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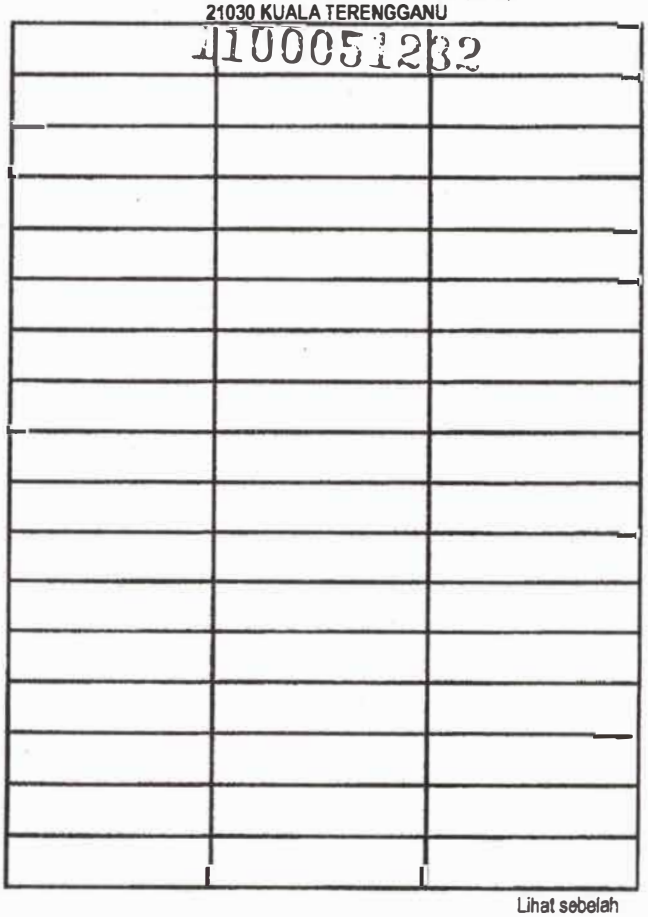
Comparison of vegetation indices (atmospheric corrected based index) for mangrove vegetation mapping at Kelantan Delta / Roziatul Zaila Bukari@Bukhari.



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COMPARISON OF VEGETATION INDICES (ATMOSPHERIC CORRECTED BASED INDEX) FOR MANGROVE VEGETATION MAPPING AT KELANTAN DELTA

ROZIATUL ZAILA BINTI BUKARI @ BUKHARI

FAKULTI SAINS DAN TEKNOLOGI
UNIVERSITI MALAYSIA TERENGGANU
2007

COMPARISON OF VEGETATION INDICES (ATMOSPHERIC CORRECTED BASED INDEX) FOR MANGROVE VEGETATION MAPPING AT KELANTAN DELTA

By

Roziatul Zaila binti Bukari @ Bukhari

Research Report submitted in partial fulfillment of
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Faculty of Science and Technology
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PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II
RESEARCH REPORT VERIFICATION

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: COMPARISON OF VEGETATION INDICES (ATMOSPHERIC CORRECTED BASED INDEX) FOR MANGROVE VEGETATION MAPPING AT KELANTAN DELTA oleh Roziatul Zaila binti Bukari @ Bukhari, no. matrik: UK 10458 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains Gunaan (Pemuliharaan & Pengurusan Biodiversiti), Fakulti Sains dan Teknologi, Universiti Malaysia Terengganu.

Disahkan oleh: / Verified by:

.....

Penyelia Utama / *Main Supervisor*

Nama: **KASAWANI IBRAHIM**

Cop Rasmi: Pensyarah
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu.

Tarikh: 30/4/07

.....

Penyelia Kedua (jika ada) / *Co-Supervisor (if applicable)*

Nama: MOHD SUFFIAN IDRIS

Cop Rasmi: Pensyarah
Institut Oseanografi
Universiti Malaysia Terengganu (UMT)
21030 Kuala Terengganu, Terengganu.

Tarikh: 30/4/07

.....

Ketua Jabatan Sains Biologi /*Head, Department of Biological Sciences*

Nama: DR. AZIZ BIN AHMAD

Cop Rasmi: Ketua
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Tarikh: 30/4/07

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LIST OF ABBEVIATION

AFRI	- Aerosol Free Vegetation Index
ARVI	- Atmospheric Resistant Vegetation Index
ASVI	- Atmosphere-Soil Vegetation Index
AVIRIS	- Airborne Visible-Infrared Imaging Spectrometer
DN	- Digital Number
APAR	- Absorbed Photosinthetically Active Radiation
GCP	- Ground Control Point
GEMI	- Global Environment Vegetation Index
GIS	- Global Information System
MACRES	- Malaysia Centre for Remote Sensing
MIR	- Middle Infrared
MSAVI	- Modified Soil Adjusted Vegetation Index
MSS	- Multi-Spectral Scanner
NDVI	- Normalized Different Vegetation Index
NIR	- Near Infrared
PVI	- Perpendicular Vegetation Index
SWIR	- Shortwave Infrared
SARVI	- Soil Adjusted Atmospherically Vegetation Index
SAVI	- Soil-adjusted Vegetation Index
RMSE	- Root Mean Square Error
TM	- Thematic Mapper
TSAVI	- Transformed Soil-adjusted Vegetation Index
VI	- Vegetation Index
VI's	- Vegetation Indices
WDVI	- Weighted Difference Vegetation Index

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ABSTRACT

A study was conducted at Kelantan Delta to identify mangrove forest types based on Vegetation Index (VI) approach. The aim of this study were to evaluate and compare the performance of different VI (Atmospheric based corrected VI), derives from the Landsat Thematic Mapper (TM) 2000 satellite. In this study four indices were used, namely the Global Environmental Monitoring Index (GEMI), Atmospherically Resistant Vegetation Index (ARVI), Modified Aerosol Free Vegetation Index Mid-Infrared (Modified $AFRI_{MIR}$) and Modified Aerosol Free Vegetation Index Shortwave-Infrared (Modified $AFRI_{SWIR}$). Total of five main mangrove forest types which were *Avicennia*, *Avicennia-Sonneratia,* Mixed *Acrostichium*, *Achantus-Sonneratia*, and Mixed *Sonneratia* have been recorded during field investigation and the performances of different VI were analyzed using Spatial-Modeler module in Erdas Imagine environment. The results demonstrated that the indices range for Modified $AFRI_{SWIR}$ at Kelantan Delta was found to be well separated and therefore five classes have been generated. It was found that the shortwave-infrared band is very sensitive to liquid water content and therefore has the potential as the best index to recognize the mangrove classes. With accuracy of 79.33%, higher than using unsupervised classification (72.67%), this index was suggested in order to reduce atmospheric noise and can well recognize the classes. The better used of Shortwave Infrared (SWIR) in this study area was due to high moisture content, influenced by many meteorological events and condition.

PERBANDINGAN KE ATAS INDEKS TUMBUHAN (INDEKS PEMBETULAN ATMOSFERA) KE ATAS HUTAN PAYA BAKAU DI DELTA KELANTAN

ABSTRAK

Satu kajian telah dijalankan di Delta Kelantan untuk mengkelaskan hutan paya bakau menggunakan Indeks Tumbuhan. Matlamat utama kajian ini ialah menilai dan membandingkan antara Indeks Tumbuhan yang berbeza (berdasarkan pembetulan atmosfera Indeks Tumbuhan), daripada imej satelit Landsat TM 2000. Empat jenis indeks yang telah digunakan di dalam kajian ini termasuklah Global Environmental Monitoring Index (GEMI), Atmospherically Resistant Vegetation Index (ARVI), Modified Aerosol Free Vegetation Index Mid-Infrared (Modified $AFRI_{MIR}$) dan Modified Aerosol Free Vegetation Index Shortwave-Infrared (Modified $AFRI_{SWIR}$). Lima jenis kelas hutan paya bakau telah direkodkan semasa kerja lapangan iaitu *Avicennia*, *Avicennia-Sonneratia,* "Mixed" *Acrostichium*, *Achantus-Sonneratia*, dan "Mixed" *Sonneratia* telah dianalisa oleh Indeks Tumbuhan dengan menggunakan "Spatial-Modeler module" di dalam perisian Erdas. Keputusan menunjukkan bahawa julat bagi "Modified $AFRI_{SWIR}$" adalah membahagi secara baik dan menghasilkan lima kelas tumbuhan. Ini membuktikan bahawa jalur gelombang pendek infra merah amat sensitif pada kandungan cecair dan mempunyai potensi sebagai indeks terbaik untuk mengenalpasti kelas hutan paya bakau. Dengan ketepatan sebanyak 79.33%, lebih tinggi daripada pengkelasan tanpa berpenyelia (72.67%), indeks ini adalah dicadangkan untuk mengurangkan gangguan atmosfera juga mampu mengkelaskan dengan baik. Penggunaan gelombang pendek infra merah di kawasan kajian adalah yang terbaik disebabkan oleh kandungan kelembapan yang tinggi, yang dipengaruhi oleh banyak keadaan dan persekitaran berkaitan cuaca.