tahun 2005 ialah antara 27.05 °C hingga 31.57 °C, 26.33 °C hingga 31.56 °C pada tahun 2006, 26.42 °C hingga 32.25 °C pada tahun 2007, 24.88 °C hingga 31.51 °C pada tahun 2008 dan antara 25.68 °C hingga 32.09 °C pada tahun 2009. Kajian ini menunjukkan tiada perubahan ketara pada nilai SST dari 2005 hingga 2009. SST pada tahun 2009 direkodkan lebih panas daripada min SST sementara SST 2008 lebih sejuk dengan perbezaan 0.26 °C dan -0.13 °C. Perbezaan antara SST MODIS Level 3 dan pengukuran SST in-situ merekodkan perbezaan purata 0.92 °C (Mei) dan 1.10 °C (Julai). SST MODIS didapati lebih panas dari SST in-situ pada bulan Mei dan Julai. Kajian ini menunjukkan data MODIS Level 3 data dari satelit Terra dapat digunakan untuk mengukur SST di perairan Terengganu.