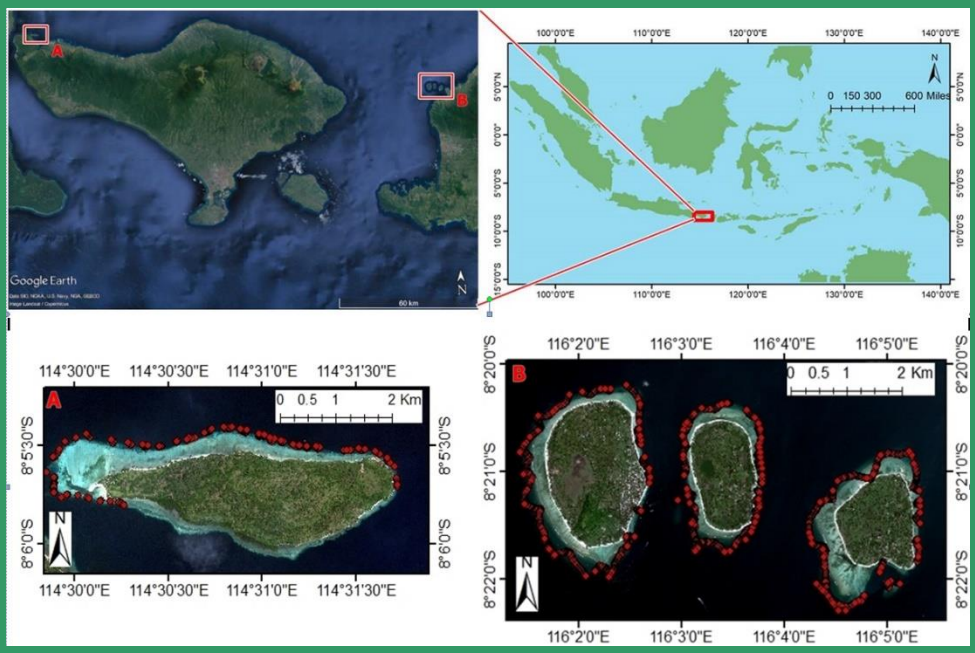
Vol. 14 N0. 2 December 2017

P-ISSN 0216-6739; E-ISSN 2549-516X
No. 774/AU3/P2MI-LIPI/08/2017

International Journal of Remote Sensing and Earth Sciences



Published by
Indonesian National Institute of Aeronautics and Space
(LAPAN)

Vol. 14 N0. 2 December 2017

P-ISSN 0216-6739; E-ISSN 2549-516X
No. 774/AU3/P2MI-LIPI/08/2017

International Journal of Remote Sensing and Earth Sciences

Published by
Indonesian National Institute of Aeronautics and Space
(LAPAN)

Editorial Committee Preface

Dear IJReSES Readers,

We sincerely thank you for reading the International Journal of Remote Sensing and Earth Sciences Vol. 14 No 2, December 2017. In general, this journal is expected to enrich the serial publications on earth sciences. In particular this journal is aimed to present improvement in remote sensing studies and its applications on earth sciences. This journal also serves as the enrichment on earth sciences publication, not only in Indonesia and Asia but also worldwide.

This journal consists of papers discussing the particular interest in remote sensing field. Those papers are having remote sensing data for image processing, geosciences, oceanography, environment, disaster, mining activities, etc. A variety of topics are discussed in this fourteenth edition. Briefly, the topics discussed in this edition are the studies of remote sensing data processing issues such as the peat thickness classes estimated from land cover, spatial projection of land use and its connection with urban ecology spatial planning, compression on remote sensing data, and preliminary study of LSU-02 photo data application to support 3D modeling. Meanwhile the topics on remote sensing applications and validation are also discussed such as determination of the best methodology for bathymetry mapping, carbon stock estimation of mangrove vegetation, detecting the area damage due to coal mining activities, and information criterion-based mangrove land classification.

The publication of IJReSES is intended to supply the demands regarding the information on the Remote Sensing and Earth Sciences. This journal is also intended to motivate Indonesian as well as Asian scientists to submit their research results. Thus, by their submitted research results, it will contribute to the development and strengthening in remote sensing field particularly in Asia. To that end, we invite scientists to play their parts in this journal by submitting their scientific research papers. We look forward to receiving your research works for the next edition of this journal.

Editor-in-Chief,

Dr M. Rokhis Khomarudin

Vol. 14 N0. 2 December 2017
P-ISSN 0216-6739; E-ISSN 2549-516X

Contribution Paper to:

IJReSES Secretariat
National Institute of Aeronautics and Space of Indonesia (LAPAN)
Jl. Pemuda Persil No. 1, Rawamangun, Jakarta 13220, INDONESIA
Phone. (021) 4892802 ext. 144 – 145 (Hunting) Fax. (021) 47882726
Pukasi.lapan@gmail.com; publikasi@lapan.go.id

Published by:
National Institute of Aeronautics and Space of Indonesia
(LAPAN)

INTERNATIONAL JOURNAL OF
REMOTE SENSING AND EARTH SCIENCES
Vol. 14 No. 2 December 2017
P-ISSN 0216-6739; E- ISSN 2549-516X
No. 774/AU3/P2MI-LIPI/08/2017

Contents

Published by:
National Institute of Aeronautics and Space of Indonesia (LAPAN)

International Journal of
Remote Sensing and Earth Sciences
P-ISSN 0216 – 6739; E- ISSN 2549-516X Vol. 14 No.1, June 2017
No. 774/AU3/P2MI-LIPI/08/2017

ABSTRACT

HARMFUL ALGAL BLOOM 2012 EVENT VERIFICATION IN LAMPUNG BAY USING RED TIDE DETECTION ON SPOT 4 IMAGE / Emiyati1, Ety Parwati, and Syarif Budhiman
IJRESES, 14 (1) 2017 : 1- 8

In mid-December 2012, harmful algal bloom phenomenon occurred in Lampung Bay. Harmful Algal Bloom (HAB) is blooming of algae in aquatic ecosystems. It has negative impact on living organism, due to its toxic. This study was applied Red Tide (RT) detection algorithm on SPOT 4 images and verified the distribution of HAB 2012 event in Lampung Bay. The HAB event in 2012 in Lampung Bay can be detected by using RT algorithm on SPOT 4 images quantitatively and qualitatively. According to field measurement, the phytoplankton blooming which happen at Lampung Bay in 2012 were Cochlodinium sp. Image analysis showed that Cochlodinium sp has specific pattern of RT with values, digitally, were 13 to 41 and threshold value of red band SPOT 4 image was 57. The total area of RT distribution, which are found in Lampung Bay, was 11,545.3 Ha. Based on the RT classification of RT images and field data measurement, the RT which is caused many fishes died on the western coastal of Lampung Bay spread out from Bandar Lampung City to Batumenyan village. By using confusion matrix, the accuracy of this this method was 74.05 %. This method was expected to be used as early warning system for HAB monitoring in Lampung Bay and perhaps in another coastal region of Indonesia.

Keywords: *harmful algal bloom, Lampung Bay, SPOT 4 image, red tide algorithm*

A PARTIAL ACQUISITION TECHNIQUE OF SAR SYSTEM USING COMPRESSIVE SAMPLING METHOD / Rahmat Arief
IJRESES, 14 (1) 2017 : 9-18

In line with the development of Synthetic Aperture Radar (SAR) technology, there is a serious problem when the SAR signal is acquired using high rate analog digital converter (ADC), that require large volumes data storage. The other problem on compressive sensing method, which frequently occurs, is a large measurement matrix that may cause intensive calculation. In this paper, a new approach was proposed, particularly on the partial acquisition technique of SAR system using compressive sampling method in both the azimuth and range direction. The main objectives of the study are to reduce the radar raw data by decreasing the sampling rate of ADC and to reduce the computational load by decreasing the dimension of the measurement matrix. The simulation results found that the reconstruction of SAR image using partial acquisition model has better resolution compared to the conventional method (Range Doppler Algorithm/RDA). On a target of a ship, that represents a low-level sparsity, a good reconstruction image could be achieved from a fewer number measurement. The study concludes that the method may speed up the computation time by a factor 4.49 times faster than with a full acquisition matrix.

Keywords: *partial acquisition technique, synthetic aperture radar, compressive sampling*

International Journal of
Remote Sensing and Earth Sciences
P-ISSN 0216 – 6739; E- ISSN 2549-516X Vol. 14 No.1, June 2017
No. 774/AU3/P2MI-LIPI/08/2017

ABSTRACT

VALIDATION OF COCHLODINIUM POLYKRIKOIDES RED TIDE DETECTION USING SEAWIFS-DERIVED CHLOROPHYLL-A DATA WITH NFRDI RED TIDE MAP IN SOUTH EAST KOREAN WATERS / Gathot Winarso and Joji Ishizaka
IJRESES, 14 (1) 2017 : 19-26

Annual summer red tides of Cochlodinium polykrikoides have happenned at southern coastal of the South Korea, accounted economic losses of 76.4 billion won in 1995 on fisheries and other economic substantial losses. Therefore, it is important to eliminate the damage and losses by monitoring the bloom and to forecast their development and movement. On previous study, ocean color satellite, SeaWiFS, standard chlorophyll-a data was used to detect the red tide, using threshold value of chlorophyll-a concentration ≥ 5 mg/m3, resulted a good correlation using visual comparison. However, statistic based accuracy analysis has not be done yet. In this study, the accuracy of detection method was analyzed using spatial statistic. Spatial statistical match up analysis resulted 68% of red tide area was not presented in satellite data due to masking. Within red tide area where data existed, 36% was in high chlorophyll-a area and 64% was in low chlorophyll-a area. Within the high chlorophyll-a area 13% and 87% was in and out of the red tide area. It was found that the accuracy of this detection is low. However if the accuracy was yearly splitted, its found that 75% accuracy on 2002 where visually red tide detected spead out to the off-shore area. The fail and false detection are not due to the failure of the detection method but caused by limitation of the technology due to the natural condition i.e. type of red tide spreading, cloud cover and other flags such as turbid water, stray light etc.

Keywords: *cochlodinium polykrikoides, chlorophyll-a, SeaWiFS, red tide*

A COMPARISON OF OBJECT-BASED AND PIXEL-BASED APPROACHES FOR LAND USE/LAND COVER CLASSIFICATION USING LAPAN-A2 MICROSATELLITE DATA / Jalu Tejo Nugroho1, Zylshal, Nurwita Mustika Sari, and Dony Kushardono
IJRESES, 14 (1) 2017: 27-36

In recent years, small satellite industry has been a rapid trend and become important especially when associated with operational cost, technology adaptation and the missions. One mission of LAPAN-A2, the 2nd generation of microsatellite that developed by Indonesian National Institute of Aeronautics and Space (LAPAN), is Earth observation using digital camera that provides imagery with 3.5 m spatial resolution. The aim of this research is to compare between object-based and pixel-based classification of land use/land cover (LU/LC) in order to determine the appropriate classification method in LAPAN-A2 data processing (case study Semarang, Central Java).The LU/LC were classified into eleven classes, as follows: sea, river, fish pond, tree, grass, road, building 1, building 2, building 3, building 4 and rice field. The accuracy of classification outputs were assessed using confusion matrix. The object-based and pixel-based classification methods result for overall accuracy are 31.63% and 61.61%, respectively. According to accuracy result, it was thought that blurring effect on LAPAN-A2 data may be the main cause of accuracy decrease. Furthermore, the result is suggested to use pixel-based classification to be applied in LAPAN-A2 data processing.

Keywords: *LAPAN-A2 microsatellite, LU/LC, object-based, pixel-based*

International Journal of
Remote Sensing and Earth Sciences
P-ISSN 0216 – 6739; E- ISSN 2549-516X Vol. 14 No.1, June 2017
No. 774/AU3/P2MI-LIPI/08/2017

ABSTRACT

VERIFICATION OF PISCES DISSOLVED OXYGEN MODEL USING IN SITU MEASUREMENT IN BIAK, ROTE, AND TANIMBAR SEAS, INDONESIA / Armyanda Tussadiah, Joko Subandriyo, Sari Novita, Widodo S. Pranowo
IJRESES, 14 (1) 2017: 37-46

Dissolved oxygen (DO) is one of the most chemical primary data in supported life for marine organisms. Ministry of Marine Affairs and Fisheries Republic of Indonesia through Infrastructure Development for Space Oceanography (INDESO) Project provides dissolved oxygen data services in Indonesian Seas for 7 days backward and 10 days ahead (9,25 km x 9.25 km, 1 daily). The data based on Biogeochemical model (PISCES) coupled with hydrodynamic model (NEMO), with input data from satellite acquisition. This study investigated the performance and accuracy of dissolved oxygen from PISCES model, by comparing with the measurement in situ data in Indonesian Seas specifically in three outermost islands of Indonesia (Biak Island, Rote Island, and Tanimbar Island). Results of standard deviation values between in situ DO and model are around two (St.dev ± 2). Based on the calculation of linear regression between in situ DO with the standard deviation obtained a high determinant coefficient, greater than 0.9 (R2 ≥ 0.9). Furthermore, RMSE calculation showed a minor error, less than 0.05. These results showed that the equation of the linear regression might be used as a correction equation to gain the verified dissolved oxygen.

Keywords: verification, PISCES model, dissolved oxygen, in situ measurement, indonesia, linear regression

IN-SITU MEASUREMENT OF DIFFUSE ATTENUATION COEFFICIENT AND ITS RELATIONSHIP WITH WATER CONSTITUENT AND DEPTH ESTIMATION OF SHALLOW WATERS BY REMOTE SENSING TECHNIQUE / Budhi Agung Prasetyo, Vincentius Paulus Siregar, Syamsul Bahri Agus, Wikanti Asriningrum
IJRESES, 14 (1) 2017: 47-60

Diffuse attenuation coefficient, Kd(λ), has an empirical relationship with water depth, thus potentially to be used to estimate the depth of the water based on the light penetration in the water column. The aim of this research is to assess the relationship of diffuse attenuation coefficient with the water constituent and its relationship to estimate the depth of shallow waters of Air Island, Panggang Island and Karang Lebar lagoons and to compare the result of depth estimation from Kd model and derived from Landsat 8 imagery. The measurement of Kd(λ) was carried out using hyperspectral spectroradiometer TriOS-RAMSES with range 320 – 950 nm. The relationship between measurement Kd(λ) on study site with the water constituent was the occurrence of absorption by chlorophyll-a concentration at the blue and green spectral wavelength. Depth estimation using band ratio from Kd(λ) occurred at 442,96 nm and 654,59 nm, which had better relationship with the depth from in-situ measurement compared to the estimation based on Landsat 8 band ratio. Depth estimated based on Kd(λ) ratio and in-situ measurement are not significantly different statistically. Depth estimated based on Kd(λ) ratio and in-situ measurement are not significantly different statistically. However, depth estimation based on Kd(λ) ratio was inconsistent due to the bottom albedo reflection because the Kd(λ) measurement was carried out in shallow waters. Estimation of water depth based on Kd(λ) ratio had better results compared to the Landsat 8 band ratio.

Keywords*: in-situ measurement, diffuse attenuation coefficient, relationship with water constituent, depth estimation, shallow water, remote sensing*

International Journal of
Remote Sensing and Earth Sciences
P-ISSN 0216 – 6739; E- ISSN 2549-516X Vol. 14 No.1, June 2017
No. 774/AU3/P2MI-LIPI/08/2017

ABSTRACT

TIME SERIES ANALYSIS OF TOTAL SUSPENDED SOLID (TSS) USING LANDSAT DATA IN BERAU COASTAL AREA, INDONESIA / Ety Parwati1 and Anang Dwi Purwanto
IJRESES, 14 (1) 2017: 61-70

Water quality information is usually used for the first examination of the pollution. One of the parameters of water quality is Total Suspended Solid (TSS), which describes the amount of matter of particles suspended in the water. TSS information is also used as initial information about waters condition of a region. TSS could be derive from Landsat data with several combinations of spectral channels to evaluate the condition of the observation area for both the waters and the surrounding land. The study aimed to evaluate Berau waters condition in Kalimantan, Indonesia, by utilizing TSS dynamics extracted from Landsat data. Validated TSS extraction algorithm was obtained by choosing the best correlation between field data and image data. Sixty pairs of points had been used to build validated TSS algorithms for the Berau Coastal area. The algorithm was TSS = 3.3238 * exp (34 099 * Red Band Reflectance). The data used for this study were Landsat 5 TM, Landsat 7 ETM and Landsat 8 data acquisition in 1994, 1996, 1998, 2002, 2004, 2006, 2008 and 2013. For detailed evaluation, 20 regions were created along the watershed up to the coast. The results showed the fluctuation of TSS values in each selected region. TSS value increased if there was a change of any kind of land cover/land used into bareland, ponds, settlements or shrubs. Conversely, TSS value decreased if there was a wide increase of mangrove area or its position was very closed to the ocean.

Keywords: *TSS, Landsat 5 TM, Landsat 7 ETM +, Landsat 8, watershed, mangrove*

SIMULATION OF DIRECT GEOREFERENCING FOR GEOMETRIC SYSTEMATIC CORRECTION ON LSA PUSHBROOM IMAGER / Muchammad Soleh1, Wismu Sunarmodo, and Ahmad Maryanto
IJRESES, 14 (1) 2017: 71-82

LAPAN has developed remote sensing data collection by using a pushbroom linescan imager camera sensor mounted on LSA (Lapan Surveillance Aircraft). The position accuracy and orientation system for LSA applications are required for Direct Georeferencing and depend on the accuracy of off-the-shelf integrated GPS/inertial system, which used on the camera sensor. This research aims to give the accuracy requirement of Inertial Measurement Unit (IMU) sensor and GPS to improve the accuracy of the measurement results using direct georeferencing technique. Simulations were performed to produce geodetic coordinates of longitude, latitude and altitude for each image pixel in the imager pushbroom one array detector, which has been geometrically corrected. The simulation results achieved measurement accuracies for mapping applications with Ground Sample Distance (GSD) or spatial resolution of 0,6 m of the IMU parameter (pitch, roll and yaw) errors about 0.1; 0.1; and 0.1 degree respectively, and the error of GPS parameters (longitude and latitude) about 0.00002 and 0.2 degree. The results are expected to be a reference for a systematic geometric correction to image data pushbroom linescan imager that would be obtained by using LSA spacecraft.

Keywords: *direct georeferencing, pushbroom imager, systematic geometric correction, LSA*

International Journal of
Remote Sensing and Earth Sciences
P-ISSN 0216 – 6739; E- ISSN 2549-516X Vol. 14 No.2, December 2017
No. 774/AU3/P2MI-LIPI/08/2017

ABSTRACT

CAN THE PEAT THICKNESS CLASSES BE ESTIMATED FROM LAND COVER TYPE APPROACH?/Bambang Trisakti Bambang, Atriyon Julzarika, Udhi C. Nugroho, Dipo Yudhatama, and Yudi Lasmana
IJRESES, 14 (2) 2017: 83-94

Indonesia has been known as a home of the tropical peatlands. The peatlands are mainly in Sumatera, Kalimantan and Papua Islands. Spatial information on peatland depth is needed for the planning of agricultural land extensification. The research objective was to develop a preliminary estimation model of peat thickness classes based on land cover approach and analyse its applicability using Landsat 8 image. Ground data, including land cover, location and thickness of peat, were obtained from various surveys and peatlands potential map (Geology Map and Wetlands Peat Map). The land cover types were derived from Landsat 8 image. All data were used to build an initial model for estimating peat thickness classes in Merauke Regency. A table of relationships among land cover types, peat potential areas and peat thickness classes were made using ground survey data and peatlands potential maps of that were best suited to ground survey data. Furthermore, the table was used to determine peat thickness classes using land cover information produced from Landsat 8 image. The results showed that the estimated peat thickness classes in Merauke Regency consist of two classes, i.e., very shallow peatlands and shallow peatlands. Shallow peatlands were distributed at the upper part of Merauke Regency with mainly covered by forest. In comparison with Indonesia Peatlands Map, the number of classes was the two classes. The spatial distribution of shallow peatlands was relatively similar for its precision and accuracy, but the estimated area of shallow peatlands was greater than the area of shallow peatlands from Indonesia Peatlands Map. This research answered the question that peat thickness classes could be estimated by the land cover approach qualitatively. The precise estimation of peat thickness could not be done due to the limitation of insitu data.

Keywords: *Peat thickness, Landsat 8 image, land cover, Merauke Regency, shallow peatlands*

SPATIAL PROJECTION OF LAND USE AND ITS CONNECTION WITH URBAN ECOLOGY SPATIAL PLANNING IN THE COASTAL CITY, CASE STUDY IN MAKASSAR CITY, INDONESIA/Syahrial Nur Amri, Luky Adrianto, Dietriech Geoffrey Bengen, and Rahmat Kurnia
IJRESES, 14 (2) 2017: 95-110

The arrangement of coastal ecological space in the coastal city area aims to ensure the sustainability of the system, the availability of local natural resources, environmental health and the presence of the coastal ecosystems. The lack of discipline in the supervision and implementation of spatial regulations resulted in inconsistencies between urban spatial planning and land use facts. This study aims to see the inconsistency between spatial planning of the city with the real conditions in the field so it can be used as an evaluation material to optimize the planning of the urban space in the future. This study used satellite image interpretation, spatial analysis, and projection analysis using markov cellular automata, as well as consistency evaluation for spatial planning policy. The results show that there has been a significant increase of open spaces during 2001-2015 and physical development was relatively spreading irregularly and indicated the urban sprawl phenomenon. There has been an open area deficits for the green open space in 2015-2031, such as integrated maritime, ports, and warehousing zones. Several islands in Makassar City are predicted to have their built-up areas decreased, especially in Lanjukang Island, Langkai Island, Kodingareng Lompo Island, Bone Tambung Island, Kodingareng Keke Island and Samalona Island. Meanwhile, the increase of the built up area is predicted to occur in Lumu Island, Barrang Caddi Island, Barrang Lompo Island, Lae-lae Island, and Kayangan Island. The land cover is caused by the human activities. Many land conversions do not comply with the provision of percentage of green open space allocation in the integrated strategic areas, established in the spatial plan. Thus, have the potential of conflict in the spatial plan of marine and small islands in Makassar City.

Keywords: *spatial projection, land use, spatial planning, remote sensing, coastal city*

International Journal of
Remote Sensing and Earth Sciences
P-ISSN 0216 – 6739; E- ISSN 2549-516X Vol. 14 No.2, December 2017
No. 774/AU3/P2MI-LIPI/08/2017

ABSTRACT

THE EFFECT OF JPEG2000 COMPRESSION ON REMOTE SENSING DATA OF DIFFERENT SPATIAL RESOLUTIONS/ Anis Kamilah Hayati and Haris Suka Dyatmika
IJRESES, 14 (2) 2017: 111-118

The huge size of remote sensing data implies the information technology infrastructure to store, manage, deliver and process the data itself. To compensate these disadvantages, compressing technique is a possible solution. JPEG2000 compression provide lossless and lossy compression with scalability for lossy compression. As the ratio of lossy compression getshigher, the size of the file reduced but the information loss increased. This paper tries to investigate the JPEG2000 compression effect on remote sensing data of different spatial resolution. Three set of data (Landsat 8, SPOT 6 and Pleiades) processed with five different level of JPEG2000 compression. Each set of data then cropped at a certain area and analyzed using unsupervised classification. To estimate the accuracy, this paper utilized the Mean Square Error (MSE) and the Kappa coefficient agreement. The study shows that compressed scenes using lossless compression have no difference with uncompressed scenes. Furthermore, compressed scenes using lossy compression with the compression ratioless than 1:10 have no significant difference with uncompressed data with Kappa coefficient higher than 0.8.

Keywords: *compression, effect, spatial resolution, remote sensing, JPEG2000*

PRELIMINARY STUDY OF LSU-02 PHOTO DATA APPLICATION TO SUPPORT 3D MODELING OF TSUNAMI DISASTER EVACUATION MAP/Linda Yunita, Nurwita Mustika Sari, and Dony Kushardono
IJRESES, 14 (2) 2017: 119-126

The southern coast of Pacitan Regency is one of the vulnerable areas to the tsunami. Therefore, the map of the vulnerable and safe area from the tsunami disaster is required. Currently, there are many mapping technologies with UAVs used for spatial analysis. One of the UAV technologies which used in this research is LAPAN Surveillance UAV 02 (LSU-02). This study aims to map the evacuation plan area from LSU-02 aerial imagery. Tsunami evacuation area was identified by processing the aerial photo data into orthomosaic and Digital Elevation Model (DEM). The result shows that there are four points identified as the tsunami evacuation plan area. These points are located higher than the surrounding area and are easily accessible.

Keywords: *Aerial remote sensing, photo data of LSU-02, 3D modelling, tsunami*

International Journal of
Remote Sensing and Earth Sciences
P-ISSN 0216 – 6739; E- ISSN 2549-516X Vol. 14 No.2, December 2017
No. 774/AU3/P2MI-LIPI/08/2017

ABSTRACT

DETERMINATION OF THE BEST METHODOLOGY FOR BATHYMETRY MAPPING USING SPOT 6 IMAGERY: A STUDY OF 12 EMPIRICAL ALGORITHMS/Masita Dwi Mandini Manessa, Muhammad Haidar, Maryani Hastuti, and Diah Kirana
IJRESES, 14 (2) 2017: 127-136

For the past four decades, many researchers have published a novel empirical methodology for bathymetry extraction using remote sensing data. However, a comparative analysis of each method has not yet been done. Which is important to determine the best method that gives a good accuracy prediction. This study focuses on empirical bathymetry extraction methodology for multispectral data with three visible band, specifically SPOT 6 Image. Twelve algorithms have been chosen intentionally, namely, 1) Ratio transform (RT); 2) Multiple linear regression (MLR); 3) Multiple nonlinear regression (RF); 4) Second-order polynomial of ratio transform (SPR); 5) Principle component (PC); 6) Multiple linear regression using relaxing uniformity assumption on water and atmosphere (KNW); 7) Semiparametric regression using depth-independent variables (SMP); 8) Semiparametric regression using spatial coordinates (STR); 9) Semiparametric regression using depth-independent variables and spatial coordinates (TNP), 10) bagging fitting ensemble (BAG); 11) least squares boosting fitting ensemble (LSB); and 12) support vector regression (SVR). This study assesses the performance of 12 empirical models for bathymetry calculations in two different areas: Gili Mantra Islands, West Nusa Tenggara and Menjangan Island, Bali. The estimated depth from each method was compared with echosounder data; RF, STR, and TNP results demonstrate higher accuracy ranges from 0.02 to 0.63 m more than other nine methods. The TNP algorithm, producing the most accurate results (Gili Mantra Island RMSE = 1.01 m and R^2=0.82, Menjangan Island RMSE = 1.09 m and R^2=0.45), proved to be the preferred algorithm for bathymetry mapping.

Keywords: *bathymetry; SPOT 6; empirical methodology; multispectral image*

CARBON STOCK ESTIMATION OF MANGROVE VEGETATION USING REMOTE SENSING IN PERANCAK ESTUARY, JEMBRANA DISTRICT, BALI/Amandangi Wahyuning Hastuti, Komang Iwan Suniada, and Fikrul Islamy
IJRESES, 14 (2) 2017: 137-150

Mangrove vegetation is one of the forest ecosystems that offers a potential of substantial greenhouse gases (GHG) emission mitigation, due to its ability to sink the amount of CO_2 in the atmosphere through the photosynthesis process. Mangroves have been providing multiple benefits either as the source of food, the habitat of wildlife, the coastline protectors as well as the CO_2 absorber, higher than other forest types. To explore the role of mangrove vegetation in sequestering the carbon stock, the study on the use of remotely sensed data in estimating carbon stock was applied. This paper describes an examination of the use of remote sensing data particularly Landsat-data with the main objective to estimate carbon stock of mangrove vegetation in Perancak Estuary, Jembrana, Bali. The carbon stock was estimated by analyzing the relationship between NDVI, Above Ground Biomass (AGB) and Below Ground Biomass (BGB). The total carbon stock was obtained by multiplying the total biomass with the carbon organic value of 0.47. The study results show that the total accumulated biomass obtained from remote sensing data in Perancak Estuary in 2015 is about 47.20±25.03 ton ha^{-1} with total carbon stock of about 22.18±11.76 tonC $ha^{-1}$and CO_2 sequestration 81.41±43.18 tonC ha^{-1}.

Keywords: *Perancak Estuary, carbon stock estimation, mangrove, CO_2 sequestration, NDVI*

International Journal of
Remote Sensing and Earth Sciences
P-ISSN 0216 – 6739; E- ISSN 2549-516X Vol. 14 No.2, December 2017
No. 774/AU3/P2MI-LIPI/08/2017

ABSTRACT

DETECTING THE AREA DAMAGE DUE TO COAL MINING ACTIVITIES USING LANDSAT MULTITEMPORAL (CASE STUDY: KUTAI KARTANEGARA, EAST KALIMANTAN) /Suwarsono, Nanik Suryo Haryani, Indah Prasasti, Hana Listi Fitriana M. Priyatna, and M. Rokhis Khomarudin
IJRESES, 14 (2) 2017: 151-158

Coal is one of the most mining commodities to date, especially to supply both national and international energy needs. Coal mining activities that are not well managed will have an impact on the occurrence of environmental damage. This research tried to utilize the multitemporal Landsat data to analyze the land damage caused by coal mining activities. The research took place at several coal mine sites in East Kalimantan Province. The method developed in this research is the method of change detection. The study tried to know the land damage caused by mining activities using NDVI (Normalized Difference Vegetation Index), NDSI (Normalized Difference Soil Index), NDWI (Normalized Difference Water Index) and GEMI (Global Environment Monitoring Index) parameter based change detection method. The results showed that coal mine area along with the damage that occurred in it can be detected from multitemporal Landsat data using NDSI value-based change detection method. The area damage due to coal mining activities can be classified into high, moderate, and low classes based on the mean and standard deviation of NDSI changes (ΔNDSI). The results of this study are expected to be used to support government efforts and mining managers in post-mining land reclamation activities.

Keywords: *damage area, coal mining, landsat multitemporal*

AKAIKE INFORMATION CRITERION BASED MANGROVE LAND CLASSIFICATION USING WORLDVIEW-2 SATELLITE IMAGES IN NUSA LEMBONGAN ISLAND/Aulia Ilham and Marza Ihsan Marzuki
IJRESES, 14 (2) 2017: 159-166

Machine learning is an empirical approach for regressions, clustering and/or classifying (supervised or unsupervised) on a non-linear system. This method is mainly used to analyze a complex system for wide data observation. In remote sensing, machine learning method could be used for image data classification with software tools independence. This research aims to classify the distribution, type, and area of mangroves using Akaike Information Criterion approach for case study in Nusa Lembongan Island. This study is important because mangrove forests have an important role ecologically, economically, and socially. For example is as a green belt for protection of coastline from storm and tsunami wave. Using satellite images Worldview-2 with data resolution of 0.46 meters, this method could identify automatically land class, sea class/water, and mangroves class. Three types of mangrove have been identified namely: *Rhizophora apiculata*, *Sonnetaria alba*, and other mangrove species. The result showed that the accuracy of classification was about 68.32%.

Keywords: *clustering, machine learning, remote sensing data*