ESTIMATION OF TOTAL SUSPENDED SOLIDS (TSS) CONCENTRATION IN THE COASTAL WATER OF KUALA TERENGGANU USING OCEAN COLOR MONITOR SATELLITE

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2007

LP
43
FMSM
2
2007

QN 5220

1100054371

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LP 43 FMSM 2 2007

1100054371

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By:

Nurul Huda Mohammad

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

Department of Marine Sciences
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2007

1100054371

This project report should be cited as:

Nurul Huda, M. 2007. Estimation of Total Suspended Solids Concentration in the Coastal Water of Kuala Terengganu using Ocean Color Monitor Satellite. Undergraduate thesis Bachelor of Science in Marine Science, Faculty of Maritime tudies and Marine Science, University Malaysia Terengganu.58p

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MARINE SCIENCE DEPARTMENT
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RESEARCH PROJECT FINAL YEAR REPORT APPROVAL AND VALIDATION FORM

I certify that the report of this final year research project entitled as:

Estimation of Total Suspended Solids (TSS) Concentration in the Coastal Water of Kuala Terengganu Using Ocean Color Monitor Satellite by **Nurul Huda Mohammad**, Matric No: **UK 10187** has been read and all the alteration and correction recommended by examiners have been done. This report 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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ACKNOWLEDGEMENT

First of all, I would like to thank God for guidance and blessing through out the project. I would also like to thank my supervisor, Mr. Suffian b. Idris for his precious guidance, advice and continuous support through out the completion of this project. I really appreciate him for giving me the chance to do this great research.

My gratitude also goes to my beloved parents and also for my brothers and sisters. The support from family was indispensable. They gave me the encouragement from the beginning until the completion of the study.

Thanks also to my fellow friends, Azlin, Nazihah, Aimi and Muna who helps me to completion this project.

Last but not least, the appreciation also goes to the Malaysian Centre for Remote Sensing (MACRES) for providing the satellite data, lab assistants of Oceanography Laboratory and Informatics Laboratory, for allowing me to use the apparatus and instruments during my sampling and lab work.

This project will not able to complete without the help and guidance of any above.

Thank you very much.

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LIST OF ABBREVIATION

Chl	Chlorophyll
DGPS	Digital Global Positioning System
GAC	Global Area Coverage
GIS	Geographic Information System
LAC	Local Area Coverage
MACRES	Malaysian Centre for Remote Sensing
MODIS	Moderate Resolution Imaging Spectrometer
MRSO	Malaysian Rectified Skewed Orthomorphic
NIR	Near infrared
OCM	Ocean Color Monitor
OSMI	Ocean Scanning Multi-spectral Imager
RMSE	Root Mean Square Error
TSS	Total Suspended Solids

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ABSTRACTS

Total Suspended Solids (TSS) is solid materials, including organic and inorganic, that suspended in the water. These would include silt, plankton and industrial wastes. High concentrations of Total Suspended Solids (TSS) can lower water quality by absorbing light. A study was carried around coastal water of Kuala Terengganu on 14th Sept 2006 and 17th September 2006. The objectives of this study are to determine the Total Suspended Solids (TSS) concentration in coastal water of Kuala Terengganu and to estimate the spatial distribution of Total Suspended Solids (TSS) using Ocean Color Monitor (OCM) satellite data. Twenty two sampling stations were sampled and water samples were collected. The concentration of Total Suspended Solids (TSS) in coastal water of Kuala Terengganu was found to range between 1.40 mg/L and 14.00 mg/L. The highest concentration of Total Suspended Solids (TSS) was at station 22 with 14.00 mg/L. The lowest concentration of Total Suspended Solids (TSS) was at stations 16 and 17 with 1.40 mg/L. The estimated Total Suspended Solids from the empirical model is lower than actual ranged from 2.00 mg/L to 3.80 mg/L and its shows that the band ratio underestimates the Total Suspended Solids (TSS) concentrations. Regression coefficient (R^2) between actual and estimated Total Suspended Solids is 0.7665 and Root Mean Square Error (RMSE) is 0.0029.Using Menon's algorithm, the concentration is higher than actual Total Suspended Solids (TSS) that is about 26.35 mg/L to 28.69 mg/L. The study found that the Total Suspended Solids (TSS) was not accurately estimated and this might be caused by less number sampling station are used in this study. Moreover, the satellite data used in this study is not clear because of illumination and atmospheric

effects occurs during satellite acquisition and these effects cannot removes totally during atmospheric correction.

ABSTRAKS

Jumlah pepejal terampai adalah bahan pepejal yang terdiri daripada bahan organic dan bukan organic yang terampai di dalam air termasuklah lumpur, plankton dan sisa industri. Kepekatan pepejal termpai yang tinggi akan menghalang penyerapan cahaya. Satu kajian telah dijalankan di perairan Kuala Terengganu. Objektif kajian ini adalah untuk mengenalpasti jumlah pepejal terampai di perairan Kuala Terengganu dan untuk menganggar taburan jumlah pepejal terampai menggunakan Ocean Color Monitor. Sebanyak 22 stesyen ditetapkan dan daripada in situ data menunjukkkan jumlah pepejal terampai di perairan Kuala Terengganu adalah 1.40 mg/L hingga 14.00 mg/L. Kepekatan pepejal terampai paling tinggi adalah di stesyen 22 iaitu 14.00 mg/L dan diikuti stesyen 21 iaitu 6.40 mg/L. Kepekatan pepejal terampai paling rendah adalah di stesyen 16 dan 17 iaitu 1.40 mg/L. Nilai kepekatan pepejal terampai dari model adalah lebih rendah iaitu 2.00 mg/L hingga 3.80 mg/L. Regresi antara kepekatan pepejal terampai dari in situ data dan anggaran dari model adalah 0.0029 dan root mean square error adalah 0.7665. Kepekatan pepejal terampai dari Menon algorithm adalah lebih tinggi iaitu iaitu 26.35 mg/L hingga 28.69 mg/L. Kepekatan pepejal terampai yang diperolehi adalah kurang tepat kerana kekurangan in situ data. Di samping itu, data satellite yang digunakan kurang jelas kerana kesan atmospheric berlaku semasa perolehan satelit data tidak dapat dibuang dan disingkirkan semasa pembetulan atmosfera.