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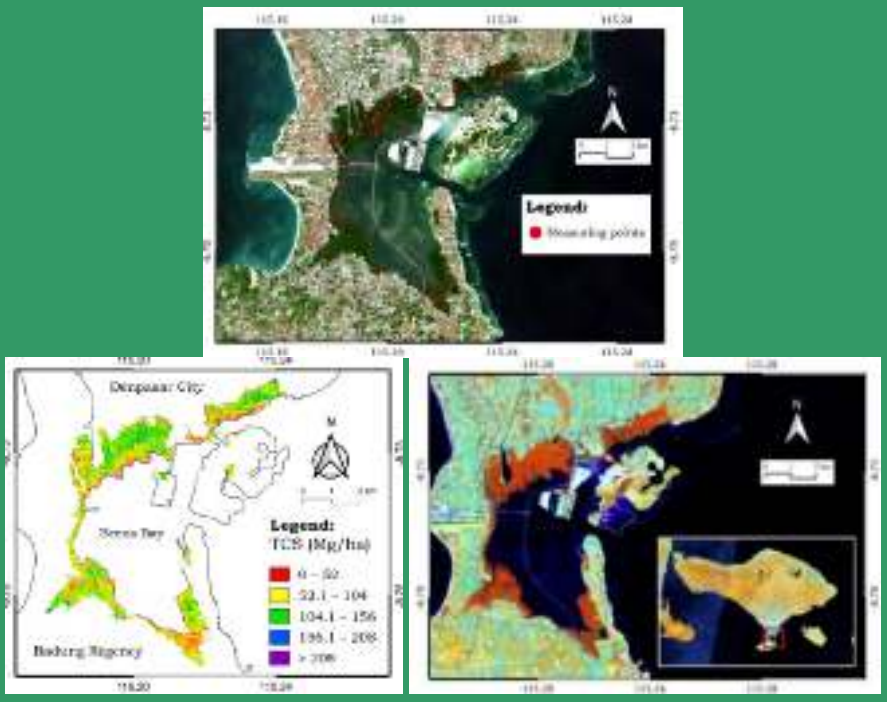

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Editorial Committee Preface

Dear IJReSES Readers,

We sincerely thank you for reading the International Journal of Remote Sensing and Earth Sciences Vol. 19 No 1, June 2022. 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 nineteen edition. Briefly, the topics discussed in this edition are the studies of remote sensing data processing issues such as bathymetri, tsunami disaster risk, water resource, flood disaster areas, weathers, and peatland. There some new methods, new analysis, and new novelties on this edition.

Finally, enjoy your reading of the IJRESES Vol. 19 No. 1 June 2022, and please refer this journal content for your next research and publication. For editorial team members and the journal secretariat, thank you very much for all big supports for this volume publication.

Editor-in-Chief,

Dr M. Rokhis Khomarudin.

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ABSTRACT

LAND USE/COVER CHANGE ON POTENTIAL LOSS OF SUMATRAN TIGERS IN KERINCI SEBLAT NATIONAL PARK BASED ON REMOTE SENSING DATA/ Muhammad Ardha, Muhammad Rokhis Khomarudin and Gatot Nugroho
IJRESES, 19 (1) 2022 : 1-10

The Sumatran tiger is an animal whose life is threatened due to land use changes and human activities. Based on remote sensing data, this study described the correlations between land use/cover (LULC) changes and the potential loss of Sumatran tigers in Kerinci Seblat National Park (KSNP) based on remote sensing data. Remote sensing technology was used due to the good historical data, and it can be used for LULC changes analysis. The results of the analysis of the LULC changes can be used to analyze the changes in the suitability level of the Sumatran tiger habitat. The analysis of LULC changes in 2000 and 2020 has been carried out from Landsat-5 dan Landsat-8 data using the random forest classification method, and then we examined the changes in the level of suitability of the Sumatran Tiger habitat. The results of the analysis of LULC changes showed a significant reduction in primary forests at 282.58 km2, while the increase in plantations and secondary forests was 186.52 km2 and 101.68 km2. This change affects the suitability level of the Sumatran tiger habitat from a highly suitable level to a suitable and not suitable class, approximately about 164.42 km2. The declining suitability level class indicated the potential loss of Sumatran tigers in the Kerinci Seblat National Park. The increasing of plantation and settlement areas will increase the activity of humans. The conflict of human activity with Sumatran tigers' life will impact the loss of Sumatran Tigers in KSNP.

Keywords: *Sumatran Tigers, land use/cover (LULC) change, habitat suitability level, Kerinci Seblat National Park*

COMPARATIVE ANALYSIS OF CLASSIFICATION METHODS FOR MAPPING SHALLOW WATER HABITATS USING SPOT-7 SATELLITE IMAGERY IN NUSA LEMBONGAN ISLAND, BALI/ Kuncoro Teguh Setiawan, Gathot Winarso, Andi Ibrahim, Anang Dwi Purwanto, I Made Parsa
IJRESES, 19 (1) 2022 : 11-20

Shallow water habitat maps are critical for sustainable marine resource management. Using a better digital classification method can provide maps of shallow water habitats with the best accuracy capable of showing actual conditions. Experts are using the object-based classification method as an alternative to the pixel-based method. However, experts continue to rely on the pixel-based classification method when determining the condition of benthic habitat in shallow water. The objective of this study is to analyze the classification results and investigate the accuracy of shallow water habitat distribution using SPOT -7 satellite imagery in Nusa Lembongan Island, Bali. Water column correction based on the algorithm of Lyzenga (2006) was applied, while both object-based and pixel-based classification were used in this study. The benthic habitat classification scheme uses four classes: substrate, seagrass, macroalgae, and coral. The results show that the accuracy of pixel-based classification using maximum likelihood models and object-based classification using decision tree models are different. Mapping benthic habitats in Nusa Lembongan, Bali, with the object-based method and decision tree models has a higher classification accuracy than the pixel-based method with an overall accuracy of 68%.

Keywords: *object-based, pixel-based, coral, seagrass, macroalgae, Lyzenga 2006*

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ABSTRACT

COMPARISON OF MACHINE LEARNING MODELS FOR LAND COVER CLASSIFICATION/ Bambang H. Trisasongko, Dyah R. Panuju, Nur Etika Karyati, Rizqi I'anatus Sholihah
IJRESES, 19 (1) 2022 : 21-30

Land cover data remain one of crucial information for public use. With rapid humanassociated land alteration, this information needs to be frequently updated. Remotely-sensed data provide the best option to construct land cover maps with numerous methods available in the literature. While disagreement exists to select the robust one, further exploration should be made to extend the understanding on the behavior of machine learners, in particular, for classification problems. This article discusses performance of pixel-based machine learning algorithms, frequently used in research or implementation. Five popular algorithms were evaluated to distinguish five rural land cover classes, i.e. built-ups, crops, mixed garden, oil palm plantations and rubber estates, from Sentinel-2 data. This research found that the benchmark, i.e., Classification and Regression Trees, was unable to differentiate woody vegetation, although the overall accuracy was moderate. This suggested that overall accuracy cannot be seen as the only measure for assessing the quality of the thematic output. Meanwhile, support vector machines and random forest competed to yield the highest accuracy and class detection capability, although the latter was in favor with 98% accuracy level. A newly developed model, like extreme gradient boosting, achieved a similar level of accuracy. This research implies that modern machine learning approaches would be invaluable for land cover classification; hence, access to these modeling toolkits is substantial.

Keywords: *artificial neural networks, classification and regression tree, extreme gradient boosting, random forests, Sentinel-2, support vector machines*

ESTIMATION OF OIL PALM PLANT PRODUCTIVITY USING SENTINEL-2A IMAGERY AT CIKASUNGKA PLANTATION PTPN VIII, BOGOR, WEST JAVA/ Afifah Nur Rahmasari, Supriatna, Andry Rustanto
IJRESES, 19 (1) 2022: 31-38

Palm oil is one of the commodities that is growing well in Indonesia with a high commercial value which makes the demand for processed palm oil products increase, it is necessary to have data and technology to estimate the productivity of oil palm plantations more efficiently. Remote sensing technology is one of the technologies that can be used to decide problems spatially and accurately, efficiently, and dynamically. One of them is remote sensing using Sentinel-2A imagery. This study aims to analyze the distribution and the accuracy of the NDVI and ARVI algorithms for the estimation of oil palm productivity at the Cikasungka Plantation PTPN VIII. The estimated productivity of oil palm plantations at Cikasungka Plantation varies in each block with estimated productivity of oil palm plantations of 35,061 Kg/Ha/Month using the algorithm NDVI and ARVI algorithm is 35,431 Kg/Ha/Month. Oil palm productivity was regressed by vegetation index and plant age to generate a model. Based on modeling with these two algorithms, the accuracy of the ARVI algorithm model has a lower RMSE value than NDVI, so it can be said that it is better for estimation of oil palm plant productivity at the Cikasungka Plantation.

Keywords: *estimated productivity, oil palm plants, vegetation index algorithm, sentinel-2A imagery*

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ABSTRACT

COMPARISON OF DATA ASSIMILATION USING SURFACE OBSERVATION, UPPER AIR, AND SATELLITE RADIATION DATA ON RAINFALL PREDICTION IN THE JAMBI REGION (Case Study of Heavy Rain October 20TH, 2020)/ Saveira Fairuz I., Nindya Pradita, Danurahni Aryashta, Gandhi Mahendra
IJRESES, 19 (1) 2022: 39-52

Weather Research and Forecasting (WRF) is a mesoscale numerical weather prediction model that can provide good rainfall prediction information. The accuracy of the initial conditions and the parameterization scheme used in the WRF model affect the quality of the resulting rainfall prediction. Therefore it is necessary to assimilate to optimize the accuracy of the initial conditions in the model using the Three Dimensional Variational (3DVAR) assimilation technique. The purpose of this study was to determine the effect of applying the 3DVAR assimilation technique with the surface, upper air, and satellite radiation observations in predicting the occurrence of heavy rain on October 20, 2020, in the Jambi region by first conducting a parameterization test of the cumulus and microphysical schemes. In this study, four experimental methods were used, namely no assimilation (NON), observation data assimilation (OBS), satellite radiation data assimilation (SAT), and satellite radiation and observation data assimilation (BOTH). Each experimental model result was then verified statistically and spatially to determine the effect of the applied data assimilation. The results of this study indicate that the combination of Grell-3D and Thompson schemes shows the best performance in predicting rainfall. Then based on the spatial analysis of the SAT experiment, it is known that it can improve the model's initial conditions on the temperature and pressure parameters. Meanwhile, based on statistical verification, the SAT experiment improved the accuracy of rainfall predictions with a better forecast skill score than other experiments tested.

Keywords: *heavy rain, parameterization, data assimilation, WRF*

CARBON MONOXIDE SPATIAL PATTERN BASED ON VEHICLE VOLUME DISTRIBUTION IN TANGERANG CITY/ Arfani Priyambodo, Adi Wibowo, M. Dadang Basuki
IJRESES, 19 (1) 2022: 53-68

Air pollution conditions in urban areas continue to increase due to the volume of vehicles every year. This volume increases sources of pollution such as motor vehicles which account for 60-70% of pollution. This study aims to analyze the distribution of vehicle volume and spatial pattern of CO in Tangerang City and see the relationship. The analysis used is descriptive and statistical spatial analysis. The results showed the distribution of vehicle volume in the morning ranged from <800-1600 vehicles on primary collector roads, while in the afternoon, there were 800 to >2000 vehicles on primary arterial roads. The spatial pattern of CO that formed on primary and collector arterial roads with residential land uses, industrial areas, and warehouses, then the CO concentration tends to be high. Meanwhile, other primary collector roads have low to moderate CO concentrations. The Spearman test and linear regression results showed a significant effect between vehicle volume on the Tangerang City CO pattern, with a strength value of 0.689 and an R Square of 0.476.

Keywords: *Vehicle Volume, Air Pollution, Carbon Monoxide, Spatial Pattern*

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ABSTRACT

LOCAL CLIMATE ZONE (LCZ) IN BANDAR LAMPUNG CITY/ Farhan Anfasa Putra, Adi Wibowo, Iqbal Putut Ash Sidiq
IJRESES, 19 (1) 2022: 69-78

The rapid growth of the population in Bandar Lampung has led to a change in the land's usage from vegetation to built-up land. In the end, less vegetation will be present, which also results in higher temperatures in urban. This study intends to identify the state of the city's building density, vegetation density, land surface temperature, and Local Climate Zone (LCZ) in Bandar Lampung. Local Climate Zone (LCZ) maps can provide information on the physical structure of urban planning based on building density, and vegetation density, and are useful in the mitigation and public monitoring of increasing urban temperatures. The data was collected using images from Landsat 8 OLI/TIRS and high-resolution satellite imagery from Maxar Technologies downloaded using Google Earth Pro. Additionally, a field survey was used to measure the air temperature. The LCZ Generator WUDAPT is used to process LCZ data. The findings revealed that Bandar Lampung was dominated by medium-density buildings in the city's canter and medium-density vegetation in its western. The highest LST in residential areas is 35°C, while forest areas have the lowest LST at 15,68°C. There are 14 LCZ classifications, covering seven building types and seven land cover types. The dense tree zone has the highest vegetation density, the open low-rise zone has the highest land surface temperature, and the compact low-rise zone has the highest building density.

Keywords: *Bandar Lampung, Building Density, Vegetation Density, Local Climate Zone, Land Surface Temperature*

SPATIAL DISTRIBUTION OF GREEN OPEN SPACES AND RELATION TO LAND SURFACE TEMPERATURE IN BANDAR LAMPUNG CITY/ Rizky Cahaya Meikatama, Adi Wibowo, Iqbal Putut Ash Sidiq
IJRESES, 19 (1) 2022: 79-90

Bandar Lampung City, the capital city of Lampung Province in Indonesia, became the number three city on the island of Sumatra, with enormous population growth from 2000 to 2015. Population growth resulted in increasing built-up land affecting several aspects, one of which was the increase in surface temperature in urban areas. This study aims to determine changes in green open space, land surface temperature (LST), and the spatial pattern of changes in Bandar Lampung City. Data processing uses Landsat 8 imagery for green space and Google Earth Engine for LST. The results of this study indicate that the distribution of changes in green open space the east to west experienced a change in green open space to non-green open space which resulted in an increase in temperature in the east, southeast, and west, from 25-30oC the temperature increased to >30oC. The change in green open space in the west and some areas found that a change from non-RTH to a public or private green open space resulted in a decrease in temperature starting from 25-30oC decreased to 20-25oC. The spatial pattern of changes in green open space in Bandar Lampung City has a clustered pattern in the west and east of the area following the topography (100-500 masl). At the same time, the land surface temperature pattern (LST) in Bandar Lampung City has a clustered pattern at temperatures <20oC, 20-25oC (found at an altitude of 100-500 masl), and >30oC (following an altitude of 25-100 masl) while for temperatures 25-30oC has a scattered pattern (following an altitude of 25-100 masl) in Bandar Lampung City.

Keywords: *Land Cover, Landsat, Land surface temperature*

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ABSTRACT

BIOMASS ESTIMATION MODEL AND CARBON DIOXIDE SEQUESTRATION FOR MANGROVE FOREST USING SENTINEL-2 IN BENOA BAY, BALI/ A. A. Md. Ananda Putra Suardana, Nanin Anggraini, Kholifatul Aziz, Muhammad Rizki Nandika, Azura Ulfa, Agung Dwi Wijaya, Abd. Rahman As-syakur, Gathot Winarso, Wiji Prasetio, Ratih Dewanti
IJRESES, 19 (1) 2022: 91-100

Remote sensing technology can be used to find out the potential of mangrove forests information. One of the potentials is to be able to absorb three times more CO2 than other forests. CO2 absorbed during the photosynthesis process, produces organic compounds that are stored in the mangrove forest biomass. Utilization of remote sensing technology is able to detect mangrove forest biomass using the density level of the vegetation index. This study focuses on determining the best AGB model based on the vegetation index and the ability of mangrove forests to absorb CO2. This research was conducted in Benoa Bay, Bali Province, Indonesia. The satellite image used is Sentinel-2. Classification of mangroves and non-mangroves using a multivariate random forest algorithm. Furthermore, the mangrove forest biomass model using a semi-empirical approach, while the estimation of CO2 sequestration using allometric equations. Mean Absolute Error (MAE) is used to evaluate the validation of the model results. The classification results showed that the detected area of Benoa Bay mangrove forest reached 1134 ha (OA: 0.98, kappa: 0.95). The best AGB estimation result is the DVIbased AGB model (MAE: 23.525) with a value range of 0 to 468.38 Mg/ha. DVI-based AGB derivatives are BGB with a value range of 0 to 79.425 Mg/ha, TAB with a value range of 0 to 547.8 Mg/ha, TCS with a value range of 0 to 257.47 Mg/ha, and ACS with a value range of 0 to 944.912 Mg/ha.

Keywords: *Mangroves, remote sensing, vegetation indices, biomass, CO2 sequestration*