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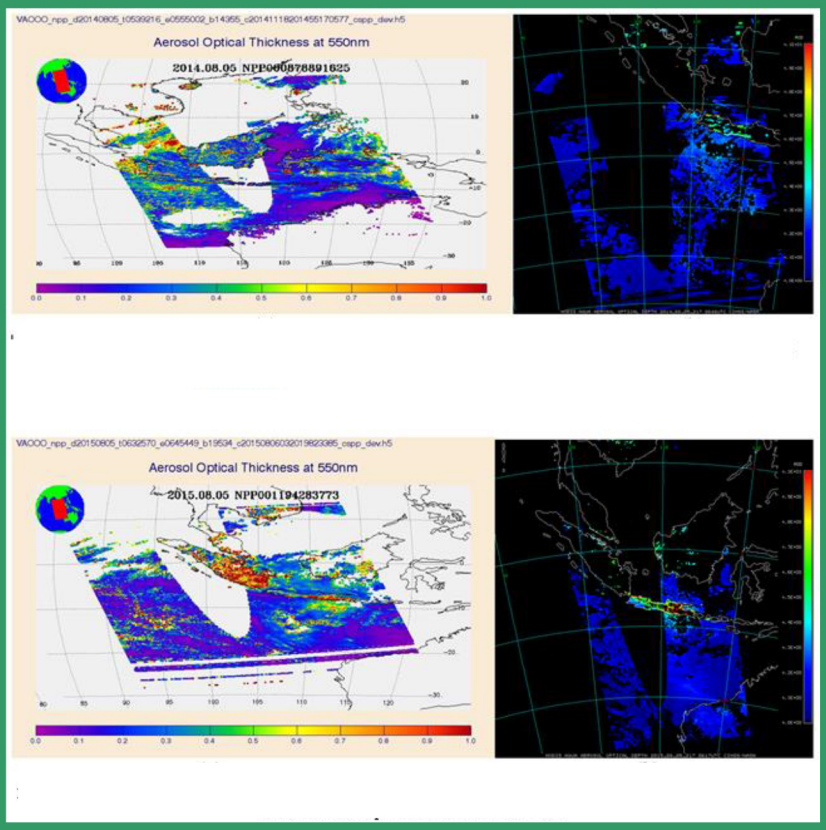

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Editorial Committee Preface

Dear Readers,

Welcome to the International Journal of Remote Sensing and Earth Sciences Vol. 12 No 2, December 2015. This journal is expected to enrich the serial publications on earth sciences, in general, and remote sensing in particular, not only in Indonesia and Asian countries, but also worldwide.

The contents of this journal are particular interest to remote sensing as the main data for geosciences, oceanography, marine biology, fisheries, meteorology, etc. In this twelfth edition, various topics are discussed, including studies of mangrove above ground biomass estimation, effect of hydrologic response unit on flow discharges Ci Rasea watershed, height model integration, water clarity mapping, ozone variability and ozone depleting substances, analysis on the quality of aerosol optical thickness data, identification of land surface temperature distribution of geothermal area, and detection of forest fire and smoke source locations.

This journal is intended, among others, to complement information on Remote Sensing and Earth Sciences, and also encourage young scientists in Indonesia and Asian countries to contribute their research results. Therefore, we would like to invite scientists to manifest their ideas through scientific research papers. We are looking forward to receiving your manuscripts for the next edition of this journal.

Editor-in-Chief,

Dr. M. Rokhis Khomarudin

Editorial Committee Members

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ABSTRACT

DEVELOPMENT OF DISSOLVED OXYGEN CONCENTRATION EXTRACTION MODEL USING LANDSAT DATA (CASE STUDY: RINGGUNG COASTAL WATERS)/Muchlisin Arief
IJReSES, 12 (1): 1-12

Water is a key component to the process of earth's life. However, with increasing industrial development and anthropogenic activities, water quality has been decreased dramatically. Therefore, monitoring is necessary to anticipate the threat of contamination and to take effective action at all levels in local or central government. Methods/algorithms were proposed for detecting/mapping /extraction concentrations of dissolved oxygen (DO) derived from Landsat remote sensing imagery using empirical formulation. The aim of this study to monitor the quality of coastal waters over large areas. The method begins with the calculation of water surface temperature derived from Landsat data, using the correlation function obtained by correlating the temperature measurement by the infrared band reflectance values. Then the image is used to calculate the concentration of DO using the correlation function. the correlation function is obtained by correlating the results of field measurements of DO with temperature. The study conducted in the Ringgung coastal waters located in Padang Cermin District, Pesawaran municipal conducted on August 7 to 11, 2012. Based on the analysis, dissolved oxygen concentration of Ringgung coastal waters is inversely proportional to the amount of fresh water entering the coastal waters and directly proportional to the aeration process. As a result, in June the concentration of dissolved oxygen near the beach (on shore water) greater than in the offshore water. While in August, the concentration of dissolved oxygen near the coast (on shore water) is lower than in the offshore water.

Keywords: detection, dissolved oxygen, correlation, Landsat, Ringgung,

THE EFFECT OF DIFFERENT ATMOSPHERIC CORRECTIONS ON BATHYMETRY EXTRACTION USING LANDSAT 8 SATELLITE IMAGERY/ Kuncoro Teguh Setiawan, Yennie Marini, Johannes Manalu, and Syarif Budhiman
IJReSES, 12 (1): 13-20

Remote sensing technology can be used to obtain information bathymetry. Bathymetric information plays an important role for fisheries, hydrographic and navigation safety. Bathymetric information derived from remote sensing data is highly dependent on the quality of satellite data use and processing. One of the processing to be done is the atmospheric correction process. The data used in this study is Landsat 8 image obtained on June 19, 2013. The purpose of this study to determine the effect of different atmospheric correction on bathymetric information extraction from Landsat satellite image data 8. atmospheric correction method is performed is the minimum radiant, dark pixels and atcor. Bathymetry extraction result of Landsat 8 uses a third method of atmospheric correction is difficult to distinguish which one is best. The calculation of the difference extraction results are determined from regression models and correlation coefficient value calculation error is generated.

Keywords*: atmospheric correction, bathymetry, Landsat 8 imagery*

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ABSTRACT

GROWTH PROFILE ANALYSIS OF OIL PALM BY USING SPOT 6 THE CASE OF NORTH SUMATERA/Ita Carolita, J. Sitorus, Johanes Manalu, and Dhimas Wiratmoko
IJReSES, 12 (1): 21-26

Oil Palm (*Elaeis guineensis* Jack.) is one of the world's most important tropical tree crops. Its expansion has been reported to cause widespread environment impacts. SPOT 6 data is one of high resolution satellite data that can give information more detail about vegetation and the age of oil palm plantation. The objective of this study was to analyze the growth profile of oil palm and to estimate the productivity age of oil palm. The study area is PTP N 3 in Tebing Tinggi North Sumatera Indonesia. The method that used is NDVI analysis and regression analysis for getting the model of oil palm growth profile. Data from the field were collected as the secondary data to build that model. The data that collected were age of oil palm and diameters of canopy for every age. Results indicate that oil palm growth can be explained by variation of NDVI with formula $y = -0.0004x^2 + 0.0107x + 0.3912$, where x is oil palm age and Y is NDVI of SPOT, with $R^2 = 0.657$. This equation can be used to predict the age of oil palm for range 4 to 11 years with R^2 around 0.89.

Keywords: *growth profile, SPOT 6, palm oil plantation age.*

THE EFFECT OF ENVIRONMENTAL CONDITION CHANGES ON DISTRIBUTION OF URBAN HEAT ISLAND IN JAKARTA BASED ON REMOTE SENSING DATA/ Indah Prasasti, Suwarsono, and Nurwita Mustika Sari
IJReSES, 12 (1): 27-40

Anthropogenic activities of urban growth and development in the area of Jakarta has caused increasingly uncomfortable climatic conditions and tended to be hotter and potentially cause the urban heat island (UHI = urban heat island). This phenomenon can be monitored by observing the air temperature measured by climatological station, but the scope is relatively limited. Therefore, the utilization of remote sensing data is very important in monitoring the UHI with wider coverage and effective. In addition, the data sensing can also be used to map the pattern of changes in environmental conditions (microclimate). This study aimed to analyze the effect of changes in environmental conditions (land use/cover, Normalized Difference Vegetation Index (NDVI) and Normalized Difference Build-up Index (NDBI)) toward the spread of the urban heat island (UHI). In this case, the UHI was identified from pattern changes of Land Surface Temperature (LST) in Jakarta based on data from remote sensing. The data used was Landsat ETM Landsat in 2007 and Landsat 8 in 2013 for parameter extraction environmental conditions, namely: land use/cover, NDVI values, NDBI, and LST. The analysis showed that during the period 2007 to 2013, there has been a change in the condition of the land use/cover, impairment NDVI, and expansion NDBI that trigger an increase in LST and the formation of heat islands in Jakarta, especially in the area of business centers, main street and surrounding area, as well as in residential areas.

Keywords: *urban heat island, Landsat ETM, land use/ cover, NDVI, NDBI, Jakarta*

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ABSTRACT

THE UTILIZATION OF LANDSAT 8 FOR MAPPING THE SURFACE WATERS TEMPERATURE OF GRUPUK BAY - WEST NUSA TENGGARA: WITH IMPLICATIONS FOR SEAWEEDS CULTIVATION/ Bidawi Hasyim, Syarif Budiman, Arlina Ratnasari, Emiyati, and Anneke K. S. Manoppo
IJReSES, 12 (1) : 41-48

Locating a suitable site is the key to success in cultivating seaweed, as it is becomes one of the coastal and marine prospects for improving the national economy. Numerous factors such as water movement, substratum, depth, salinity, light intensity, surface water temperature, influence the growth of this aquatic plant, and should be considered while choosing a farming area. One of key parameters on studying sea water conditions is surface temperature distribution, as changes on temperature effecting physical, chemical, and biological condition of the sea water. Surface waters temperature is affected by radiation, and sun position, geographic, seasons, overcast, interaction process between air and waters, evaporation level, and wind blowing. It's rarely easy job to measure surface waters temperature, because often, researcher has to deal with strong winds and high waves. The objectives of this research is to do surface waters temperature mapping of Grupuk Bay – West Nusa Tenggara, using thermal infrared channel of Landsat-8 data, which is supported by field observation data. Surface temperature measurement is conducted through field survey in conjunction with Landsat-8 orbit. Surface temperature calculation is carried out by using certain method issued by United States Geological Survey (USGS, 2013). Calculation result on Grupuk Bay's water surface temperature shows that it ranges from 28.00 to 30.00oC, while field survey result shows that it ranges from 28.27 to 29.69oC. This research shows that sea surface temperature measurement result based on Landsat-8 data has nearly identical range with field survey result.

Keywords: *surface water temperature, Grupuk Bay, Landsat-8, infrared thermal imaging*

DETECTING THE AFFECTED AREAS OF MOUNT SINABUNG ERUPTION USING LANDSAT-8 IMAGERIES BASED ON REFLECTANCE CHANGE/Suwarsono, Hidayat, Jalu Tejo Nugroho, Wiweka, Parwati, and M. Rokhis Khomarudin
IJReSES, 12 (1) : 49-62

The position of Indonesia as part of a "ring of fire" bringing the consequence that the life of the nation and the state will also be influenced by volcanism. Therefore, it is necessary to map rapidly the affected areas of a volcano eruption. Objective of the research is to detect the affected areas of Mount Sinabung eruption recently in North Sumatera by using optical images Landsat-8 Operational Land Imager. A pair of Landsat 8 images in 2013 and 2014, period before and after eruption, was used to analysis the reflectance change from that period. Affected areas of eruption was separated based on threshold value of reflectance change. The research showed that the affected areas of Mount Sinabung eruption can be detected and separated by using Landsat 8 OLI images based on the change of reflectance value band 4, 5 and NDVI. Band 5 showed the highest values of decreasing and band 4 showed the highest values of increasing. Compared with another uses of single band, the combination of both bands (NDVI) give the best result for detecting the affected areas of volcanic eruption.

Keywords: affected area, Landsat 8, NDVI, Mount Sinabung, reflectance

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ABSTRACT

CHLOROPHYLL-A CONCENTRATIONS ESTIMATION FROM AQUA-MODIS AND VIIRS-NPP SATELLITE SENSORS IN SOUTH JAVA SEA WATERS / Rayhan Nuris, Jonson Lumban Gaol, and Teguh Prayogo
IJReSES, 12 (1): 63-70

This study aimed to estimate the concentration of chlorophyll-a from satellite imagery of National Polar-Orbiting *Operational Environmental Satellite System* (NPOESS) *Preparatory Project* (NPP) in the south Java sea waters and compare it to the concentrations of chlorophyll-a estimation result from the MODIS-Aqua satellite. NPP satellite had *Visible / Infrared Imager Radiometer Suite* (VIIRS) sensors which performance was same as *Moderate Resolution Imaging Spectroradio-meter* (MODIS) sensor with a better spatial resolution. This study used daily satellite imagery of VIIRS-NPP for the period of September 2012 to August 2013. The algorithm that was used to estimate the concentration of chlorophyll-a was *Ocean Color 3-band ratio* (OC-3). The results showed that the spatial distribution pattern of chlorophyll-a concentration between VIIRS - NPP sensor and MODIS had the same pattern, but the estimation of chlorophyll-a concentration from the MODIS sensor was higher than VIIRS -NPP sensor. The concentration of chlorophyll-a showed that there were spatial and temporal variation in the south Java sea waters. Generally, concentrations of chlorophyll-a was higher in East monsoon than West monsoon.

Keywords: *Aqua-MODIS, chlorophyll-a, VIIRS-NPP, remote sensing, south Java Sea waters*

MONITORING OF LAKE ECOSYSTEM STATUS USING LANDSAT DATA (A CASE STUDY: LAKE RAWA PENING)/ Bambang Trisakti, Nana Suwargana, and Joko Santo Cahyono
IJReSES, 12 (1): 71-81

Most lakes in Indonesia have suffered degradation (decrease in quality) caused by land conversion in the catchment area, soil erosion, and water pollution from agriculture and households. This study utilizes remote sensing data to monitor several parameters used as ecosystem-status assessors in accordance with the guidelines of Lake Ecosystem Management provided by the Ministry of Environment. The monitoring was done at Lake Rawa Pening using Landsat satellite data TM/ETM+ over the period of 2000-2013. The data standardization was done by sun angle correction and atmospheric correction by removing dark pixels by using histogram adjustment method. RGB color composites (R: NIR + SWIR, G: NIR, B: NIR-RED) were used for aquatic vegetation (water hyacinth) identification; thus, the lake's surroundings can be delineated. Further samples were collected for water hyacinth classification with Maximum Likelihood method. Total Suspended Matter (TSM) and the water clarity parameters were reduced by Doxoran model and field measurement model. The results show that Lake Rawa Pening was deterioting in term of quality during the period of 2000-2013; it can be seen from the dynamic rate of the shrinkage and the expansion of lake's surface, the uncontrolled distribution of water hyacinth so that it covered 45% of the lake's surface area, the increased concentration of TSM, and the decreased water clarity. Most of Rawa Pening's water have clarity less than 2.5 m which indicates the thropic status of the lake's water is in hypertrophic class.

Keywords: *Lake Ecosystem, satellite data, water hyacinth, water quality*

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ABSTRACT

MANGROVE ABOVE GROUND BIOMASS ESTIMATION USING COMBINATION OF LANDSAT 8 AND ALOS PALSAR DATA/Gathot Winarso, Yenni Vetrita, Anang D Purwanto, Nanin Anggraini, Soni Darmawan, and Doddy M. Yuwono
IJReSES, 12 (2): 85-96

Mangrove ecosystem is important coastal ecosystem ecologically and economically. Mangrove provides rich-carbon stock, most carbon-rich forest among ecosystems of tropical forest. It will be very important for the country has a large mangrove area in global community regarding the climate change policy related emission trading on the Kyoto Protocol. Estimation of mangrove carbon-stock using remote sensing data plays an important role in emission trading in the future. Estimation models of mangrove above ground biomass are still rare and based on common forest biomass estimation model that already have been developed. Vegetation indices are most models used for biomass estimation model, but have low correlation result according some research. Synthetic Aperture Radar (SAR) data with a volume scattering capability chance to get more good correlation on biomass estimation. In this paper, the new model using a combination between optic data and SAR was proposed and studied. Biomass is volume dimension that related with canopy of the tree and also related to height of tree. Vegetation indices provided two dimensional information on biomass trough recording the canopy density of vegetation and could be well estimated using optical remote sensing data. One more dimension to be 3 dimensional is height of three and could be provided from SAR data. Vegetation Indice which used is NDVI extracted from Landsat 8 data and height of tree calculated from ALOS PALSAR. Field biomass data calcultaed using non-decstructive allometric based biomass estimation at 2 different location that is Segara Anakan Cilacap and Alas Purwo Banyuwangi Indonesia. Vegetation indices and field biomassa and ALOS PALSAR-based biomassa estimationresulted low correlation. However, multiplication of NDVI and tree height with field biomass correlation resulted R^2 0.815 at Alas Purwo and R^2 0.081 at Segara Anakan. Low correlation at Segara anakan was due to failed estimation of tree heigh. It seems that ALOS PALSAR height was not accurate at relative short tree dominated likes at SegaraAnakanCilacap and pretty good at high tree dominated. Need to validate this method using more data and improve more accuracy of tree heigh estimation.

Keywords : *mangrove, biomass, Landsat 8, ALOS PALSAR*

THE EFFECT OF HYDROLOGIC RESPONSE UNIT TO FLOW DISCHARGES CI RASEA WATERSHED BASED ON LANDSAT TM/Emiyati, Eko Kusratmoko, and Sobirin
IJReSES, 12 (2): 97-106

This paper discussed spatial pattern of Hydrologic Response Unit (HRU), which is a unit formed of hydrological analysis, including geology and soil type, elevation and slope, and also land cover in 2009. This paper also discusses the impact of HRU on flow Ci Rasea watershed, West Java. A Ci Rasea watershed is part of citarum upstream which located in the Province of West Java. This study used SWAT (Soil and Water Assessment Tool) model to get HRU and flow in spatially. This method used Landsat TM data for land cover and daily rainfall for flow modeling. The results shown spatial pattern of HRU spatially was affected by land cover, soil type and slope. In 2009, accumulated surface runoff and the changing of flow were affected by changes of HRU spatially. The large amount accumulation of flow rate happened in HRU which has landcover paddy field with clayey dusty soil and flat slope. While the small amount of flow rate happened in HRU which has plantation with clay soil and slightly tilted slopes as HRU dominant. It was found that an accumulation of surface runoff in Ci Rasea watershed can be reduced by made some area which has clay and slightly tilted slope become a plantation area and also areas which has a sandy loam soil and flat slope can be used for paddy fields. Beside influenced by HRU, amount of flow rate also influence with distance of sub watershed with the outlet. By using the NS model and statistical t-student for calibration and validation was obtained that the accuracy of flow models with this HRU was 70%. It was meant that the model can better simulate flows of the Ci Rasea watershed.

Keywords: *SWAT, HRU, landcover, watershed, Landsat Ci Rasea*

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ABSTRACT

HEIGHT MODEL INTEGRATION USING ALOS PALSAR, X SAR, SRTM C, AND ICESAT/GLASS/ Atriyon Julzarika,
IJReSES, 12 (2): 107-116

The scarcity of height models is one of the important issues in Indonesia. ALOS PALSAR, X SAR, SRTM C, and ICESAT/GLASS are free available global height models. Four data can be integrated the height models. Integration takes advantage of each characteristic data. The spatial resolution uses ALOS PALSAR. ICESAT/GLASS has a minimal height error because it is DTM. SAR has advantages of minimal error in the highland and need a low pass filter on the lowland. DSM uses X SAR and DEM from ALOS PALSAR. Characteristics and penetration of vegetation objects can be seen from the wavelength type of SAR data. This research aims to make height model integration in order to get the vertical accuracy better than vertical accuracy of global height models and minimum height error. The study area is located in Karo Regency. The first process is to crop the height models into Karo Regency, geoid undulation correction using EGM 2008. The next step is to detect pits and spires by using radius value 1000 m and depth $\pm 1.96\sigma$ (± 5 m) with uncertainty 95,45%. Then generate HEM and height model integration. To know the accuracy of this height model, 80 reference points measured using GNSS, altimeter, and similar point observed on the height model integration are selected. The accuracy test covers RMSE, accuracy (z), and height difference test. The result of this study shows that the height model integration has a vertical accuracy in 1.14 m. This height model integration can be used for mapping scale 1: 10.0000.

Keywords: *integration, height model, SAR data, scale 1:10.000*

WATER CLARITY MAPPING IN KERINCI AND TONDANO LAKE WATERS USING LANDSAT 8 DATA/Bambang Trisakti, Nana Suwargana, and I Made Parsa
IJReSES, 12 (2): 117-124

Land conversion occurred in the lake catchment area caused the decreasing of water quality in many lakes of Indonesia. According to Lake Ecosystem Management Guidelines from Ministry of Environment, tropic state of lake water is one of parameters for assessing the lake ecosystem status. Tropic state can be indicated by the quantity of nitrogen, phosphorus, chlorophyll, and water clarity. The objective of this research is to develop the water quality algorithm and map the water clarity of lake water using Landsat 8 data. The data were standardized for sun geometry correction and atmospheric correction using Dark Object Subtraction method. In the first step, Total Suspended Solid (TSS) distributions in the lake were calculated using a semi empirical algorithm (Doxaran et al., 2002), which can be applied to a wide range of TSS values. Secchi Disk Transparency (SDT) distributions were calculated using our water clarity algorithm that was obtained from the relationship between TSS and SDT measured directly in the lake waters. The result shows that the water clarity algorithm developed in this research has the determination coefficient that reaches to 0,834. Implementation of the algorithm for Landsat 8 data in 2013 and 2014 showed that the water clarity in Kerinci Lake waters was around 2 m or less, but the water clarity in Tondano Lake waters was around 2 – 3 m. It means that Kerinci Lake waters had lower water clarity than Tondano lake waters which is consistent with the field measurement results.

Keywords*: lake water, SDT, TSS, tropic state, water clarity*

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ABSTRACT

OZONE VARIABILITY AND OZONE DEPLETING SUBSTANCES (ODS) IN INDONESIA BASED ON MLS-AURA DATA/Ninong Komala and Novita Ambarsari
IJReSES, 12 (2): 125-134

Research and characterizing theozone profiles and Ozone Depleting Substances (ODS) in Indonesia is a satellite data-based research activities. The aim of the study was to obtain the characteristics of ozone in Indonesia as well as the contribution of to the variability of ozone. By performing a data inventory based on satellite data, analyze the pattern of annual, seasonal and perform linkage analysis of the contribution of ODS changes to the conditions of ozone. Daily data of vertical profiles of ozone and in the form of volume mixing ratio (vmr) with format HDF (Hierarchical Data Format) is extracted to the territory of Indonesia to take parameters as latitude, longitude, and concentration. then converted to Excel format with the help of data processing software of MATLAB.Results obtained in the form of ozone characteristics and in Indonesia, the percentage of contribution to the variability of ozone also contribution to the variability of ozone in Indonesia in several levels of height. By using Microwave Limb Sounders (MLS) AURA satellite data in the period of 2005 to 2013 characteristics of monthly vertical profiles of ozone and in Indonesia has been obtained. studied were ClO and BrO. Peak of vertical profiles of ozone occurs at a pressure of 10 hPa or altitude of 25.9 km. ClO peak occurs at a pressure of 2.1 hPa or altitude of 30.6 km and BrO reached the peak at 14 hPa or altitude of 24.5 km. When ClO and BrO reach a maximum concentration at stratosphere then ozone molecules is potentially damaging or decrease in the stratosphere. Temporal variations of ozone showed decrease when concentrations increased (particularly ClO and BrO). Linear regression of ozone with ozone showed a negative correlation coefficient which indicates there is a strong relationship between ozone concentrations decline with an increase in pressure of 14 hPa when BrO reach the maximum. Likewise for ClO which also showed a negative correlation with the decrease in ozone concentration. ClO contribution to the decreasing of ozone in Indonesia was marked by every addition of 0.01 ppb ClO will reduce ozone of 0.00583 ppm (5.83 ppb). While any increase of 0.01 ppb of BrO will decrease 0.03 ppb of ozone.

Keywords: *BrO, ClO, MLS-AURA, ozone*

ANALYSIS ON THE QUALITY OF AEROSOL OPTICAL THICKNESS DATA DERIVED FROM NPP VIIRS AND AQUA MODIS OVER WESTERN REGION OF INDONESIA /Erna Sri Adiningsih, Andy Indrajat, and Noriandini D. Salyasari
IJReSES, 12 (2): 135-142

Preliminary analysis on quality data of Aerosol Optical Thickness/Depth or AOT/AOD derived from NPP VIIRS EDR (Environmental Data Record) has been done in previous work. Qualitative analysis of the previous work revealed that AOT data of VIIRS had insufficient quality due to some factors such as sun glint and cloud cover. However the accuracy of AOT VIIRS data over western area of Indonesia has not been investigated. Therefore this paper describes further analysis on AOT VIIRS data quality and accuracy. Comparison with AOT derived from Aqua MODIS data was implemented since AOT of MODIS has verified well with ground AOT data. Examination on cloud masking intermediate product of VIIRS was done for its importance in AOT data processing and persistent cloud cover obstacle over Indonesia. We used VIIRS and MODIS data archieved by LAPAN ground station. Further analysis on sunglint and cloud masking images indicates that these two intermediate products predominantly affect the quality of AOT from VIIRS and MODIS over the study areas. Compared with AOT of MODIS, AOT of VIIRS seems to result more pixels consisting AOT information over the same area and date. The statistical results showed that AOT values of VIIRS highly correlated with AOT values of MODIS with R^2 of 78%. The accuracy of AOT derived from VIIRS was adequate as indicated by RMSE of 0.0977 or less than 0.5 for the samples over Sumatra, Borneo, and Java islands. Visual comparison of AOT images indicates that VIIRS data could result more detailed AOT values than MODIS data. Therefore the AOT of VIIRS data could be recommended for use in western area of Indonesia.

Keywords: *aerosol optical thickness, NPP VIIRS EDR, Aqua MODIS, sun glint, cloud masking*

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ABSTRACT

IDENTIFICATION OF LAND SURFACE TEMPERATURE DISTRIBUTION OF GEOTHERMAL AREA IN UNGARAN MOUNT BY USING LANDSAT 8 IMAGERY/Udhi Catur Nugroho and Dede Dirgahayu Domiri
IJReSES, 12 (2): 143-150

Indonesian tectonic position lies at the confluence of Eurasia, Australia and the Pacific.Therefore, Indonesia has big geothermal potential. One of the areas that has geothermal potential is UngaranMount. Sensing technology can have a role in geothermal exploration activity to map the distribution of land surface temperatures associated with geothermal manifestations. The advantages of remote sensing are able to get information without having to go directly to the field with a large area, and it takes quick, so that the information can be used as aninitial reference exploration activities. This study aimed to obtain the distribution of land surface temperature as a regional analysis of geothermal potential. The method used was a correlation of brightness temperature (BT) Landsat 8 with land surface temperature (LST) MODIS. The results of correlation analysis showed the R^2 value was equal to 0.87, it shows that between BT Landsat 8 and LST MODIS has a very high correlation. Based on Landsat 8 LST imagery correction, the average of fumarole temperature and hot spring is 24^0C. Fumarole and hot spring are located in dense vegetation land which has average temperature around26.9^0C. Land surface temperature Landsat 8 can not be directly used to gain geothermal potential, especially in the dense vegetation area, due to the existence of dense vegetation can absorb heat energy released by geothermal surface appearance.

Keywords: *land surface temperature, Landsat, MODIS, geothermal, Ungaran*

DETECTION OF FOREST FIRE, SMOKE SOURCE LOCATIONSIN KALIMANTAN DURING THE DRY SEASON FOR THE YEAR 2015 USING LANDSAT 8 FROM THE THRESHOLD OF BRIGHTNESS TEMPERATURE ALGORITHM/ Kustiyo, Ratih Dewanti, and Inggit Lolitasari
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Almost every dry season, there are large forest/land fires in several regions in Indonesia, especially in Kalimantan and Sumatra in the dry season of August to September 2015 a forest fire in 6 provinces namely West Kalimantan, Central Kalimantan, South Kalimantan, Riau, Jambi, and South Sumatra. Even some parties proposed that the Government of Indonesia declares them as a national disaster. The low-resolution remote sensing data have been widely used for monitoring the occurrence of forest/land fires (hotspots), and mapping of burnt scars. The hotspot detection was done by utilizing the data of NOAA-AVHRR and MODIS data which have a lower spatial resolution (1 km). In order to increase the level of detail and accuracy of product information, this research is done by using Landsat-8 TIRS (Thermal Infrared Sensor) band which has a greater spatial resolution of 100 m. The purpose of this research is to find and to determine the threshold value of the brightness temperature of the TIRS data to identify the source of fire smoke. The data used is the Landsat-8 of several parts of Borneo during the period of 24 August to 18 September 2015 recorded by the LAPAN's receiving station. Landsat - 8 TIRS band was converted into brightness temperature in degrees Celsius, then dots in a region that is considered the source of the smoke if the temperature of each pixel in the region > 43^oC, and given the attributes with the highest temperatures of the pixels in the region. The source of the smoke was obtained through visual interpretation of the objects in the multispectral Natural Color Composite (NCC) and True Color Composite (TCC)images. Analysis of errors (commission error) is obtained by comparing the temperature detected by TIRS band with a visual appearance of the source of the smoke. The result of the experiment showed that there were detected 9 scenes with high temperatures over 43^oC from the 27 scenes Kalimantan Landsat-8 data, which include 153 sites. The accuracy (commission error) of identification results using temperature ≥ 51°C is 0%, temperature ≥ 47°C is 10%, and temperature ≥ 43°C is 30.5%.

Keywords*: Landsat 8, TIRS, brightness temperature, hotspots, source ofsmoke*.