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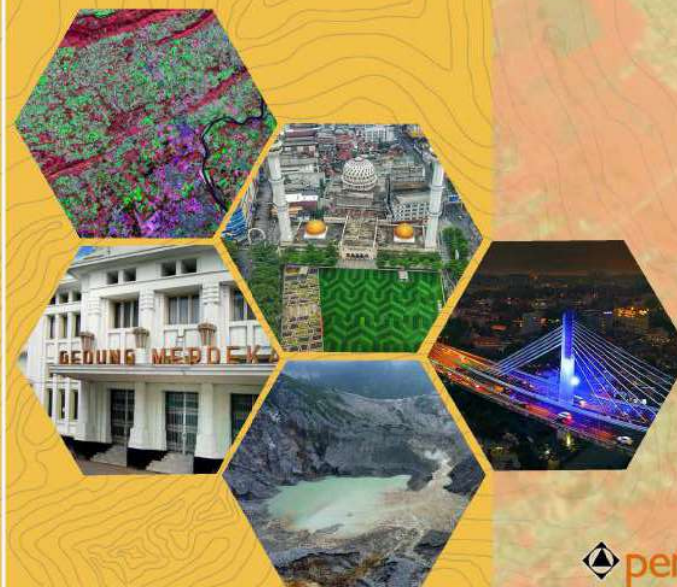
2019  
**ICOIRS**

THE FIFTH INTERNATIONAL CONFERENCE OF INDONESIAN  
SOCIETY FOR REMOTE SENSING (ICOIRS) AND MAPIN CONGRESS

17-20 September 2019, ITENAS-Bandung, West Java Indonesia

“The Revolution Of Earth  
Observation For a Better Human Life”

**ABSTRACT**



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THE FIFTH INTERNATIONAL CONFERENCE OF INDONESIAN  
SOCIETY FOR REMOTE SENSING (ICOIRS) AND MAPIN CONGRESS

“The Revolution Of Earth Observation  
For a Better Human Life”

17-20 SEPTEMBER 2019  
BALE DAYANG SUMBI  
INSTITUT TEKNOLOGI NASIONAL BANDUNG  
WEST JAVA - INDONESIA



# FOREWORD



*Assalamualaikum Warahmatullahi Wabarakatuh.*

First, I would like to say thanks to all committee, sponsor, our students, and our colleague for supporting The Fifth International Conferences of Indonesian Society for Remote Sensing (ICOIRS) and Indonesian Society for Remote Sensing Congress.

The 5<sup>th</sup> ICOIRS and MAPIN Congress was organized by collaboration of Indonesian Society for Remote Sensing (ISRS/MAPIN), Institut Teknologi Nasional (ITENAS), Center for Remote Sensing Institut Teknologi Bandung, Universitas Pendidikan Indonesia, Universitas Winaya Mukti and Universitas Pajajaran and supported by Ministry of Research, Technology and Higher Education (RISTEKDIKTI), Geospatial Information Agency (BIG), Indonesian National Institute of Aeronautics and Space (LAPAN), Agency for the Assessment and Application of Technology (BPPT), The Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (ATR/BPN) and Meteorological, Climatological, and Geophysical Agency (BMKG). This event bring together researchers, policy makers, and practitioners from developed and developing countries to share insights into the challenges and opportunities of remote sensing technology and its application in solving the problems of Indonesia especially and South East Asia countries. It showcase cutting-edge research from around South East Asia, cutting-edge research from around South East Asia, focusing on themes of equity and risk, learning, capacity building, methodology, and possibly investment approaches in remote sensing. It explore practical adaptation policies and approaches, and share strategies for decision making to support global cooperation for conserving the earth and for a better human life.

The four-day conference among others consist of plenary, technical and poster sessions, panel discussions, congress of ISRS/MAPIN, exhibition, talk show, workshop, hands on training and city tour. We invite you to join us full time on The 5<sup>th</sup> ICOIRS and MAPIN Congress and make a successful conference on the application of Remote Sensing, Photogrammetry, GIS, GPS/GNSS, and other related digital mapping technologies in Indonesia and South East Asia.

Hopefully this technical programme can help and guide all of you to absorb all new things on this conference.

Please enjoy it. Thanks...

*Wassalamualaikum warahmatullahi wabarakatuh*

**Sincerely**  
Dr. Soni Darmawan  
(General Chair of ICOIRS2019 Organizing Committee)

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Sumberdaya Alam (PTISDA), BPPT.



**Dr. Soni Darmawan**  
Institut Teknologi Nasional Bandung




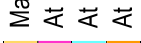
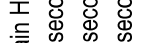
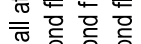
# MAIN PROGRAMME

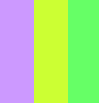


	07.30 - 08.30	08.30 - 09.45	09.45 - 10.00	10.00 - 12.00	12.00-13.00	13.00-15.00	15.00-16.00	17.00-20.00			
Day 1 - Tuesday (17th Sep 2019)	Registration	Opening Ceremony	Lunch	Commercial Session	Poster session	Technical Session	Technical Session	Gala Dinner for Invitation			
									Commercial Session	Technical Session I	Technical Session I
									Technical Session II	Technical Session II	Technical Session II
									Technical Session III	Technical Session III	Technical Session III
Day 2 - Wednesday (18th Sep 2019)	Keynote Speaker	Coffee Break	Keynote speaker	Commercial Session	Poster session	Technical Session	Technical Session				
				Technical Session I	Technical Session I	Technical Session I					
				Technical Session II	Technical Session II	Technical Session II					
				Technical Session III	Technical Session III	Technical Session III					
				Geomatics Scientific Meeting	Geomatics Scientific Meeting	Geomatics Scientific Meeting					
				Commercial Session	Commercial Session	Commercial Session					



	07.30 - 08.30	08.30 - 09.45	09.45 - 10.00	10.00 - 12.00	12.00-13.00	13.00-15.00	15.00-16.00	17.00-20.00
<b>Day 3 - Thursday (19th Sep 2019)</b>		Keynote Speaker	Coffee Break	Talkshow Technical Session I Technical Session II Technical Session III Technical Session Commercial Session	Lunch	Talkshow Technical Session I Technical Session II Technical Session III MAPIN Congress Commercial Session	Closing Ceremony	Gala Dinner for MAPIN Committee and invitation
<b>Day 4 - Friday (20th Sep 2019)</b>	Preparation	<b>CITY TOUR</b>						

**Information:**

-  Main Hall at Bale Dayang Sumbi
-  At second floor of Bale Dayang Sumbi
-  At second floor of Bale Dayang Sumbi
-  At second floor of Bale Dayang Sumbi

-  At Audio Visual, Building No. 12
-  Demonstration stage at Bale Dayang Sumbi
-  At Cafe Cinde



# TABLE OF CONTENT

<b>Identification of Addition, Distribution Pattern, and Sedimentation Density Level Using Landsat Satellite Image in the Coastal Area of Cirebon City</b> [Thobibie and Yackob Astor] .....	1
<b>Change Detection of Mangrove Forest using Soil Adjusted Vegetation Indices Based on Multi temporal Images, Case Study: East Coast of Lampung Province</b> [Nirmawana Simarmata, TrikaAgnestasia and Tessa Khairani Ermanto] .....	2
<b>EVI and NDWI Of Landsat-8 for Identifying Growth Phase of Corn in Sumenep, East Java Province</b> [Rizatus Shofiyati, Fita Anggraini Yuliana1 and Wahyu Supriatna].....	3
<b>Study of Base Map and Marine Thematic Map Usage to Make Coastal Waters Location Permits Map in Coastal Waters and Small Islands (Study Area: Maratua Island, East Kalimantan)</b> [Santi Azzahrah, Yackob Astor and Muhandis Sidqi] .....	4
<b>Rapid Mapping for Disaster Recovery (Case Study: Petobo, Palu)</b> [Zachary Afif, Willy Gomarga1 and Bambang Edhi Leksono] .....	5
<b>Land Change Modeler for Predicting Land Cover Change in Banjarmasin City South Borneo at 2014 – 2022</b> [Prama Aryaguna and Aswin Saputra].....	6
<b>Driving-Factors Identification of Land-Cover Change in West Java Using Binary Logistic Regression Based on Geospatial Data</b> [Udjianna Pasaribu, Riantini Virtriana and Albertus Deliar].....	7
<b>Capability of Sentinel-1 Synthetic Aperture Radar Polarimetric Change Detection for Burned Area Extraction in South Kalimantan, Indonesia</b> [Syamani Syamani] .....	8
<b>Acquisition Programming Integration of Image Satellites in LAPAN</b> [Ogi Gumelar, Destri Yanti Hutapea , Siti Desty Wahyuningsih and Haris Suka Dyatmika].....	9
<b>Remote Sensing Image Transformation with Cosine and Wavelet Method for SPACE MAP Visualization</b> [Ogi Gumelar, Riyan Mahendra Saputra, Gusti Dharma Yudha, Agnes SonditaPayani and Siti Desty Wahyuningsih].....	10
<b>Effect of Canopy Cover on Ultraviolet Intake in Coffee Leaf: A Preliminary Study Based on Spectral Analysis</b> [Mochamad Firman Ghazali, Anggun Tridarwati and Ketut Wikantika] .....	11
<b>Sentinel-1 based Wet land Identification to Support Regional Planning Review of Ogan Komering Ilir Regency</b> [Budi Heru Santosa and Fiolenta Marpaung].....	12

<b>Modeling of Surface Roughness on Agriculture Area Using Radarsat-2 Satellite</b> [Rian Nurtyawan, Agung Budiharto, Geta Ayu Ferdiyanti and Ketut Wikantika]...	13
<b>Machine Learning Approach for Peatland Delineation Using Multi-sensor Remote Sensing Data in Ogan Komering Ilir, South Sumatera Province</b> [Dionysius Sencaki, Hari Prayogi, Siti Arfah and Teguh Piyanto].....	14
<b>The Effect of Using Different Vegetation Indices for Mangrove Leaf Area Index Modelling</b> [Aldo Restu Agi Prananda and Muhammad Kamal] .....	15
<b>Land Cover Identification Using Pleiades Satellite Imagery By Comparison of NDVI and BI Method in Jatinangor, West Java</b> [Dwi Arini, Quinoza Guvil and Nur Wahidah].....	16
<b>Estimation Above-Ground Biomass And Carbon Stock Of Kuala Sepetang Mangrove Forest Reserve Using Allometry and Remote Sensing Technique</b> [Mohd Hasmadi Ismail, Muhd Ekhzarizal Mohd Eusop and Pakhriazad Hassan Zaki]	17
<b>Trends on Edaphic and Microclimatic for Fe'I Banana Trees Distribution in Padakembang Village and Maluku Islands, A Remote Sensing Perspective</b> [Mochamad Ghazali, Ketut Wikantika and Fenny M. Dwivanny] .....	18
<b>Economic Valuation of Cabon Dioxide Emissions From Burned Peatland in Ogan Komering Ilir Using MODIS Data</b> [Riissiyani Riissiyani, Tiara Grace, Citra Hasna Paramita and Wisnu Ali Martono]	19
<b>Study of Spatio Temporal Traffic Congestion Characteristic in Special Region of Yogyakarta Using Worldview-2 Imagery and Aerial Video</b> [Arfin Fajar Ramadhan, Nur Aprilia Sulistyaningrum and Bowo Susilo].....	20
<b>Deformation and Instability At Merapi Dome Identified By High-Resolution Camera</b> [Herlan Darmawan, Pamungkas Yuliantoro, Wiwit Suryanto, Afif Rakhman and Agus Budi-Santoso] .....	21
<b>Spatial Model of Air Surface Temperature From Landsat 8</b> [Adi Wibowo] .....	22
<b>Simulating the Overland Flow in Prospectively Cleared Tropical Forest Using Airborne LIDAR and High-Resolution Optical Images</b> [Abd. Ramlizaayahudin Mahli, Mohd. Rizaludin Mahmud and Mohd. Nadzri Mohd. Reba] .....	23
<b>Land Suitability Analysis For Global Mangrove Rehabilitation In Indonesia</b> [Luri Nurlaila Syahid, Anjar Dimara Sakti, Riantini Virtriana, Wiwin Windupranata, Sonny Adhitya Sudhana, Felia Niwan Wilwatikta, Adam Irwansyah Fauzi and Ketut Wikantika].....	24

<b>Above-Ground Biomass Estimation of Mangrove Forest Using WorldView-2 Imagery in Perancak Estuary, Bali</b> [Dian Utari, Muhammad Kamal and Frida Sidik].....	25
<b>Window Image Matching Size Determination for Geometric Accuracy Test of High and Very High Resolution Images</b> [Sukentyas Estuti Siwi, Mulia Inda Rahayu, Randy Prima Brahmantara, Fadila Muchsin, Yudhi Prabowo, Kurnia Ulfa, Marendra Eko Budiono, Destri Yanti Hutapea, Choirun Nissa Rangkuti and Ratih Dewanti].....	26
<b>Application of Remote Sensing and Analytical Hierarchy Process (AHP) for Developing Landslide Vulnerability Zone in Boja District Kendal Regency Central Java Province</b> [Sinatrya Diko Prayudi, Devina Trisnawati, Thomas Triadi Putranto and Najib].....	27
<b>Indirect Losses Estimation on Economic Sector Due to Tsunami in Ngombol District Purworejo Using Geoeye and National DEM (Demnas) Imagery</b> [Nur Aprilia Sulistyaningrum, Arfin Fajar Ramadhan and Totok Wahyu Wibowo].	28
<b>The Influence of Water Balance In Mangrove Forests Growth To Mangrove's Degradation And Depletion, Case Study: Southeast Asia</b> [Felia Niwan Wilwatikta, Anjar Dimara Sakti, Luri Nurlaila Syahid and Ketut Wikantika].....	29
<b>Detecting Mangrove Deforestation Using Multi Land Use Land Cover Change Datasets: A comparative analysis in Southeast Asia</b> [Sonny Adhitya Sudhana, Anjar Dimara Sakti, Ketut Wikantika, Luri Nurlaila Syahid, Bambang Irawan, Lilik Budi Prasetyo and Muhammad Kamal] .....	30
<b>Calculation of Total Economic Value of Peatland Burnt Area in Pangkalan Lanpam Subdistrict, Ogan Komering Ilir (OKI) South Sumatera Province</b> [Tiara Grace, Riissiyani Riissiyani, Anisah Anisah and Dionysius Sencaki].....	31
<b>Spatial Distribution of Indonesian Lakes from Global Surface Water Dataset</b> [Rossi Hamzah, Fajar Setiawan and Bunkei Matsushita] .....	32
<b>Trial of Monitoring the Propagation Land Forest Fires and Smoke Distribution by Using Himawari-8 Satellite (Case Study: Central Kalimantan)</b> [Gabriella Tania Adolong, Zadrach Ledoufij Dupe and Hana Listi Fitriana].....	33
<b>Analysis of Dominant Land Cover Class Based On Land Change Cluster Pattern in West Java Province</b> [Christopher Simanjuntak, Albertus Deliar and Riantini Virtriana] .....	34
<b>Detecting Floodwater in Urban Areas using Sentinel-1 Synthetic Aperture Radar Imagery, with Bengkulu Flooding as A Test Case</b> [Zulfikar Adlan Nadzir, Lea Kristi Agustina and Nirmawana Simarmata] .....	35

## **Evaluation of Atmospheric Correction Algorithms for Sentinel-2 Over Paddy Field Area**

### **Area**

[Kurnia Ulfa, Hendayani Hendayani, Masnita Oktavi, Kuncoro Pradono, Liana Fibriawati, Danang Candra, Fadila Muchsin and Kiki Damanik] ..... 36

## **Current Development of Community Satellite Processing Package (CSPP) to Support Near Real-time Remote Sensing Satellite Data Processing**

[Budhi Gustiandi and Donna Monica] ..... 37

## **Field Spectral Reflectance Measurement Distance Effect to The Mangrove Species (Avicennia sp.) Mapping**

[Tito Kanekaputra and Muhammad Kamal] ..... 38

## **Utilization of Himawari-8 Satellite Data for Estimated Rainfall with Various Methods (Case Study of Heavy Rain Jayapura 16-18 March 2019)**

[Adi Ramses Sagala, Hezron Salawane and Andreas Kurniawan Silitonga] ..... 39

## **Automatic Aura Remote Sensing Satellite Data Acquisition System**

[Olivia Maftukhaturrizqoh and Budhi Gustiandi] ..... 40

## **Towards a Study of Fire Occurrences in Indonesia**

[Armi Susandi, Mamad Tamamadin, Aristyo Rahadian Wijaya, Angga Fauzan Pratama, Irvan Faisal, Alvin Pratama, Destika Agustina Widiawan and Olgha Puspa Pandini] 41

## **The Effect Of Land Use Changes Towards Flood Peak In Sari Watershed Province West Nusa Tenggara**

[Rani Rahim Suryandari and Sudaryatno Sudaryatno] ..... 42

## **The Aim of Object Modeling Analysis Based on Building Information Modeling**

[Asep Yusuf Saptari, Putri Rahmadani and Heza Pratama Erdiza] ..... 43

## **GEOBIA for Mangrove Mapping Using UAV-Modified NIR 1 Camera Sensor**

[Nurul Khakhim, Arief Wicaksono, Wahyu Lazuardi and Zulfikri Isnaen] ..... 44

## **Land Surface Temperature Analysis Based on Land Cover Variations Using Satellite Imagery**

[Shafira Himayah, Riki Ridwana and Arif Ismail] ..... 45

## **Habitat Suitability Modelling Of Pasakbumi (Eurycomalongifolia Jack.) In Riam Kanan Conservation Forest Zone Using Sentinel-2 Biophysical Parameters**

[Abdi Fithria] ..... 46

## **Validation of Suomi-NPP CrIS/ATMS CO2 Data Using Global Atmospheric In Situ Data**

[Muchamad Muchlis, Andy Indradjad, Budhi Gustiandi, Haris Suka Dyatmika and Wisnu Sunarmodo] ..... 47

## **Evaluation of Multitemporal Speckle Filtering for SENTINEL-1 Imagery**

[Novie Indriasari] ..... 48

<b>Stream Order Selection for Indonesian Topographic Map Generalization</b> [Fahrul Hidayat, Nugroho Purwono1, Danang Budi Susetyo, Mochamad Irwan Hariyono, Tia Rizka Nuzula Rachma and Rizka Windiastuti] .....	49
<b>Land Cover Changes Research Level Subpixel A Case Study of Tasikmalaya City on Multi Temporal Landsat Image</b> [Riki Ridwana, Projo Danoedoro, Sigit Herumurti, Shafira Himayah and Lili Somantri] 50	50
<b>Prediction and Location Suitability of Settlement Growth At The BWK II Of Semarang City</b> [Bitta Pigawati. Agung Sugir, I Nyoman Ary Mandhara Putra and Tia Adelia Suryani] 51	51
<b>Spectral Analysis for Phenological Studies Of Leaves AndFruits Development In Coffee Plantation In Gunung Puntang: A Preliminary Result</b> [Mochamad Firman Ghazali, Ketut Wikantika, Anggun Tridawati and Agung Budi Harto] .....	52
<b>Early Study Of Magnetic Permeability And Magnetic Susceptibility of Peat In Ogan Komeriing Ilir, South Sumatera, Indonesia</b> [Anisah Anisah, Fiolenta Marpaung, Andri Purwandani, Djoko Nugroho and Lena Sumargana] .....	53
<b>Consecutive Dry Days and Peatland Fires in Ogan Komeriing Ilir Regency</b> [Winarno, Anisah, Afifuddin, Siti Arfah and Syaefudin] .....	54
<b>Oil Spill Contingency Plan (OSCP) By Environmental Sensitivity Index (ESI) Analysis At East Barito District, South Barito District and Kapuas District (Tamiang Layang, Buntok and Surrounding Area), Central Kalimantan Province</b> [Undang Hernawan and Rahayu Kusuma Risdianto] .....	55
<b>Design of Automate SAR Processing System in LAPAN toSupport Easier and Fast Data Services</b> [Marendra Eko Budiono, Haris Suka Dyatmika, Novie Indriasari, Qonita Amriya, Rahmat Arief, Rachmat Maulana and Shadiq Ali] .....	56
<b>The Effect of Land Cover Change to Urban Heat Island Phenomenon in 2007 – 2018 at North Cikarang Subdistrict, Bekasi Regency</b> [Cecil Nadira Putri Ramadhan] .....	57
<b>Google Earth Engine Application for Estimating Changes in Water Surface Area of Lake Toba</b> [Fahmi Aziz, Eko Kusratmoko and Masita Dwi Mandini Manessa] .....	58
<b>Precise Topographic Mapping Using Direct Georeferencing in UAV</b> [Angung Syetiawan, Herjuno Gularso, Giri Iryan Kusnadi and Gian Nugraha Pramudita] 59	59
<b>LiDAR Application of Intertidal Coastal Zoning for Aquaculture in Wolo, Kolaka, Southeast Sulawesi</b> [Sofi Ulfiasari and Sari Dwika Ratri] .....	60

<b>Development of Frame Sample for Estimating Corn Crop Area</b> [Lena Sumargana, Heri Sadmono and Swasetyo Yulianto] .....	61
<b>Preliminary Study on Validation of HIMAWARI-8 Data with Ground Based Rainfall Data at South Sumatera, Indonesia</b> [Fanny Meliani, Reni Sulistyowati, Zilda Dona Okta Permata, Lena Sumargana, Rizki Amaliyah, Andri Purwandani, Nuga Putrantijo and Akbar Rizki Ramadhan] .....	62
<b>Effect of Peat Thickness on the Occurrence of Forest and Land Fires in OKI Regency, South Sumatra</b> [Afifuddin, Sumirah and Djoko Nugroho] .....	63
<b>Assessing the Effect of Various Training and Testing Set Ratios to Model the Satellite Derived Bathymetry</b> [Ratna Sari Dewi, Yustisi Lumban-Gaol, Ayu Nur Safi'i, Aldino Rizaldy, Agung Syetiawan and Ati Rahadiati] .....	64
<b>Spatial Analysis of Rice Field Phenology using Sentinel-1 and Sentinel-2 in Karawang Regency</b> [Supriatna Supriatna and Adi Wibowo] .....	65
<b>Spatial correlation between the distribution of land/forest fires and the local activities of villagers in Ogan Komering Ilir, South Sumatera</b> [Hartanto Sanjaya, Gatot Fajar Suryono, Azalea Eugenie and Ati Dwi Nurhayati] ..	66
<b>Investigation Method for Shaded Coffee Plantation Detection using Aerial Photograph</b> [Anggun Tridawati, Mochamad Firman Ghazali, Ketut Wikantika, Agung Budi Harto, Rohayati Suprihatini and Ketut Tomy Suhari] .....	67
<b>Peat Depth Mapping in Penyabungan area, Ogan Komering Ilir (OKI) Regency using GPR (Ground Penetrating Radar)</b> [Sumirah, Lena Sumargana, Djoko Nugroho and Afifuddin] .....	68
<b>Vertical Accuracy Evaluation of National DEM Data at Buru Island</b> [Maundri Prihanggo, Rofiatul Ainiyah and Rofiqoh Rofiqoh] .....	69
<b>A Study of DEM generation from Ascending and Descending Path in Urban Area</b> [Rahmat Arief and Haris Suka Dyatmika] .....	70
<b>Remote Sensing Capabilities on Land Subsidence and Water Disaster Studies</b> [Heri Andreas, Hasanuddin Zainal Abidin, Dina Anggreni Sarsito and Dhota Pradipta]	71
<b>Deforestation Detection using Multitemporal Satellite Images</b> [Danang Surya Candra] .....	72
<b>Hydrogeology Disaster Analysis as Recommendation for Spatial Planning Review Document Ogan Komering Ilir, South Sumatera</b> [Mega Noverishka Putri, Hari Priyadi, Muhammad Dayuf Jusuf, Syaefudin Syaefudin and Hari Prayogi] .....	73

<b>Modeling a Tsunami in Western Lampung based on Aerial Photogrammetry and Remote Sensing Data</b> [Arliandy P. Arbad, Stevanus Jonathan, Agung Bhakti, Meimuna Chusna and Achmad Ardy] .....	74
<b>A Preliminary Study on Machine Learning and Google Earth Engine for Mangrove Mapping</b> [Muhammad Kamal, Nur Mohammad Farda, Ilham Jamaluddin, Artha Parela, Ketut Wikantika, Lilik Budi Prasetyo and Bambang Irawan] .....	75
<b>Karst Imaging of Mangkalihat in East Kalimantan; Insight from Landsat OLI 8, DEMNAS and Field Investigation</b> [Fitriani Agustin, M.Luthfi Faturrohman and Sonia Rijani] .....	76
<b>Post-Liquefaction Reconsolidation of Coastal Area in Talise Beach, Palu, Indonesia</b> [Togi Tampubolon and Jeddah Yanti] .....	77
<b>Comparing the Use of Majority Rules in Simple Object-Based Image Classification and Post-Classification Filtering</b> [Projo Danoedoro].....	78
<b>The Soputan’s Deformation After Eruption in December 2018 by Using DInSar Method</b> [Saiyidinal Fikri, Imam Satria Yudha and Mohammad Rohmaneo Darminto] .....	79
<b>Study of Earthquake Cycle Deformation in Matano Fault using GNSS And SAR Interferometry</b> [Adnan Khairi, Moehammad Awaluddin and Yudo Prasetyo].....	80
<b>Above-ground Carbon Stock Estimates of Rubber Plantation using Sentinel 2A Imagery: Case Study in PTPN IX Kebun Getas and Kebun Ngobo, Semarang Regency</b> [Lalu Deden Yuda Pratama and Projo Danoedoro] .....	81
<b>Profile of dielectric constant of peat in Ogan Komering Ilir Regency, Indonesia using SAR Sentinel-1 and Ground Penetrating Radar</b> [Fiolenta Marpaung, Sumirah Sumirah, Lena Sumargana and Djoko Nugroho] .....	82
<b>A New Chapter in Participatory Mapping in Indonesia</b> [Franko Jhoner, Rahmat Kurniadi Dewantara and Fajar Harnowo] .....	83
<b>Rainfall Distribution in Relation to Flooding in Upper Citarum Watershed, Indonesia</b> [Syifa Hanifa, Mangapul Parlindungan Tambunan and Kuswantoro Marko] .....	84
<b>Application of Lyzenga Algorithm on Sentinel-2B and SPOT-7 Imagery for Estimation of Coral Reef Condition, Capacity and Presence (Case Study: in Kapo-Kapo Island and Soetan Island, Pesisir Selatan Regency, West Sumatra Province</b> [Tessa Khairani Ermanto, Bambang Edhi Leksono and Nirmawana Simarmata].....	85

<b>Analysis of GNSS Kinematic Precision by Using TRACK Software in Various Baseline Lengths</b> [Henri Kuncoro] .....	86
<b>The Application of a Method of Normalized Difference Vegetation Index (NDVI), Normalized Difference Moisture Index (NDMI) and Parameter Physical to Zoning Prone Landslide in Bandar Lampung City</b> [Tamara Tamara].....	87
<b>Utilization of Google Maps for Depicting Landslide Pattern in Indonesia</b> [Sukristiyanti, Ketut Wikantika, Imam Sadisun, Lissa Yayusman and Pamela] .....	88
<b>Impervious land extraction and urban development potential evaluation</b> [Junjun Wu and Qinhuo Liu] .....	89
<b>Spatial vulnerability to tsunami models on the northern coast of Buleleng sub-district</b> [Maria Pramudita Wetty and Eko Kusratmoko] .....	90
<b>Geometry Accuracy Analysis of the Three Dimensional Model Using the Close Range Photogrammetry Method for Conservation Object of Culture (Case Study: Cow Statue, Faculty of Livestock, Diponegoro University)</b> [Yudo Prasetyo, Nurhadi Bashit, Billy Silaen and Moehammad Awaluddin] .....	91
<b>Topographic correction on LAPAN-A3 multispectral image: An initial assessment</b> [Zylshal Zylshal] .....	92
<b>An algorithm of the fraction of absorbed photosynthetically-active radiation based on GF-6 satellite remote sensing images</b> [Li Li, Xiaozhou Xin and Hailong Zhang] .....	93
<b>Pseudo Height Anomaly Over Indonesia in Respect of GRACE Gravity Satellite</b> [Dina Anggreni Sarsito, Brian Bramanto, Muhammad Syahrullah, Heri Andreas and Dhota Pradipta] .....	94
<b>The Effects of DEM Specification on Watershed Model in Mataram City, West Nusa Tenggara Province</b> [Danang Budi Susetyo, Nugroho Purwono and Ati Rahadiati] .....	95
<b>Recent Developments and Outlook for Terrestrial and Maritime Applications of Spaceborne SAR Data</b> [Marco van der Kooij] .....	96
<b>Multiple Linear Regression Analysis of Remote Sensing Data for Determining Vulnerability Factors of Landslide in Purworejo</b> [Sudaryatno, Prima Widayani, Totok Wahyu Wibowo, Bayu Aji Sidiq Pramono, Awit Dini Meikasari, Zulfa Nur'Aini Afifah, Karunisa Pasya Kusumawardani and Muhammad Rizki Firdaus] .....	97



<b>Minerals Targeting using Landsat-8 in Baturape area and its surroundings, Gowa Regency, South Sulawesi Province, Indonesia</b> [Ibnu Munzir, Ulva Ria Irfan, Ilham Alimuddin and Irzal Nur] .....	98
<b>Application of Vegetation Health Index (VHI) to Identify Distribution of Agricultural Drought in Indramayu Regency, West Java</b> [Asma Zuhro, Mangapul Parlindungan Tambunan and Kuswantoro Marko] .....	99
<b>Total Suspended Solid Mapping Using Remote Sensing: Accuracy Comparison of Absolute and Relative Atmospheric correction</b> [Maria Roswita Kartika Sari Bawono and Pramaditya Wicaksono] .....	100
<b>Assessment of population exposure to PM10 for respiratory disease mortality in Malaysia</b> [Muhammad Alfatih Pahrol, Wan Rozita Wan Mahiyuddin and Mohamad Iqbal Mazeli] .....	101
<b>Modeling of Density Vulnerability of Landslide Using the IFSAR DEM In Manuju and Bungaya District Gowa Regency, South Sulawesi Province</b> [Johan Eden, Ilham Alimuddin and Busthan Azikin] .....	102
<b>Calculation of Rice Field Embankment Coefficient using High-Resolution Satellite Imagery</b> [Heri Sutanta, Ajeng Gunawan and Yusuf Wibisono] .....	103
<b>Utilization of High Resolution Image for Toponym Data Acquisition</b> [Mochamad Irwan Hariyono] .....	104
<b>Tree height and crown mapping from LiDAR and High Resolution Satellite Image in Malaysia Tropical Reserve Forest</b> [Mohd Yussainy Md Yusop, Mohd Nadzri Md Reba and Mohd Rizaludin Mahmud] .....	105
<b>Remote Sensing Utilization for Zoning Analysis of Drought-prone Area in Indramayu Regency</b> [Nandi, Dody Wibowo, Iwan Setiawan and Lili Somantri] .....	106
<b>Land Suitability Analysis Using Analytical Hierarchy Process and Geographic Information System for Coffea arabica Linn. in Benguet Province, Philippines</b> [Richard Dein Altarez, Elvert Lucas, John Christian Pabustan, Cyrx Ermel Concepcion, Maricor Pabillaran, Jerome Maglinao and Alexandrio Ramirez] .....	107
<b>The Distribution Pattern of The Drought Agricultural Land in Serang Regency Using the NDDI Algorithm</b> [Rista Nur Aini] .....	108
<b>Determining Variations in Public Transport Access Using GIS in Klang Valley City, Selangor, Malaysia</b> [Shahrul Syukri Yahya and Edie Ezwan Mohd Safian] .....	109

<b>Utilization of Remote Sensing and GIS Applications for Shoreline Change Prediction (Study Case: Semarang City and Surrounding)</b> [Isniah Nur Cahya Dewi and Nurul Khakhim] .....	110
<b>Correlation Analysis of Satellite Based Mangrove Index and Mangrove Forest Health at Segara Anakan Cilacap, Central Java, Indonesia</b> [Gathot Winarso, Muhammad Kamal, M. Syamsu Rosid, Wikanti Asriningrum and Jatna Supriatna] .....	111
<b>Characterization of Groundwater Basin Using Satellite Gravity Data: A Case Study from Lombok Island</b> [Gumilar Utamas Nugraha] .....	112
<b>Utilization of Landsat Imagery for Monitoring the Development of Bandar Lampung City</b> [Lili Somantri] .....	113
<b>Suitability Model using Support Vector Machine for Land Use Planning Scenarios in Java Island, Indonesia</b> [Sitarani Safitri, Irawan Sumarto, Akhmad Riqqi, Albertus Deliar, Dini Norvyani and Jesika Taradini] .....	114
<b>Identifying Geothermal Steam Spots Based on Binary Logistic Method to A High-Resolution Imagery and Field Measurement</b> [Firdausi Zahara Gandes, Asep Saepuloh and Ketut Wikantika] .....	115
<b>As-Built Drawing Determination of LFM Building ITB Using Terrestrial Laser Scanner</b> [Irwan Gumilar, Taufiiqulhakim Rifqi Hawaari and Teguh Purnama Sidiq] .....	116
<b>Updating of Homecoming Routes Map 2019 (Study Case: Kalimantan Island)</b> [Ricky Whisnuhandoko Soebakir] and Soni Darmawan] .....	117
<b>Remote Sensing as A Tool of Regenerating Water Investment in Semarang City</b> [Yosef Prihanto, Raldi Koestoer and Nadya Oktaviani] .....	118
<b>Development of Mangrove Forest Geodatabase in Indonesia</b> [Yusuf Hary Saputro and Soni Darmawan] .....	119
<b>Study of Carbon Stocks Dynamic in Rawa Aopa Watumohai National Park (South East Sulawesi Indonesia) Using Combination of Alos Palsar and Landsat Image in the Perspective of Climate Change Mitigation</b> [Laode M Golok Jaya, Sudarsono Sudarsono, Ika Purwanti Ningrum, Fitra Saleh and Ketut Wikantika] .....	120
<b>National Policy and Remote Sensing Interaction Model for Monitoring Carbon Stocks in Indonesia (A Case Study: South Konawe Regency)</b> [Sitti Hairani Idrus and Laode M Golok Jaya] .....	121

<b>Long-term Secchi Disk Depth from Landsat TM and ETM+ in Indonesian Lakes using Google Earth Engine</b> [Rossi Hamzah, Fajar Setiawan and Bunkei Matsushita] .....	122
<b>Image Processing Using CCTV's Surveillance with Edge Detection Methods and Advantage in GIS-Based Smart Parking Systems</b> [Muhammad Dita Farel, Deni Suwardhi and Agung Budi Harto] .....	123
<b>Urban Heat Island in Megacity in Indonesia Based on Thermal Infrared Remote Sensing</b> [Gumilar Utamas Nugraha and Andi Agus Nur] .....	124
<b>Analysis of the Effect of Land Use on Surface Temperature and Its Relationship with Urban Heat Island Phenomena Using Remote Sensing Methods in Bandar Lampung City</b> [Afrida Gitawardani, Bambang Edhi Leksono and Nurul Qamilah] .....	125
<b>Filtering DSM Extraction from Wordview Images to DTM Using Open Source Software</b> [Catur Aries Rokhmana and Ahmad Ridho Sastra] .....	126
<b>Determining the Zone of Potassium in Muria Mountain Using Landsat-8 Oli By Spectral Angle Mapper</b> [Aska Zakiya, Mutiari Rindianingrum and Nabilah Afifah Harahap] .....	127
<b>Landslide Susceptibility Map Using Geography Information System and Frequency Ratio Approach for Mitigation in Bialo Watersheds South Sulawesi Indonesia</b> [Andang Suryana Soma, Usman Arsyad and Nurul Fadillah] .....	128
<b>Multi Data Digital Terrain Model for Waterlogging Analysis in Institut Teknologi Bandung Ganesha Campus</b> [Kamal Nur Fauzan, Deni Suwardhi and Irwan Gumilar] .....	129
<b>Prototype of Remote Sensing Data and Information System based on Open Source Technology to Support Disaster Management</b> [Muhammad Priyatna, Ahmad Sutanto and Taufik Hidayat] .....	130
<b>Building Footprint Extraction from Lidar Data</b> [Mochamad Irwan Hariyono, Fahrul Hidayat and Danang Budi Susetyo] .....	131
<b>Development of Landsat/LDCM Data Acquisition System Integration base on Virtual Ground Station In order to Provide National Intermediate Resolution Remote Sensing Data</b> [Hidayat Gunawan, Wismu Sunarmodo, Nurmajid Setyasaputra, Kuncoro Adipradono and Ayom Widipaminto] .....	132
<b>Evaluation of Institut Teknologi Bandung (ITB) Ganesa Waste Management Based on Geographic Information System (GIS)</b> [Mutia Dewi Ariani, Deni Suwardhi and Riantini Vitriana] .....	133

<b>Comparative Study of 3D Geographic Information System and Building Information Modeling for Facility Management</b> [Kavita Nur Fadhila, Deni Suwardhi and Shafarina Wahyu Trisyanti] .....	134
<b>Assessment of Drought Using Standardized Precipitation Index and Normalized Difference Drought Index in Majalengka Regency, West Java</b> [Arofah Arief Santoso, Eko Kusratmoko and Adi Wibowo] .....	135
<b>Bathymetry Extraction of Empirical Models Using SPOT 7 Satellite Imagery</b> [Kuncoro Teguh S, Masita D. M. Manessa and Surahman Surahman] .....	136
<b>Three Dimensionals Modelling of Isola UPI Building using Terrestrial Laser Scanner</b> [Kurniawan Djamal, Gusti Ayu Jessy Kartini and Hary Nugroho] .....	137
<b>The Comparison of Point Cloud Registration Quality on Maptek I-Site Studio and Cloud Compare</b> [Fathur Rahman, Gusti Ayu Jessy Kartini and Hary Nugroho] .....	138
<b>Identification of Soil Erosion Areas and Soil Conservation in the Ci Lutung Watershed Using the RUSLE Method</b> [Restu Adjie, Eko Kusratmoko and Andry Rustanto] .....	139
<b>Determining Recharge Groundwater Using Delineation of Morphological Surface in Ligarmukti Karst Area Bogor Regency</b> [Rizka Maria, Ananta Purwoarminta and Hilda Lestiana] .....	140
<b>Investigation of Cartographical Aspect for Highway (Toll Road) Map (Case Study: Java Island)</b> [Bugie Guntara and Soni Darmawa] .....	141
<b>Spatial Modeling of Peat Land Fire-Based Anthopogenic Case Study of the Kepulauan Meranti District</b> [Turmudi Turmudi, Dewayany Sutrisno and Irmadi Nahib] .....	142
<b>Suitability Of space utilization Settlement coastal areas In Abeli and Nambo subdistricts Kendari City, Southeast Sulawesi Province</b> [M Aris Rauf, Hasbullah Syaf and Muslim Tadjuddah] .....	143
<b>Investigation of Relationship Between Age of Palm Oil and Spectral Reflectances Derived from Variety of Radar Data (Study Case: Asahan, North Sumatera)</b> [Yohanes Kunto] .....	144
<b>The Importance of Geospatial Information</b> [Totok Sedyantoro and Asep Karsidi] .....	145
<b>Deforestation and Carbon Emissions at Poso Regency, Central Sulawesi Province, Indonesia</b> [Jaka Suryanta, Turmudi Baniaman and Irmadi Nahib] .....	146

<b>Flood Rapidmapping in Konawe and North Konawe Southeast Sulawesi Province</b> [Dadan Ramdani] .....	147
<b>Automatic Reconstruction of Building Openings In 3D Models using 2D Architecture Images</b> [R Laksmiari Saraswati] .....	148
<b>Geometric Correction Model for Dual Sensor Pushbroom Aerial Camera</b> [Donna Monica, Ahmad Maryanto and Hidayat Gunawan] .....	149
<b>Object Based Convolutional Neural Network for Cloud Classification in Very High-Resolution Hyperspectral Imagers</b> [Rahmat Rizkiyanto, Bijak Rabbani, Didi Yudha Perwira and Aniati Murni Arymurthy] .....	150
<b>Android Application Development for Unlivable Houses Data Collection Based on Participatory Mapping</b> [Alfadila Anas and Dewi Kania Sari] .....	151
<b>Improvement of Spatial Modeling for Online Geoprocessing on the Spacemap Urban Change Detection Model</b> [Agnes Sondita Payani, Gusti Darma Yudha, Ogi Gumelar and Hanna Afida] .....	152
<b>Changes of Land Use Monitoring within Forest Area</b> [Cherie Pribadi and Teguh Hariyanto] .....	153
<b>Gis-Based Study of Groundwater Monitoring of Villages, Karhe Region, Maharashtra, India</b> [Vaishali Navale and Sumedh Mhaske] .....	154
<b>Monitoring of Sultan Idris Shah Bridge Using Global Navigation Satellite System and Accelerometer</b> [Masreta Mohd, Nazirah Mohamad, Othman Zainon, Zulhasdee Zulkifli, Nasarularifin Kamarudin and Khairul Khusairi Khalil] .....	155
<b>The Effect of Building Density on Land Surface Temperature (Case Study: Turikale District, Maros Regency)</b> [Muhammad Asyraf, Astrid Damayanti and Muhammad Dimiyati] .....	156
<b>Land Use Change Mapping and Its Impact on Storm Water Runoff Using Remote Sensing and Gis: A Case Study of Mumbai, India</b> [Darshan Sansare and Sumedh Mhaske] .....	157
<b>The Evaluation of Changes in Land Values at Wonorejo Mangrove Tourism Area (Case Study: Rungkut Subdistrict, Surabaya District)</b> [Udiana Wahyu Deviantari, Yanto Budisusanto and Yaasmiin Pratita Apsari] .....	158
<b>Development of highway (toll road) Geodatabase in Java Island region</b> [Leonardo Matasik and Soni Darmawan] .....	159

<b>Spatial Analysis of Deforestation in Water Recharge Areas of the Toyaning Sub-Watershed as A Drought Mitigation Effort</b> [Hanri Bawafi, Tito Latif Indra and Astrid Damayanti] .....	160
<b>The Use of Sentinel-2 and ALOS PALSAR Data for Lithology Mapping in Dense Vegetation Environment Using Random Forest Machine Learning Algorithm, Case Study Komopa Region – Papua, Indonesia</b> [Hary Nugroho, Ketut Wikantika, Satria Bijaksana and Asep Saepuloh] .....	161
<b>Updating of Homecoming Route Map 2019 (Case Study:Java and Bali Island)</b> [Arief Rahman Hakim and Soni Darmawan] .....	162
<b>Type and Distribution Evaluation of Traffic Signs Using Video Tracking</b> [Andri Riyanto, Henri Kuncoro and Sumarno] .....	163
<b>Identification of Oil Palm Using Multiscatter and Multiresolution of SAR Data (Study Case: Asahan, North Sumatera)</b> [Anwar Ersyad Ananta and Soni Darmawan] .....	164
<b>Investigation of relationship between age palm oil and spectral reflectances derived from Variety of Optical Data (Case Study: Asahan Regency, North Sumatra Province)</b> [Adithia Rizky Prabowo and Soni Darmawan] .....	165
<b>Updating of Homecoming Routes Map 2019 (Study Case: Sumatera Island)</b> [Nurul Huda Cantika and Soni Darmawan] .....	166
<b>Remote Sensing Data for Atlas of Volcanic Landscape Resources</b> [Fakhrudin Mustofa, Mulyanto Darmawan, Amanah Anggun Prabandari and Zidni Farhati Silmi] .....	167
<b>Development Geodatabase of Homecoming Route Map 2019 (Study Case: Java - Bali)</b> [Siscaayu Purwanti and Soni Darmawan] .....	168
<b>Investigation of relationship between age palm oil and spectral reflectances derived from Variety of Optical Data (case study Tabara and Tajati in Paser Regency, East Kalimantan Province)</b> [Muhammad Riski Deni and Soni Darmawan] .....	169
<b>Identification of Land Cover Changes in Mangrove Forest Areas Using Cellular Automata (Case Study: Kalimantan Island)</b> [Apin Suyana and Soni Darmawan] .....	170
<b>Investigation of relationship between age palm oil and spectral reflectances derived from variations of SAR data (Case Study: Tabara and Tajati in East Kalimantan)</b> [Asparoni Herman and Soni Darmawan] .....	171
<b>Identification of Palm Oil Plantation Using Multispectral and Multiresolution of Optical Imagery (Case Study: Asahan Regency, North Sumatra Province)</b> [Apriandi Kaban and Soni Darmawan] .....	172

<b>Determining Location of Tsunami Disaster Temporary Evacuation Shelter (TES) Utilizes Network Analysis in City Of Makassar, South Sulawesi Province</b> [Feni Ismiati, Astrid Damayanti and Muhammad Dimiyati] .....	173
<b>GIS-Based Bivariate Statistical Modelling for Landslide Susceptibility Mapping in Kayangan Watershed, Yogyakarta</b> [Wahyu Nurbandi and Projo Danoedoro] .....	174
<b>Development of Paddy Pest and Disease Mapping Using Interpolation and Drone Image Method Employing Photo-Radiometric and Legal Observation Approached Data</b> [Baba Barus, Laode Ls Iman, Bambang Hendro Ts and Chiharu Hongo] .....	175
<b>Application of Sentinel-2 to Identify Indications Land Cover Changes 2017-2018</b> [Samsul Arifin, Tatik Kartika, Dede Dirgahayu and Kuncoro Teguh Setiawan] ....	176
<b>Updating of Homecoming Route Map 2019</b> [Nadila Dwiyantri and Soni Darmawan] .....	177
<b>Investigation of Paddy Field Classification using Multitemporal Analysis Landsat 8 Data of Rice Phenologybased (Case Study of North Coast, West Java)</b> [Dede Dirgahayu and I Made Parsa] .....	178
<b>GIS-Based Current Analysis and Efficiency Improvement of Building Water Supply Network</b> [Amit Chaudhari and Abhaykumar Wayal] .....	179
<b>Identification of Palm Oil Plantation Using Multispectral and Multiresolution of Optical Imagery (Case Study: Tabara and Tajati, Long Ikis, Paser Regency, North Kalimantan Province)</b> [Eggy Urva Wahyuni and Soni Darmawan] .....	180
<b>Object Detection of Aerial Image Using Mask-Region Convolutional Neural Network (Mask-R CNN)</b> [Musyarofah] .....	181
<b>Strain Analysis Lombok Island Based on GNSS Observation Data 1996 – 2018</b> [Ardita Hadi Pancanugroho and Henri Kuncoro] .....	182
<b>Position Precision Analysis of the Dual Frequency Low Cost GPS Module Measurement with Static Differential Method in Various Baseline Length Variations</b> [Muhammad Haris Jonas and Henri Kuncoro] .....	183
<b>Microwave Wind Speed Estimation in Tropical Cyclone Condition</b> [Syarawi Muhammad Husni Mohd Sharoni and Mohd Nadzri Md. Reba] .....	184
<b>Analyzing mangrove forest area changes in coastal zone of Langsa City using landsat imagery</b> [Ayu Suciani, M.Taufik Rahmadi and Zukya Rona Islami] .....	185

<b>Identify and Analysis Coral Reefs Changes Using Landsat 8 Oli Imagery in Coastal Zone of Langsa City</b> [M.Taufik Rahmadi, Ayu Suciani and Hamdani] .....	186
<b>An Experience of Digital Aerial Photogrammetry for Large Scale Mapping in Variation Terrain Area</b> [Budhy Soeksmantono].....	187
<b>Analysis of Subduction Zone Deformation in South East Java Based on 2009-2014 GPS Continue Observation Data</b> [Rizki Ahmad Faturochman, Henri Kuncoro and Hary Nugroho] .....	188
<b>Pattern of Spatial Distribution of Agricultural Drought Using Landsat Imagery 8 Oil/Tirs in Bacukiki District City of Parepare</b> [Ayi Priana and Andy Nugroho] .....	189
<b>The classification of oil palm plantations derived from Landsat 8 OLI images using Google Earth Engine</b> [Sri Mulyati, Iksal Yanuarsyah and Sahid Hudjimartsu] .....	190
<b>A Precision Review of InaCORS Online Post Processing Service Compared with GNSS Scientific Software for Establishing Horizontal Reference Network (Case Study: Bandung, Java Island, Indonesia)</b> [Rifqi Oktavianto and Henri Kuncoro] .....	191
<b>Weekly Sea Surface Temperature from SNPP-VIIRS Data Using Open Source Software</b> [Maryani Hartuti, Arum Tjahjaningsih, Iskandar Effendy and Jansen Sitorus] .....	192
<b>Lombok Earthquakes using D-InSAR Techniques based on Sentinel 1A Data</b> [Rian Nurtyawan and Muhammad Fachri Yulanda] .....	193
<b>Soil Moisture Estimation Using Dubois Model (1995) for Monitoring Phase of Padi Growth</b> [Rian Nurtyawan and Ardianti Nur] .....	194
<b>Oil Palm Age Identification by using Sentinel-1 Data in Riau-Indonesia</b> [Ita Carolita, Dede Dirgahayu, Tatik Kartika and Heru Noviar] .....	195
<b>Application of Interferometric SAR using Sentinel-1A for Flood Monitoring in South of Sulawesi, Indonesia</b> [Jefriza Jefriza, Habibah Lateh, Izham Muhamad Yusoff, Ismail Ahmad Abir, Saumi Syahreza, Pakhrul Razi and Muhammad Rusdi] .....	196
<b>Correlation Analysis of PM10 Air Pollution with NDVI (Normalized Difference Vegetation Index) Based on Landsat-8 and Sentinel-2A Satellite Images</b> [Muhammad Reza Kusuma, Rika Hernawati, and Soni Darmawan].....	197



<b>SAR Sentinel-1: Mitigation strategies for Earth's surface displacements in Aceh, Indonesia</b>	
[Jefriza Jefriza, Habibah Lateh, Ismail Ahmad Abir, Izham Mohammad Yusoff, Saumi Syahreza, Pakhrul Razi and Muhammad Rusdi].....	198
<b>Detection of Urban Heat Island (UHI) in Central Jakarta Based on Landsat Imagery</b>	
[Masyita Hayatuddin and Rika Hernawati].....	199
<b>Using Visible Spectral-Index as Alternative Methods for Identifying Levels of Ganoderma Boninese Infection</b>	
[Dhimas Wiratmoko, Retnadi Heru Jatmiko, Muhammad Arif Yusuf, Rana Farrasati and Agus Eko Prasetyo] .....	200
<b>Detection of Shoreline Changes Based on Landsat Satellite Imagery Using Applications Digital Shoreline Analysis System (DSAS) (Case Study: Coastal District of Karawang)</b>	
[Akhmad Setiabudi and Thonas Maryanto] .....	201
<b>The Effect of Building Density on Surface Temperature Based Landsat-8 in Bandung City, West Java, Indonesia</b>	
[Dery Chahyanto and Rika Hernawati].....	202
<b>Detection of Vegetation Changes Using Landsat Satellite Images in Bandung, Indonesia</b>	
[Ichwan Altarans, Rika Hernawati, and Soni Darmawan].....	203
<b>Analysis of PM10 Air Pollution with Increasing the Number of Vehicles Based on Landsat Satellite Images in Bandung City</b>	
[Anisa Maulidina, Rika Hernawati, and Soni Darmawan] .....	204
<b>Analysis Air Pollution PM<sub>2,5</sub> with Correlation NDVI (Normalized Difference Vegetation Index) Using Landsat 8 in Bandung, West Java</b>	
[Anis Pratiwi, Rika Hernawati, and Soni Darmawan] .....	205
<b>Identification of PM10 Air Pollution Distribution Using Satellite Landsat Images in Bandung, Indonesia</b>	
[Novita Dewi, Rika Hernawati and Soni Darmawan] .....	206
<b>Urban Building Land Mapping and Monitoring Using Approach (Normalized Difference Built-Up Index) NDBI in Bandung City, West Java Province</b>	
[Felita Nathania and Rika Hernawati] .....	207
<b>A Correlation Analysis of the Relationship Between Land Surface Temperature and Parameters Particulate Matter (PM) 10 In Bandung City, Indonesia</b>	
[Aab R. Abdullah, Rika Hernawati, and Soni Darmawan] .....	208
<b>Analysis of increasing TSS before and after reclamation activities in Jakarta Bay Using Landast 8 Data</b>	
[Ety Parwati and Syifa W. Adawiah] .....	209

<b>The Algorithm Models of PM10 Air Pollutant Based on Landsat Satellite Imagery in Bandung City</b> [Rika Hernawati and Soni Darmawan] .....	210
<b>Utilization of Google Earth for flood hazards mapping in paddy fields, Bojongsoang District, Bandung Regency</b> [Boedi Tjahjono, Khursatul Munibah, Sella As Kumala, Intan Rr Permata and Hiroyuki Wakabayashi] .....	211
<b>Evolution of Remote Sensing: What's next?</b> [Abhineet Jain] .....	212
<b>Asset Identification of Belitung Timur District Government using Geospatial Information Approach</b> [Fahrudin and Nurul Mustofa] .....	213
<b>Estimating and mapping aboveground biomass/carbon stock using ALOS-2 PALSAR-2 of the mangrove forests in East Kalimantan, Indonesia</b> [M. K. Neshia] .....	214
<b>A Comparative Assessment on the Applicability of UAV and TLS for Estimating Aboveground Biomass of Mangrove Forest in Mahakam Delta, East Kalimantan, Indonesia</b> [Md. M. Hossain] .....	215
<b>Aboveground Mangrove forest biomass and carbon stock assessment with Terrestrial Laser Scanner (TLS) using Quantitative Structure Model (QSM) in East Kalimantan, Indonesia</b> [G. K. Beyene] .....	216
<b>Estimation of Aboveground biomass/ carbon stock and carbon sequestration using UAV images at Kebun Raya Unmul Samarinda (KRUS) education forest, East Kalimantan, Indonesia</b> [Md A. Hashem] .....	217
<b>Integrating Terrestrial Laser Scanner and UAV data to estimate AGB/ carbon stock in KRUS tropical rain forest, East Kalimantan, Indonesia</b> [W. B. Tesfay].....	218
<b>Estimating Aboveground Biomass/Carbon Stock and Carbon Sequestration using UAV (Unmanned Aerial Vehicle) images in the Mangrove Forests Mahakam Delta, East Kalimantan, Indonesia</b> [Eko Kustiyanto] .....	219
<b>Mangrove Biomass Estimation Based on Vegetation Height Through LiDAR and Terrasar-X Data Approaches</b> [Nanin Anggraini] .....	220

<b>Traffic Object Survey Using Smartphone (Comparative Study: DKI Jakarta and Bandung City)</b> [Sumarno] .....	221
<b>Integrated Database Management System by Using Satellite Imagery for Disasters Along Southern Front of Himalaya</b> [Mamoona Saher] .....	222
<b>The Relationship Between Night Time Light and Population in 2000 and 2015 in The Java Island</b> [Anika Putri, Mutia Kamalia, Ratri Widyastuti, Masita Dwi Mandini, Supriatna Supriatna and Yoanna Ristian] .....	223
<b>Risk Earthquake Estimation of Lembang Fault Earthquake Casualty in Coblong, Bandung, Indonesia</b> [Irwan Meilano, Puti Nabila Riyadi and Akhmad Riqqi] .....	224
<b>Prediction of Potential Fishing Zones for Mackerel Tuna (Euthynnus sp) in Bali Strait using Remotely Sensed Data</b> [Achmad Fachruddin-Syah, Laras Wulan Ramdani and Komang Iwan-Suniada] ...	225
<b>Utilization of Remote Sensing Satellite Data to Predict Future Cloud Cover in Indonesia: A Preliminary Study</b> [Ahmad Luthfi Hadiyanto, Ketut Wikantika, Ary Setijadi Prihatmanto and Nurjanna Joko Trilaksono] .....	226
<b>Application Of Dem Terrasar-X To Prospecting Geothermal: Rajabasa Volcanic Complex, Sumatra, Indonesia</b> [Fitriani Agustin, Indra Sanjaya and Undang Hernawan] .....	227
<b>The Development of WebGIS for The Cultural Sites in Kotagede Sub-District combined with 360° Photosphere Visualization</b> [Ni Luh Kompyang Sariani, Bambang Kun Cahyono, Dany Puguh Laksono, Djurdjani Wardaya and Gondang Riyadi] .....	228
<b>Relative Bathymetry Extraction Using SPOT 7 Satellite Imagery</b> [Kuncoro Teguh S] .....	229
<b>Effect of Object Homogeneity on Agisoft Processing Success</b> [Anna Charieninna, Monica Maharani and Hary Nugroho] .....	230
<b>Spatial Analysis of Rice Phenology Using Sentinel-2 and UAV in Parakan Salak, Sukabumi Regency</b> [Rokhmatuloh Rokhmatuloh, Supriatna Supriatna, Adi Wibowo, Iqbal Putut Ash Shidiq, Tjong Giok Pin and Revi Hernina] .....	231
<b>Identification of Photo Number Effect for 3D Modeling in Agisoft Software</b> [Monica Maharani, Anna Charieninna and Hary Nugroho] .....	232



**Sun Azimuth as Initial Reference of Stakeout Direction on Tunnel Surveys Project**  
[Nurul Yuhanafia and Muhammad Nurul Ihsan] ..... 233

**Integrated Ecological Index (IEI) for Urban Ecological Status based on Remote Sensing Data: A Study at Semarang – Indonesia**  
[Like Indrawati, Sigit Heru Murti B S and Rini Rachmawati] ..... 234

## **Oil Palm Age Identification by using Sentinel-1 Data in Riau-Indonesia**

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**Abstract.** Oil palm has become one of the most rapidly expanding equatorial crops in the world, with the global extent of oil palm cultivation increasing from 3.6 million ha in 1961 to 17.2 million ha in 2012. Indonesia has a very wide oil palm plantation that must be mapped well. By using oil palm maps that produced regularly, the Government can monitor the land-use changes easily. The important information that can be generated from oil palm plantation is age. Many information can be obtained if the age of oil palm can be known, for instance: the yield production and time for replantation. Mapping of oil palm land cover using satellite remote sensing data has been carried out in many studies across the tropics. Sentinel is one of satellite that has 2 kinds of sensors, optic, and SAR. This is very important for Indonesia as a tropical country that often covered by clouds. This study has objectives to build a model for estimation of oil palm age by using both sensors. The study area is Riau Province as this area has a very wide of oil palm plantation. The materials used in this research are Sentinel Data as the Primary data, the higher resolution data as supporting Primary data, and data from the field. Field data was collected under cooperation with PTPN 5. The methods for analyzing data are time series, spectral and backscatter analysis. The results of this research identify that using both sensors gives better accuracy than a single sensor of Sentinel.

**Keywords:** Oil Palm Age, Sentinel, Time Series Analysis, Back Scatter Analysis

## **Application of Interferometric SAR using Sentinel-1A for Flood Monitoring in South of Sulawesi, Indonesia**

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**Abstract.** Updated information on flood mapping that recently occurred in South Sulawesi is an important necessity for site policymakers. Mapping of flood area during or soon after the flooding event is tremendous hardwork. However, using active-remote sensing namely InSAR (Interferometric Synthetic Aperture Radar) technique can overcome these limitatations. To achieve it, at least two radar images have to be obtained which is 1 image before and 1 image during/after a flood event. We selected 2 images Sentinel-1A GRDH data for the same pass direction and the same time acquisition with polarization VH (Vertical-Horizontal), 12 days of temporal baseline. The images were then processed by SNAP Toolbox. The results show that Sentinel-1A succeeded in detecting and monitoring flood event, where inundated of water in Tallo River is visible in VH polarization.

**Keywords:** Flood, Sentinel, monitoring

# Application of Interferometric SAR using Sentinel-1A for Flood Monitoring in South of Sulawesi, Indonesia

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**Abstract** An updated information of flood mapping that recently occurred in South Sulawesi is an important necessity for site policy makers. Mapping of flood area during or soon after the flooding event is tremendous hardwork. However using active-remote sensing namely InSAR (Interferometric Synthetic Aperture Radar) technique can overcome these limitations. To achieve it, at least two radar images have to be obtained which is 1 image before and 1 image during/after flood event. We selected 2 images Sentinel-1A GRDH data for the same pass direction and the same time acquisition with polarization VH (Vertical-Horizontal), 12 days of temporal baseline. The images were then processed by SNAP Toolbox. The results show that Sentinel-1A succeeded in detecting and monitoring flood event, where inundated of water in Tallo River is clearly visible in VH polarization.

## 1. Introduction

Recently, flood had occurred (25 January 2019) in South Sulawesi, Indonesia. The issue is necessary since there is a little information available about the site area. Since the study area is located in a tropical region, passive remote sensing displays certain limitations mainly cloud cover over the study area and data can only be acquired during the day, while on the other hand, active remote sensing (synthetic aperture radar) can overcome these restrictions due to the data that can be acquired potentially at any time even day or night and even penetrates cloud cover. However, using active remote sensing such as Sentinel-1A is value added since its low revisit time 12 days and it is value added for flood monitoring.

Some examples of successful application of radar for flood monitoring [1], [2]. Mapping disaster map, when flood is still occurring is another positive output of using remote sensing.

## 2. Study Area

The study area is along the Tallo River to the Bili-Bili Dam located in Southern of Ujung Pandang City, Makasar, South Sulawesi (Figure 1 and Figure 3.a). For the investigated flood area and damage

analysis, the Sentinel-1A (C-Band) SAR data with Ground Range Detected (GRD) product format were used. The mode of satellite data is Interferometric Wide (IW) which has swath width area of 250 km and has a dual polarization (VV & VH). The GRD range azimuth resolution is 20x22 m with pixel spacing 10x10 m [3].

### 3. Data

This research used Sentinel-1A GRDH IW with the ESA (European Space Agency) SNAP Processor software with 2 images acquisition which is, before and during the flooding event. In this case, there are 2 data available dated at 13<sup>th</sup> and 25<sup>th</sup> January 2019 images. The first image acquisition (13/01/2019) is before flood and the second (25/01/2019) is during the flood. The flood occurred on 25 January 2019. Because of the flooding event prolonged until subsequent days, Sentinel-1A is compatible for the site area since the time acquiring is at noon 15:34 – 15:35 local time. This means that Sentinel-1 captured the flood event and is suitable for this research. Table 1 shows the Sentinel-1A data.

Table 1. Satellite Sentinel-1A with dual polarization VV VH and azimuth range resolution 20x22 m.

Satellite Data	Pass Direction	Time	Track	Date (Jan 2019)	Orbit
Sentinel-1A IW GRDH	Ascending	15:34:27 pm	10	13	25457
				25	25632

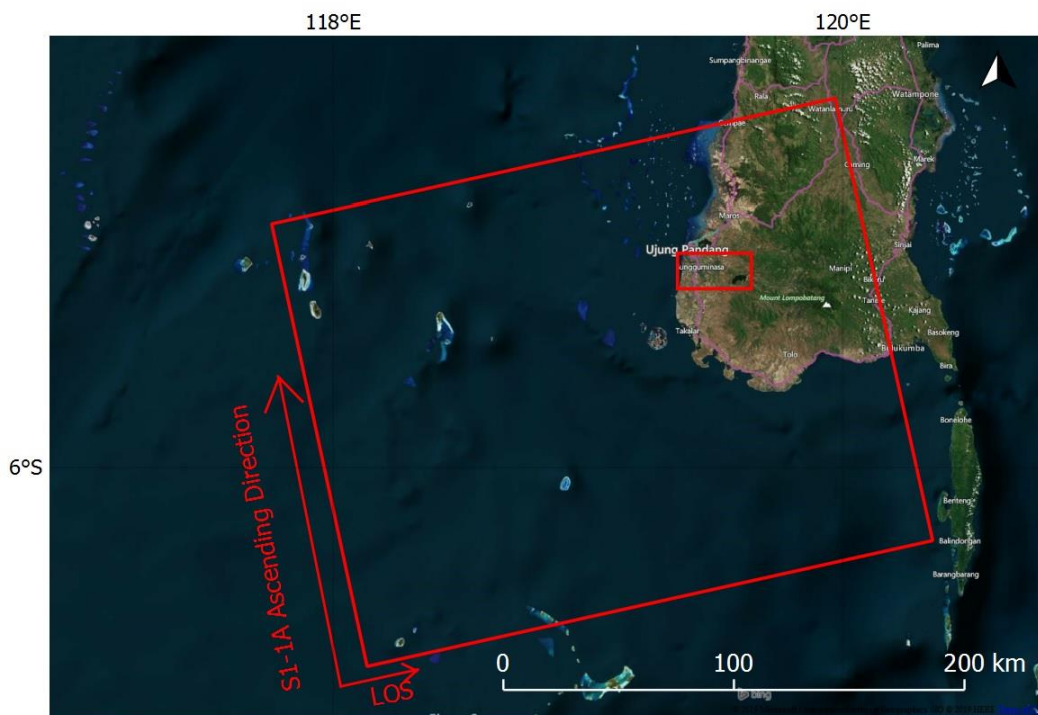


Fig.1 Small red rectangle is study Area, while large red rectangle refer to ascending mode of radar image. Purple line is the province main road.



## 4. Methodology

InSAR technique utilizes two or more SAR images in the format of SLC (Single Look Complex) or GRDH in order to extract information from a pair of SAR images at different acquisition times [4]. SAR emits its own energy of an electromagnetic wave to the earth surface with specific wavelength and frequency. The lowest frequency sensor has high sensitivity [5], [6] to surface feature with an accuracy of the topography and displacement in meter and millimetre respectively [7].

Flood area monitoring can be analyzed by its pixel coefficient of backscatter ( $\sigma_0$ ), which has low values than other pixels because the radar signal is reflected away from the sensor and this results in the area looking dark (black) in SAR images. The processing flow using SNAP Processing Tool [8] which is shown in Figure 2.

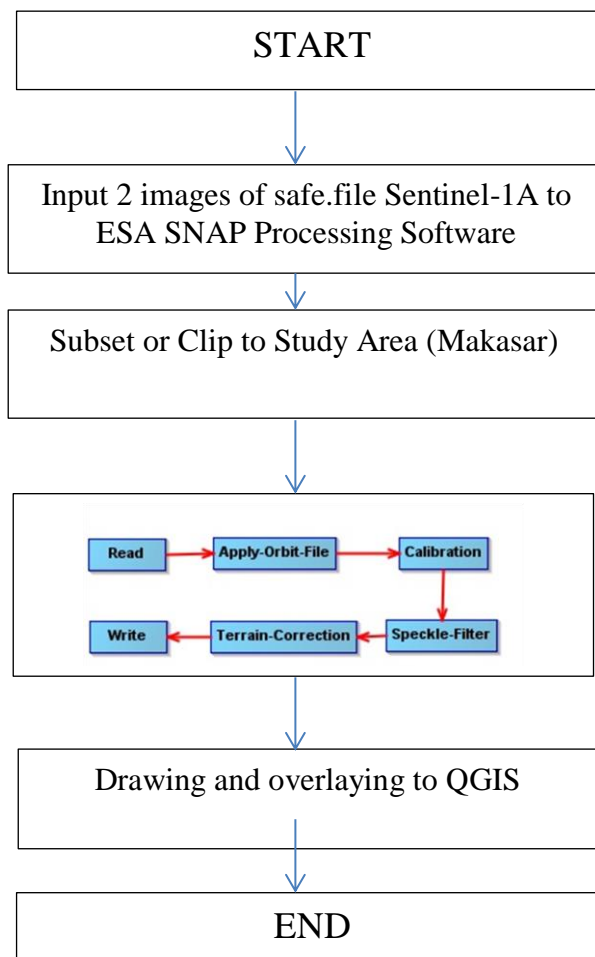


Figure 2. Flowcart of methodology with using ESA SNAP and QGIS

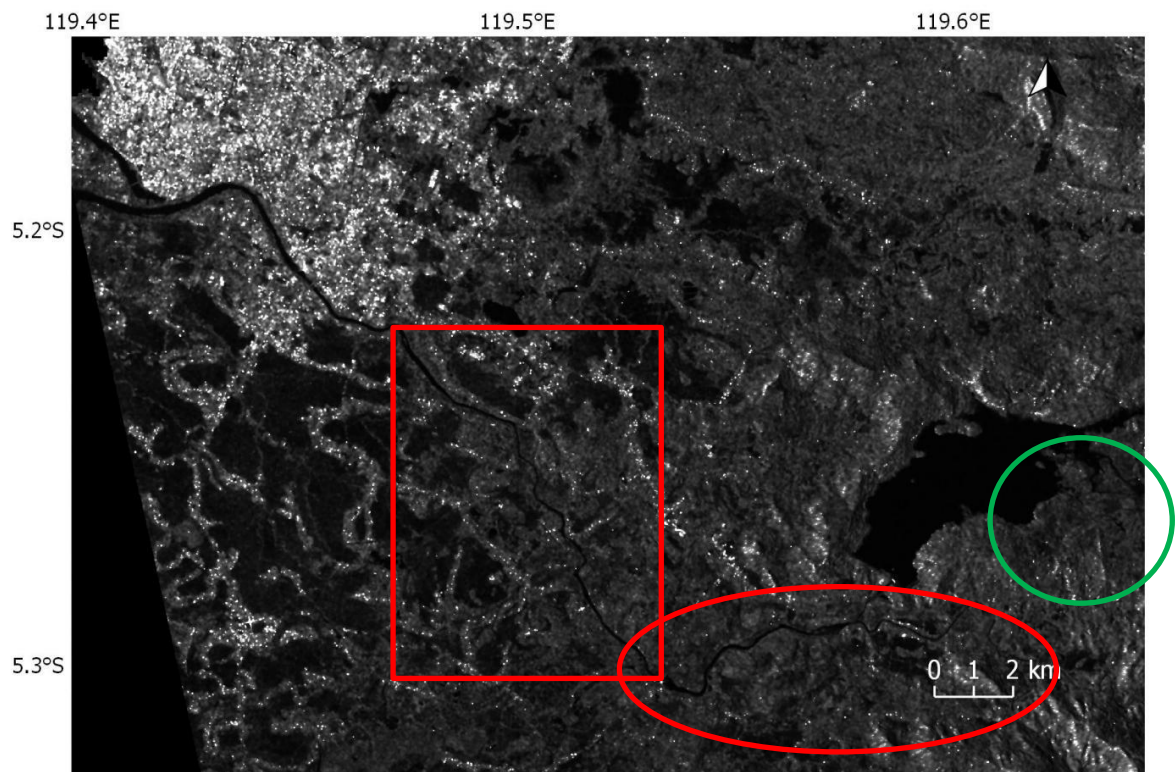
For flood detection and monitoring, we used before and during flood images to compare water and land area. To decide the value threshold, statistical analysis was applied for selecting the water area.



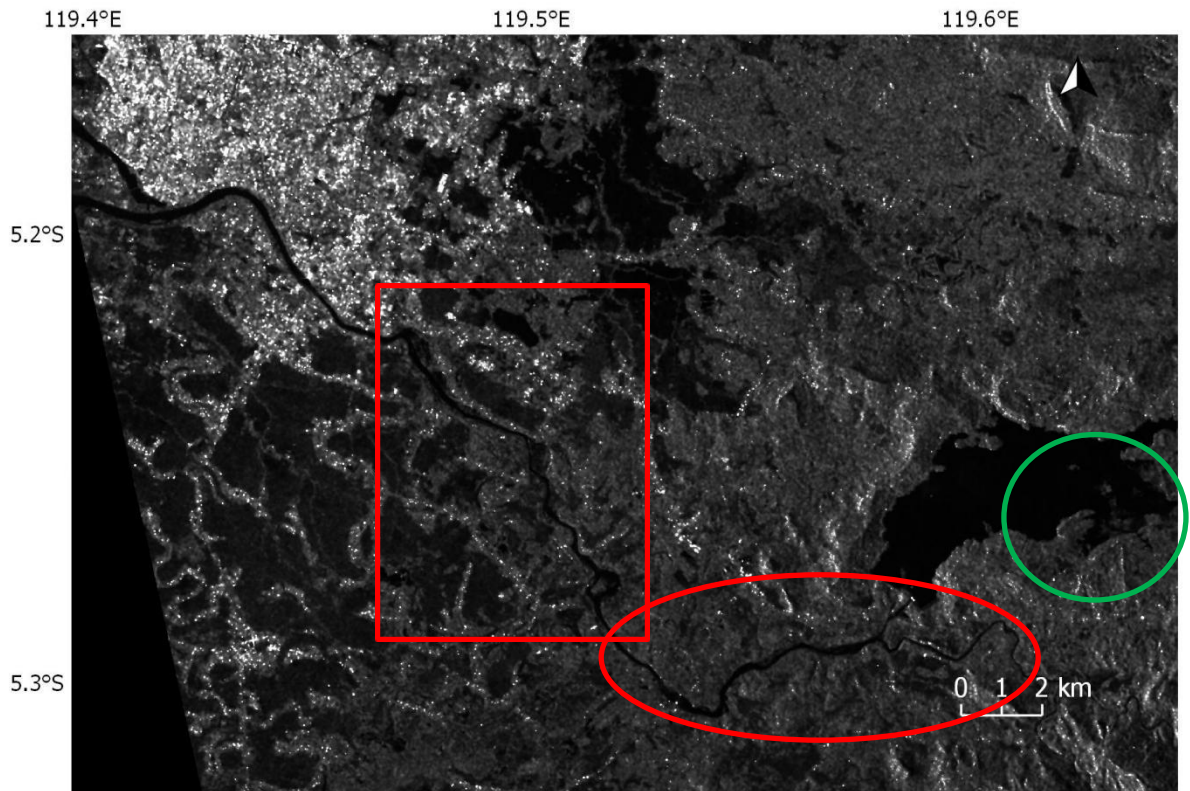
**Figure 3.a.** An aerial view of the study area, Near Tallo River, South Sulawesi Aeh (red rectangle in Fig.1(<https://www.bing.com/maps/aerial>)). See VH before and during flood in Fig.3b-3c.

## 5. Result

The results present a potential of detecting and monitoring flood event using 12 days of Sentinel-1A GRDH images with the intensity of the radar images. Clear differences of VH polarisation between before and during flood are described in Fig.3b and Fig.3c. An observation of Center of the figure clearly shows inundated flood by over loading water of Tallo River dominated by dark areas. Moreover the river makes its own flow directly to the Billi-Billi Dam (see bottom right corner of red rectangle in Fig.3c). In addition, the width of the Tallo River looks wider when compared to before flooding image (Fig.3c). More than that, in the East-West of the Billi-Billi Dam, the land area disappears, which is perhaps due to high intensity and the pressure of water come in to the dam (see green circle in Fig. 3c)



**Figure 3.b.** VH Before Flood



**Figure 3.c.** VH During Flood

## 6. Conclusion

This paper presents the potential of SAR classification technique to monitor flooding events in South Sulawesi with an active remote sensing Sentinel-1A GRDH IW using SNAP Processing Toolbox. The flooding features can be identified clearly and are highly visible in VH polarization.

## 7. Future Work

Since Sentinel-1A has another polarization VV, a comparison VV and VH is the next task beside Change Detection technique using SARPROZ by D. Perrisin which is to obtain the detail information of the differences in each pixels.

## 8. Acknowledgement

Authors would like to thank European Space Agency, who has provided Sentinel-1A GRDH data for free in the website and for SNAP Sentinel-1 Processing Tool. And to Badan Pengelolahaan Sumber Daya Manusia (BPSDM), Aceh Government which is provide the schoolarship in Universiti Sains Malaysia.

## 9. References

- [1] P. Razi, J. T. S. Sumantyo, F. Febriany, M. Nasucha, and J. Aminuddin, "Interferometry Synthetic Aperture Radar ( InSAR ) Application for Flood Area Detection Observed by Sentinel 1A," in *Progress in Electromagnetics Research Symposium PIERS*, 2018, pp. 905–909.
- [2] R. Kumar, "Flood Inundation and Hazard Mapping of 2017 Floods in the Rapti River Basin Using Sentinel-1A Synthetic Aperture Radar Images," 2019, pp. 77–98.
- [3] ESA User Guide, "Interferometric Wide Swath," *Online*, 2019. [Online]. Available: <https://sentinel.esa.int/web/sentinel/user-guides/sentinel-1-sar/acquisition-modes/interferometric-wide-swath>.
- [4] P. A. Rosen *et al.*, "Synthetic Aperture Radar Interferometry," *Proceeding Ieee*, vol. 88, no. 3, pp. 333–382, 2000.
- [5] A. Refice *et al.*, "SAR and InSAR for Flood Monitoring : Examples With COSMO-SkyMed Data," vol. 7, no. 7, pp. 2711–2722, 2014.
- [6] A. Refice *et al.*, "Inundation monitoring through high-resolution SAR / InSAR data and 2D hydraulic simulations," 2020.
- [7] Y. Rauste, H. Lateh, Jefriza, M. W. I. Wan Mohd, A. Lönnqvist, and T. Häme, "TerraSAR-X data in cut slope soil stability monitoring in Malaysia," *IEEE Trans. Geosci. Remote Sens.*, vol. 50, no. 9, pp. 3354–3363, 2012.
- [8] Sentinel-1 Tutorials, "SNAP Processing and Tutorials," 2016. [Online]. Available: <http://step.esa.int/>. [Accessed: 11-Dec-2016].

**Correlation Analysis of PM10 Air Pollution with NDVI  
(Normalized Difference Vegetation Index) Based on  
Landsat-8 and Sentinel-2A Satellite Images**

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**Abstract.** Dust particulates in the air Suspended Particulate Matter (SPM) is a mixture of various organic and inorganic compounds with small diameters ranging from <1 micron - 500 microns. Particulate (PM10) is an air particle that is less than 10 microns in size. This study correlates the NDVI vegetation index with PM10 in Bandung, West Java in 2001 - 20019 from these results show the relationship between NDVI and air pollution index is negative or inversely proportional, which means the higher (+) NDVI, the air pollution index decreases (-) with a confidence level of 39.35% in 2001, 45.13% in 2006, 60.04% in 2011, 36.83% in 2016, 50.71% in 2019 and 46.96% in 2018 and 48.96% in 2019 with Sentinel. Thus, the NDVI index can be used to obtain air pollution information that indicates if the NDVI index value in the extraction will get a correlation value between Landsat 8 satellite images and Sentinel 2A where the correlation results on field measurements are Landsat at 68.93% and Sentinel 90.15%.

**Keywords:** Particulate matter, PM10, PM2.5, Landsat 8, Sentinel 2A, NDVI, TVDI