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ICSSM 2019 OVERVIEW

Climate change and sustainable environmental management have become the world's focus in recent years. Various researches carried out in local, regional and global scale show significant threats of changing environments in many dimensions.

CORECT and **CRoSOS** are two research groups which focused on coastal and marine environmental dynamics related to climate change. CORECT (Coastal Resilience and Climate Change Adaptation-Research Group) is a research group from Faculty of Fisheries and Marine Science, Universitas Brawijaya (UB) with research background on coastal ecology, marine chemistry and remote sensing applications for studying the dynamics of the coastal and marine environment. CRoSOS (Center for Remote Sensing and Ocean Sciences), a research center from Udayana University, focusing on remote sensing applications to analyze the dynamics in the marine environment. The first collaboration between the research group implemented on the 1st CORECT Science Symposium, September 2018, located in UB, Malang. The symposium was attended by participants from universities in Indonesia, NTOU -Taiwan, Indonesia government agencies, USAID Program for Climate Change Adaptation (APIK) and East Java Ecotourism Forum (EJEF).

Indonesia Japan Joint Scientific Symposium (IJSS) 2019 is the 9th Symposium to be held by Faculty of Marine Science & Fisheries and Postgraduate Program - Udayana University. IJSS is one of the implementations of collaboration between Chiba University and sister Indonesian universities since 2004. The main purpose of this symposium is to provide a meeting that will enforce progress, stimulate growth and advance the state of knowledge between students and researchers from Indonesia and Japan, as well as those from countries around the world.

The Institute of Electronics, Information and Communication Engineers (IEICE) is a Japanese institute specializing in the areas of electronics, information and communication engineering, and associated fields. Established in 1917, currently, IEICE has the Engineering Sciences Society, NOLTA Society, Communications Society, Electronics Society, Information and Systems Society, and the Human Communication Group. Eighty-four technical committee conferences in relevant fields are held, with each being organized autonomously. This year, The Seminar on Microwave Remote Sensing (SOMIRES) becomes an annual IEICE activity.

In 2019, these three institutions collaborated to hold an International conference entitled **International Conference on Sustainability Science and Management: Advanced Technology in Environmental Research**, which will be held on **14-15 November 2019** in Sanur, Bali, Indonesia.

This international conference is expected to present interesting discussions through the presentation of research results, related to **Marine Science and Fisheries, Engineering and IT, Environmental Science and Social Science**.



International Conference on Sustainability Science and Management: Advanced Technology in Environmental Research



Coastal Resilience and Climate Change Adaptation (CORECT) 2nd Symposium
The 9th Indonesia Japan Joint Scientific Symposium (IJSS 2019)
Seminar on Microwave Remote Sensing (SOMIRES) 2019

Bali, Indonesia, 14-15 November 2019

CORECT is a research group from Faculty of Fisheries and Marine Science, Brawijaya University, with research background on coastal ecology, marine chemistry and remote sensing applications for studying the dynamics of the coastal and marine environment.

Indonesia Japan Joint Scientific Symposium (IJSS 2019) is the 9th Symposium to be held by Faculty of Marine Science & Fisheries and Postgraduate Program –Udayana University. IJSS is one of the implementation of collaboration between Chiba University and sister Indonesian universities since 2004. The main purpose of this symposium are to provide a meeting that will enforce progress, stimulate growth and advance the state of knowledge between students and researchers from Indonesia and Japan, as well as those from countries around the world.

Seminar on Microwave Remote Sensing (SOMIRES) is symposium of Chiba University Global Prominent Program to promote advanced technology on microwave remote sensing (synthetic aperture radar) and applications.

Keynote Speakers

Prof. Ocky Karna Radjasa
Director of RCS, Ministry of Research, Technology and Higher Education, Indonesia

Prof. Josaphat Tetuko Sri Sumantyo
Center for Environmental Remote Sensing, Chiba University, Japan

Prof. Ming An Lee
Dept. of Environ. Biology and Fisheries Science, NTOU and TGEO, Taiwan

Dr. Stefano Vignudelli
Consiglio Nazionale delle Ricerche, Istituto di Biofica, Pisa, Italy

Prof. Sei-Ichi Saitoh
Director of The Arctic Research Centre, Hokkaido University, Japan

Prof. John Lynham
Director of Graduate Ocean Policy Certificate, Univ. Hawaii

- In conjunction with **CERes International Symposium 2019**
- Special session from **JST SATREPS Program**



Organized by:



Supported by:



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Proceeding:



Journal partners:



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ICSSM 2019 CHAIRMAN



On behalf of the 1st International Conference on Sustainability Science and Management (ICSSM) 2019, organizing committee, we would like to welcome you to our conference, which is being held on November 14-15 this year at Denpasar, Bali. This international event is collaborations of Indonesia Japan Joint Scientific Symposium (IJSS) 2019 is the 9th Symposium to be held by Faculty of Marine Science & Fisheries and Postgraduate Program-Udayana University, CORECT Symposium, Brawijaya University and The Seminar on Microwave Remote Sensing (SOMIRES) Chiba University.

This international conference is focused on enhancing the beneficial use of advanced technology in terms of environmental research: marine sciences and fisheries, engineering and IT and environmental science. Within a very limited time, we have already received 186 abstracts for both categories of Oral and Poster presentations, which come from various scientists and students from different institutions. These abstracts have been reviewed by our committee and divided into two different categories based on oral or poster presentation; 131 abstracts for oral presentations and 55 abstracts for a poster presentation. The theme we have been received is dominated by marine sciences and fisheries, followed by environmental science, and engineering and IT.

This conference will provide an ideal forum for obtaining information about the latest developments, exchanging ideas, identifying future trends in environmental research area and making contacts with the international community, whether in industry, academia, or government, the opportunity to create communities that fuel innovation, facilitate knowledge sharing, and provide support through a session designed to foster discussion and collaboration. Moreover, this symposium will be strengthened the collaboration between multi-institution and developed a better atmosphere among the different research groups, either for basic research or technology developments. In order for these papers to publicly available, it will be published in the international journal and proceeding, and national journal as we have already signed the contract with E3S Web of Conference Proceeding indexed in Scopus and EEC Journal indexed in Scopus.

We thank the committee, which comprises Udayana University, Brawijaya University, and Chiba University who have been working so hard to organize this conference since the very beginning. We also, thank Governor of Bali Province who has been supported the social events.

As concluding remarks, please enjoy the conference; we are sure that all of us will enjoy this great symposium in terms of both its academic and social programs with the beautiful place of Bali Island.

We look forward to meeting you in Bali during ICSSM 2019

I Wayan Gede Astawa Karang, Ph.D

Udayana University of Bali
Conference Chairman

CORECT-RG CHAIRMAN



Dear Distinguished Guests, Ladies, and Gentlemen:

On behalf of the Coastal Resilience and Climate Change Adaptation - Research Group (CORECT) is a research group from Faculty of Fisheries and Marine Science, Universitas Brawijaya, I am delighted to welcome you all to the International Conference on Sustainability Science and Management: Advanced Technology in Environmental Research (CORECT-IJSS 2019). This conference is jointly hosted by Universitas Brawijaya, Udayana University, University of Indonesia and Chiba University.

The CORECT-IJSS 2019 was initiated by the 1st CORECT Science Symposium, September 2018, located in Universitas Brawijaya, Malang. The symposium was attended by participants from universities in Indonesia, NTOU -Taiwan, Indonesia government agencies, USAID Program for Climate Change Adaptation (APIK), East Java Ecotourism Forum (EJEF) and CReSOS Udayana University.

The success of the conference ultimately depends on many people who have worked hard with us on planning and organizing both the program and supporting all the other arrangements. In here, I would like to express my sincere appreciation to Udayana University for preparing the excellent program, venue, and many activities.

I do believe the conference will become an annual platform for the people who care about the sustainable development of the science to exchange and share knowledge and experiences; essentially to find the solutions to resolve the threats the human beings are facing nowadays; and to provide the solutions to the policy makers for further actions. Furthermore, I hope that from CORECT-IJSS 2019 conference, the great intellectual works will be turned into accredited publications of international journals. Therefore, your participation is indeed valuable in function as a global research platform to provide the knowledge needed to support transformations toward sustainability. I am certain that our conference will contribute great efforts to the sustainability science and management of our Earth in the future.

Finally, on behalf of CORECT, I hereby express my wholehearted thanks to all the organizers and everyone who has contributed efforts to this conference. May all your wishes come true and all of you have an enjoyable stay in this beautiful city, Denpasar-Bali.

Bambang Semedi

Associate Professor, Universitas Brawijaya
Head of CORECT-RG

RECTOR OF UNIVERSITAS BRAWIJAYA



Your Excellency Board members of IJSS,
Keynote and invited speaker of ICSSM 2019,
Chairman of the ICSSM 2019,
Distinguished presenters and participants,

It is a pleasure to welcome you all to **The International Conference on Sustainability Science and Management (ICSSM 2019): Advanced Technology in Environmental Research.**

This collaborative event between Faculty of Fisheries and Marine Science, Universitas Brawijaya, Faculty of Marine Science and Fisheries, Udayana University, CRESOS, University of Indonesia and IJSS-Chiba University creates important opportunities for research development and technology dissemination in the field of environmental sciences, including fisheries and marine science.

Indonesia, with its vast ocean and biodiversity, has launched sustainable development initiative in its marine management policy. Managing natural resources -especially fisheries and marine resources- in the future, will face increasingly severe challenges. In addition to technical efforts to increase productivity, stakeholders must prepare strategies to anticipate the impacts of climate change which will surely affect the marine and fisheries resources. This conference provides a valuable opportunity for academics, scientists, industry specialists and decision-makers to share experiences regarding the application of technology for environmental research and management.

I am grateful to the many experts who have come to share their knowledge in this multi-session conference. I also welcome the many representatives of universities, industry associations and NGOs who have joined us.

I sincerely hope you will enjoy today and the next two days of discussion and networking.

Thank you for your participation.

Warm regards,

Prof. Nuhfil Hanani AR
Rector of Universitas Brawijaya

RECTOR OF UDAYANA UNIVERSITY



Distinguished speakers and participants,
Welcome to Denpasar, Bali

It gives me great pleasure to extend to you all a very warm welcome and in particular at 1st International Conference on Sustainability Science and Management: Advanced Technology in Environmental Research. This conference is hosted by Udayana University and takes place at Werdhapura Hotel, Bali from November 14 to 15, 2019.

This conference has been made possible by a collaboration between Udayana University, Brawijaya University, and Chiba University. The theme of this conference is advanced technology in environmental research. The main purpose of this conference is to provide a meeting that will enforce progress, stimulate growth and advance the state of knowledge between researchers from all around the world. Currently, Udayana University has a purpose to become a world-class university and this conference brings a good opportunity for Our Lecturer and student to share their research.

This conference consists of three annual symposiums, namely the Indonesian Japan Joint Scientific Symposium (IJSS) 2019, 2th CORECT symposium - Brawijaya University and CERE S International Symposium - Chiba University. The collaboration between Indonesian universities and Japan universities and sister universities are growing up. This collaboration creates academic and research collaboration among Indonesia universities and Japan universities in many areas. We invite ideas for the development of themes within any aspect of a broad topic, which has been a focus of collaboration between Indonesia and Japan. Through the conference, we do hope that we can maintain strong relationships and collaborations between all Udayana University, Brawijaya University, and Chiba University both now and in the future.

Finally, we do hope that this program book is beneficial for your information during the conference in Bali. In case you would like to ask for any more detail information, our committee is more than happy to serve you.

Enjoy your conference.
Thank you.

Prof. A.A. Raka Sudewi
Rector of Udayana University

SCIENTIFIC COMMITTEE

Prof. Sei Ichi Saitoh	Hokkaido University, Japan
Dr. I Nyoman Radiarta	IMRO -Ministry of Marine and Fisheries Affairs, Indonesia
Dr. Stefano Vignudelli	National Research Council, Italia
Dr. Jonson Lumbangaol	Institut Pertanian Bogor, Indonesia
Dr. Kyunghoon Lee	Busan Fisheries Research Institute, Korea
Dr. Kamachi Masafumi	Japan Agency for Marine-Earth Science and Technology, Japan
Dr. Bambang Semedi	CORECT RG, Brawijaya University, Indonesia
Dr. Sisir Kumar Dash	Ministry of Earth Science, India

SCIENTIFIC COMMITTEE

Prof. Dr. dr. A.A. Raka Sudewi	Rector of Udayana University
Prof. Takeshi Tokuhisa	President of Chiba University, Japan
Prof. Dr. Ir. Nuhfil Hanani AR, MS	Rector of Brawijaya University
Prof. Dr. dr. I Putu Gede Adiatmika	Director of Postgraduate Program, Udayana University
Prof. Takahiro Osawa	CRoSOS Udayana University
Prof. Dr. I Wayan Arthana, MS	Dean of Faculty of Marine Science and Fisheries, Udayana University
Prof. Dr. Ir. Happy Nursyam, MS	Dean of Faculty Fisheries and Marine Science, Brawijaya University
Prof. Agoes Soegianto	Faculty of Science and Technology, Airlangga University

ORGANIZING COMMITTEE

I Wayan Gede Astawa Karang, Ph.D	Dept. of Marine Science and Fisheries, Udayana University, Indonesia
Bambang Semedi, Ph.D	CORECT-RG, Universitas Brawijaya, Indonesia
Prof. Takahiro Osawa	Head of CreSOS, Udayana University, Indonesia
Prof. I Wayan Arthana	Dean of Faculty of Marine Science and Fisheries, Udayana University
Prof. Happy Nursyam	Dean of Faculty Fisheries and Marine Science, Universitas Brawijaya
Dr. Kuan-Tsung Chang	Dept. of Civil Engineering and Environmental Informatics, MUST, Taiwan
Prof. Ming-An Lee	Dept of Environmental Biology and Fisheries Science, NTOU, Taiwan

SECRETARIAT

Rarasrum Dyah Kasitowati	Treasury, Universitas Brawijaya
M. Arif Asadi	Scientific and Program, Universitas Brawijaya
Gede Raka Angga Kartika	Secretary, Udayana University
Dhira K. Saputra	Secretary, Universitas Brawijaya
Pande Gde Sasmita Julyantoro	Scientific and Program, Udayana University
Gede Hendrawan, Ph.D	Scientific and Program, Udayana University
Oktyas Muzaky Luthfi	Scientific and Program, Universitas Brawijaya
Made Ayu Pratiwi	Scientific and Program, Udayana University
Arief Setyanto	Scientific and Program, Universitas Brawijaya
Ni Made Ernawati	Scientific and Program, Udayana University
Dian Aliviyanti	Scientific and Program, Universitas Brawijaya
Annisa Nurwahida	Universitas Brawijaya
Mayshita Yonar	Universitas Brawijaya
Dian Aliviyanti	Universitas Brawijaya
Jessica Elona	Universitas Brawijaya
Asih Sekar Sesama	Universitas Brawijaya
Rayindra Yonang	Universitas Brawijaya
Valerie Astrid Immanuel	Universitas Brawijaya



International Conference on Sustainability Science and Management: Advanced Technology in Environmental Research

CONFERENCE PROGRAM

DAY-1: Thursday, November 14		
TIME		PROGRAM
07:30-08:30	Ballroom	REGISTRATION
08:30-08:35		OPENING CEREMONY (MC)
08:35-08:45		Welcome Dance
08:45-08:50		Report
08:50-09:00		Welcome Address by Rector of the University of Udayana
09:00-09:10		Speech Chairman IJJSS
09:10-09:20		Speech Chairman CORECT-FPIK UB
09:20-09:30		Speech IJJSS JAPAN SITE
09:30-09:50		Speech and opening by Governor of Bali
09:50-09:55		Official Opening (Symbolic)
09:55-10:00	Photo session and press conference	
10:00-10:15		COFFEE BREAK
10:15-10:40	Ballroom	<i>Keynote session, moderator: Prof. I Wayan Arthana (Udayana University)</i>
10:40-11:00		KEYNOTE SPEECH I
11:00-11:20		KEYNOTE SPEECH II
11:20-11:55		KEYNOTE SPEECH III
11:55-12:10		Token of Appreciation
12:10-13:00		LUNCH BREAK / Prayer / Networking
13:00-16:30	Ballroom	PARALLEL SESSION
13:00-13:30		The 1st SeMIREs - IEICE / Engineering and IT Themes, ROOM : MARGA 1
13:30-16:30		Invited Speaker: Dr. Kuan Tsung Chang <i>Oral Presentation (EI/MF)</i>
13:00-13:30		Session I, Social Science Themes, ROOM : TIRTA
13:30-16:30		Invited Speaker: Prof. Made Sudiana Mahendra <i>Oral presentation (MF/SE)</i>
13:00-13:25		Session I, Marine Fisheries Themes, AUDITORIUM PANGRIPTA LOKA
13:25-13:50	Invited speaker: Prof. Happy Nursyam	
13:50-16:45	Invited Speaker: Prof. RK Trivedy <i>Oral presentation (MF)</i>	
17:15-18:30	Ballroom	<i>Japan – Indonesia Sister University /IJSS Forum</i>
18:30-21:00		<i>1.Indonesia member 2. Japan member</i>
18:30-21:00	Ballroom	GALA DINNER AND PERFORM.

Scan me:



Conference program and abstracts could be accessed from following link: bit.ly/icssm2019

International Conference on Sustainability Science and Management: Advanced Technology in Environmental Research

CONFERENCE PROGRAM

TIME		PROGRAM	
07:30-08:30		Ballroom	REGISTRATION
08:30-08:35			Opening (MC)
08:35-08:55		Ballroom	Keynote session, moderator: Bambang Semedi, Ph.D (CORECT-RG, Brawijaya University)
08:55-09:15			KEYNOTE SPEECH IV Dr. Stefano Vignudelli, Consiglio Nazionale delle Ricerche, Istituto di Biofica, Italy
09:15-09:35			KEYNOTE SPEECH V Prof. Sei-ichi Saitoh, Director of Arctic Research, Hokkaido University, Japan
09:35-09:45			KEYNOTE SPEECH VI Prof. John Lynham, Director of Graduate Ocean Policy Certificate, Univ. Hawaii
			Discussion, guided by moderator
09:45-10:00		Ballroom	COFFEE BREAK
10:00-11:30			PARALLEL SESSION
			Session II, The 7th (SOMIRES) /Engineering and IT Themes, ROOM : MARGA 1
10:00-10:30			Invited Speaker: Prof. Fadli Syamsuddin
10:30-11:15			Oral presentation (EI/ES/MF)
			Session II, CERES Symposium / Environmental Science Themes, ROOM : MARGA 2
			Invited Speaker: Bambang Semedi, Ph.D
			Oral Presentation (EI/ES/MF)
			Session II, Social Science Themes, ROOM : TIRTA
10:00-10:30			Invited Speaker: Prof. Kenichi Sakakibara
10:30-11:15			Oral presentation (SE)
			Session II, Marine Fisheries Themes, ROOM: CIPTA
			Invited Speaker: Prof. Hsin-Ming Yeh
			Oral Presentation (MF)
			Session II, Marine Fisheries Themes, AUDITORIUM PANGRIPTA LOKA
10:00-10:30			Invited Speaker: Dr. I Nyoman Radiarta
10:30-11:15			Oral presentation (MF)
11:30-13:00			SESSION BREAK: Lunch / Prayer Jum'at / Networking
13:00-16:30		Ballroom	PARALLEL SESSION
			Session III, Engineering and IT Themes, ROOM : MARGA 1
13:00-16:15			Oral presentation (EI)
			Session III, Environmental Science Themes, ROOM : MARGA 2
			Oral Presentation (EI/ES/MF)
			Session III, Social Science Themes, ROOM : TIRTA
13:00-16:15			Oral presentation (SE)
			Session III, Marine Fisheries Themes, ROOM : CIPTA
			Oral Presentation (MF)
			Session III, Marine Fisheries Themes, AUDITORIUM PANGRIPTA LOKA
13:00-16:15			Oral presentation (MF)
16:30-17:00			CLOSING CEREMONY AND AWARD ANNOUNCEMENTS

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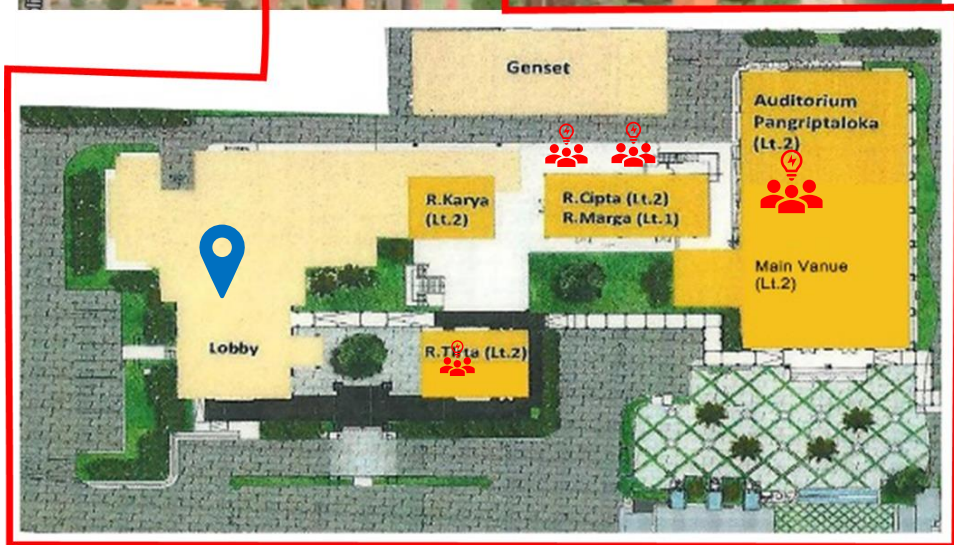


Conference program and abstracts could be accessed from following link: bit.ly/icssm2019

VENUE SITEPLAN

The Werdhapura Village Center, Sanur, Bali

Open map, tap here: bit.ly/icssmvenue



Registration desk



Presentation rooms, including:

1. Auditorium Pangripta Loka (2nd Floor)
2. Room Cipta (2nd Floor)
3. Room Marga 1 and 2 (1st Floor)
4. Room Tirta (2nd Floor)

KEYNOTE SPEAKERS

Keynote Speaker (I)



Prof. Ocky Karna Radjasa

“Disaster and climate change perspectives within National Research Priority 2020-2024”

Time: 10:15 – 10:40, November 14, 2019

Education:

- Ph.D., Aquatic Biosciences, University of Tokyo, Japan. 2001

Research field:

- Marine Biotechnology, Marine Microbiology

Affiliations and Professionals:

- Director of Research and Community Services, Ministry of Research, Technology and Higher Education (2015-present)
- Project leader. USAID-funded PEER Science on Enhancing Research Capacity Through a Biotechnology-driven Investigation of Novel Gram-Negative Bacteria from Indonesian Sponges. (2017-2020)
- Head of Advisory Board of Halu-Oleo University. Kendari (2016-2020)
- Governing Board Member of SEAMEO-SEARCA. Manila (2016-2019)
- Professor. Department of Marine Science, Diponegoro University, Indonesia (2011-present)
- Indonesian project leader. USAID-funded University California-Indonesia partnership in Marine Biotechnology (2011-2014)
- Indonesian Lead Partner. EU-consortium project on Marine fungi for the treatment of cancer (2011-2014)

Keynote Speaker (II)



Prof. Josaphat Tetuko Sri Sumantyo

“Development of Advanced Airborne Microwave Remote Sensing Technology and Its Applications”

Time: 10:40 - 11:00, November 14, 2019

Education:

- Ph.D., Artificial System Sciences (Applied Radio Wave and Radar Systems), Chiba University, 2002

Research field:

- Microwave remote sensing, Synthetic Aperture Radar, Microsatellite

Affiliations and Professionals:

- Center for Environmental Remote Sensing, Chiba University, Japan
- Head Department of Environmental Remote Sensing and Head Division of Earth and Environmental Sciences, Graduate School of Science and Engineering, Chiba University in FY 2019
- Member of international and domestic organizations, reviewer of journals, and organizations

Keynote Speaker (III)



Prof. Ming An Lee

“Adaption strategy of grey mullet fishing fleet possibly influenced by climate variability in the Northwestern Pacific”

Time: 11:00 - 11:20, November 14, 2019

Education:

- 1987, M.S. (Fisheries), NTOU Taiwan
- 1991, Ph.D. (Fisheries Science), NTOU Taiwan

Research field:

- Remote Sensing, Earth Observation, Fisheries Oceanography

Affiliations and professionals:

- President of Taiwan Group of Earth Observation (TGEO) Taiwan (2016 - 2019)
- Professor & Dean, College of Ocean Science and Resources, NTOU (2008-2014)
- Professor & Dean, College of Ocean Science and Resources, NTOU (2005-2008)
- Professor of Dept. of Fisheries Biology - NTOU (1995 - present)
- Editor-in Chief, Journal of Fisheries Society, Taiwan
- SOC member of PORSEC (Pan Ocean Remote Sensing Conference Association) (2008 - 2018)
- Visiting professor, NWFS, NOAA

Keynote Speaker (IV)



Dr. Stefano Vignudelli

Time: 08:35 - 08:55, November 15, 2019

Research field:

- Satellite Altimetry, Remote Sensing, Oceanography

Affiliations and Professionals:

- *Consiglio Nazionale delle Ricerche*, Istituto di Biofica, Italy
- Vice-president elect of PORSEC association
- Senior Researcher at Consiglio Nazionale delle Ricerche (National Research Council) in Pisa, Italy.
- Co-editor of the Springer Book "Coastal Altimetry" (20 chapters, 70 people involved and top 25% books)
- Co-author of five chapters of books and around 100 publications (41 in peer-reviewed journals)
- Associate editor for Elsevier *Advances in Space Research Journal* in the area of satellite oceanography

Keynote Speaker (V)



Prof. Sei-Ichi Saitoh

“Sustainable Fisheries Using Satellite Remote Sensing, Marine-GIS and Data Assimilation System -A Smart Fisheries Under Changing Climate”

Time: 08:55 - 09:15, November 15, 2019

Education:

- Ph.D., (Fisheries) Hokkaido University, 1984

Research field:

- Satellite Oceanography, Satellite Remote Sensing, Marine-GIS, Operational Fisheries Oceanography, Marine Ecology

Affiliations and Professionals:

- Director of Arctic Research, Hokkaido University, Japan
- American Geophysical Union
- Association for the Sciences of Limnology and Oceanography
- The Oceanography Society
- The Japanese Society of Fisheries Oceanography
- The Japanese Society of Photogrammetry and Remote Sensing
- The Japanese Society of Scientific Fisheries
- The Oceanographic Society of Japan
- GIS Association of Japan
- Research Professor, Arctic Research Center, Hokkaido University (2019)
- Special Appointed Professor, Arctic Research Center, Hokkaido University (2016-2019)
- Director, Arctic Research Center, Hokkaido University (2015-2019)
- Executive adviser, Green & Life Innovation Inc. (2012)
- COE, Space Fish LLP (Venture Company) (2006-2012)
- Professor, Graduate School of Fisheries Sciences, Hokkaido University (2000-2014)

Keynote Speaker (VI)



Prof. John Lynham

Time: 09:15 – 09:35, November 15, 2019

Education:

- Ph.D., Economics, University of California Santa Barbara, 2008
- NSF/IGERT Economics and Environmental Science Training Program

Affiliations and Professionals:

- Professor, Department of Economics, University of Hawai'i at Mānoa (2018 – present)
- Director, Graduate Ocean Policy Certificate program, University of Hawai'i at Mānoa (2014 – present)
- Fellow, Environmental Market Solutions Lab (emLab), University of California Santa Barbara (2018 – present)
- Advisory Committee, Conservation Strategy Fund (2017 – present)
- Reserve List of Scientists, Scientific, Technical and Economic Committee for Fisheries (STECF), European Commission (2016 – present)
- Affiliated Researcher, Center for Ocean Solutions, Stanford University (2013 – present)
- Editorial Board, Marine Policy (2017 – present)
- Editorial Board, Journal of Environmental Economics & Management (2013 – present)

PRESENTATION GUIDELINES

ORAL PRESENTATION

- Each session room completed with a laptop, projector, pointer and operator to help you manage your presentation
- Please sending your presentation in advance via Google Form adress: bit.ly/uploadicssm2019
- If you are not able to do that, please meet with the session support as early as possible (at the very latest 20 min before the start of the session (!) of your presentation) to upload your slides from USB flash drive / memory stick.
- Acceptable formats: PPTX (PowerPoint 2007/2010/2013/2016) or PDF. It is strongly recommended that all presentations be in Microsoft PowerPoint (PPT/PPTX) or PDF, windows-based environment. Presenters wishing to use any operating system other than the above-mentioned must bring in their computer and will be responsible for its operation.
- Oral presentations have a maximum 15 minutes slot - please prepare a PowerPoint presentation that lasts for up to 10-12 minutes maximum to allow 3-5 minutes for discussion after your talk. This equates to roughly 10 slides excluding your title and acknowledgement slides.
- We will give you a warning at 11 minutes so you have a minute to wrap up. We will be very strict about timing and will stop you when your 12 minutes time is up even if you have not finished.
- Be sure you have embedded any multimedia objects (e.g., movies) in the slides
- Be sure to provide your name on the title slide
- PLEASE label your file with your Name and the session number.

POSTER SESSION

- Presenters must locate their assigned poster display, which will be numbered, and hang their poster at least 15 minutes before the poster session. Materials to mount posters will be provided by the conference organizers.
- Poster exhibition area located around Auditorium Pangripta Loka
- The maximum size of a poster is A0 vertical, max width is 90cm.
- Posters have to be flexible, power strips will be provided.
- The title and authors must appear at the top of the poster. We recommend the use of a font size legible from a distance of 2 meters.
- Consider providing a brief handout or copies of your poster to distribute to poster session attendees.
- In order to facilitate your interaction with participants visiting your poster, we encourage you to prepare a short verbal description of your key finding

ORAL PRESENTATION

SESSION I

The 1ST SeMIREs IEICE / Engineering and IT - Room Marga I -

Time	Code	Author and Paper Title	Page
13.30	El - 34	Cahya Edi Santosa, J T S Sumantyo, Indra Riyanto, Vebtasvili The Design of an 2x2 Subarray Microstrip Antenna for Airborne XBand Circularly-Polarized Synthetic Aperture Radar	p.49
13.45	El - 06	Hisato Kashihara, Josaphat Tetuko Sri Sumantyo, Cahya Edi Santosa Broadband X-band Patch Antena for Circularly Polarized Synthetic Aperture Rader onboard UAV	p.32
14.00	El - 05	Noboru Hamaguchi, Kazuteru Namba, J T S Sumantyo CP-SAR Image Processing System using TCP/IP with Kintex-7 FPGA Board	p.30
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13.45	MF - 107.2	<p>D Setyohadi, D O Sutjipto</p> <p>Population Dynamics of Fringescale Sardinella (<i>Sardinella fimbriata</i> Valenciennes, 1847) in the Java Sea of East Java, Indonesia</p>	
14.00	MF - 27	<p>Wang Yu Cian, Ming-An Lee, Sheng-Yuan Teng, Yi Chen Wang</p> <p>Adaption Strategy of Grey Mullet Fishing Fleet Possibly Influenced by Climate Variability in the Northwestern Pacific</p>	
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14.30	MF - 29	<p>I-Ling Huang, Chien-Ming Hsu, Ming An Lee</p> <p>Ontogenetic variation in Feeding Habits of <i>Trichiurus japonicus</i> in the Waters</p>	

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Detection of the Silent Subsidence over Extensive Area by SBAS DInSAR: A case study of Southern Bali, Indonesia

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Abstract. Many cities facing land subsidence in the world. In many cases, an excessive groundwater extraction to meets human needs usually leads to the land subsidence. Since the subsidence rates are very slow (a few cm per year) make their presence are usually unnoticed before they lead to severe damages on the buildings or houses and other infrastructures. Therefore, knowing the presence of subsidence in advance is very important. In this study screening for the land subsidence presence in the city of Denpasar, Bali, Indonesia is conducted. The Sentinel-1A/B SAR dataset which taken from October 2014 to June 2019, is processed using SBAS DInSAR method. It is found the subsidence occur in districts of Denpasar Selatan, Denpasar Barat, and Kuta. The subsidence ranging from -100 mm to -200 mm occur in the area about 93.03 ha. All extracted points of interests show the linear behavior subsidence. The spatio-temporal behavior of subsidence in Denpasar is presented clearly. However, the mechanism and deriving factors of subsidence remain unclear. Therefore, further study is needed.

Keywords: Subsidence, Monitoring, Denpasar, SBAS DInSAR, Sentinel-1A/B

Characterization of optical properties of cloud and aerosol using ground-based camera imagery calibrated with a spectroradiometer

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Abstract. Cloud and aerosol significantly affect the Earth's radiation budget through scattering and absorption of solar radiation. Although detailed understanding of the interaction among cloud, aerosol, and water vapor is indispensable, limited efforts have so far been made in ground-based observations. In this work, we propose and demonstrate an imaging study, in which a commercially available CMOS camera (EOS kiss X5) and a six-band camera (Macaw) are employed together with a compact spectroradiometer (MS-720) to estimate the optical parameters of clouds and aerosols from camera imagery. The data from the spectroradiometer are used to convert the camera digital number (DN) to the radiance reflected from clouds. We also employ aerosol observation instruments, namely, a sunphotometer, a visibility meter, and a vertical lidar system for recording the ancillary information on the atmospheric conditions. The altitude information can be obtained by analyzing the lidar data. The sunphotometer provides the aerosol optical thickness (AOT) required for estimating the solar irradiance illuminating the target clouds. We also use the 6-band camera data to estimate the spatial distribution of water vapor in relation to the cloud formation. Examples of typical case studies will be presented and discussed for evaluating the capability of the present approach.

Keywords: Cloud radiance, Imaging measurement, Spectroradiometer, Solar irradiance, Aerosol

Utilization of Remote Sensing Satellite Data to Describe the Distribution of Albacore Tuna (*Thunnus Alalunga*) at WPP 573

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Abstract. The Indian Ocean is well known as fishing locations of Albacore Tuna. The aim of this study is to predict the Albacore Tuna fishing area and to determine the relationship between environmental parameters and the location of the catch point. The method in this research uses the remote sensing approach by utilizing satellite imagery to map the capture location and the Generalized Additive Model approach to determine the prediction of the relationship of environmental parameters with the location of the catch point. The satellite imagery used maps oceanographic parameters using VIRRS-SNPP for Chlorophyll-a Concentration (CHL-a) and Sea Surface Temperature (SST), and also ARMOR3D for Sea Surface High (SSH). The results of the Albacore Tuna potential zone revealed that albacore tuna habitat was significantly affected by the SSH + SST + CHL-a model with the lowest AIC value of 3381,650 and the largest CDE was 77.6%. Based on the model, it can be seen the value of oceanographic parameters with temperature susceptibility of 27-31°C, Chlorophyll-a 0.2-0.4 mg / m³ and sea-level height of 0.9-1.0 cm. Based on the GIS and GAM approach, Potential fishing areas of Albacore Tuna (*Thunnus alalunga*) in the Indian Ocean of South East Java, South of Bali Island to South of East Nusa Tenggara Province.

Keywords: Albacore Tuna Fish, GAM, Remote sensing, Indian Ocean

Automatic classification of cloud images observed with ground-based visual camera based on convolutional neural network

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Abstract. Clouds exert significant influence on the Earth's radiation budget through the reflection and absorption of solar and terrestrial radiation. Although cloud analyses of satellite images have been performed frequently, studies on the ground-based imagery are still limited. In this study, we apply the method of convolutional neural network (CNN) to classify cloud images recorded with a commercially available web camera. The ancillary information on the cloud base-height is obtained from the data of a vertically operated Mie-scattering lidar. A total of around 4500 cloud images are classified into the following eight classes: cumulonimbus/ nimbostratus, cirrocumulus/altocumulus, cirrus, cirrostratus, cumulus, stratocumulus, stratus/altostratus, and clear-sky. The application of the CNN algorithm to the training data composed of 3500 images (78% of the total) has led to an accuracy of 96%, while in the case of validation using around 1000 images (22%), the model gives an accuracy of 89%. Comparison with the concurrent images from Himawari-8 meteorological satellite is also discussed.

Keywords: Convolutional neural network, Cloud classification, Automatic classification, Visible web-camera, Lidar observation

Detecting the Landslide Areas Using Single Optical Sensor Image and Synthetic Aperture Radar Image

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Abstract. Satellite remote sensing is one of the useful tools to understand the situation of damaged areas when a severe natural disaster occurred because that can observe remotely wide area at a once. In general, it is necessary to use satellite image both before and after to extract damaged areas. It is easy to detect changes of land surface by comparing before and after images. However, it is not always a possible method in emergency situation. There is no useful archive data in some region for detecting damages. Furthermore, additional pre-processing is required such as geometric correction and removing effects of seasonal changes for each data sets. In this study, we would like to propose the new method to detect landslide areas just using satellite images of after natural disaster occurrence. ALOS and ALOS-2 as optical sensor and Synthetic Aperture Radar (SAR) images are applied for this study and the characteristics of each methods are evaluated in actual disaster events. We developed two methods to detect landslide areas using Normalized Difference Vegetation Index (NDVI) and NIR-Blue-Red (NBR). We developed NBR as new index for the 2008 Iwate-Miyagi Nairiku Earthquake and the 2009 July Chugoku-Northern Kyushu Heavy Rainfall for application of optical sensor images. As a result, we found that it is possible to detect landslide areas from two thresholds which are determined as intersections of histograms created from the pixel values of landslide area, vegetation area and water area in NDVI and NBR images. The method using NDVI could detect landslide areas with 99% recall and 29% precision for the 2008 Iwate-Miyagi Nairiku Earthquake when the region of 0.15-0.62 which was determined by the two thresholds, and with 93% recall and 4% precision for the 2009 July Chugoku-

Northern Kyushu Heavy Rainfall when 0.15-0.50 was used. On the other hand, the method using NBR could detect those with 80% recall and 52% precision for the 2008 Iwate-Miyagi Nairiku Earthquake when $-0.23-0.13$ was used, and with 73% recall and 3% precision for the 2009 July Chugoku-Northern Kyushu Heavy Rainfall when $-0.21-0.02$ was used. We can find that the method using NDVI is possible to detect with high recall and the method using NBR is possible to detect with high precision. For SAR applications, we developed three methods; first, using one polarization images such as HH, HV, VH and VV images, second, using two polarization images of four images, and third using all the four polarization images for the 2014 August Heavy Rainfall. The method using HH polarization image could detect 18 landslide areas of 19 landslide areas which actually occurred for the 2014 August Heavy Rainfall when $-6.2-13.4$ was used as thresholds. The method using two-polarization images and four-polarization images could detect all landslide areas in front side slope. In conclusions, landslide areas can be detected using the proposed methods which use only "after image". This is very useful in emergency disaster phase in case that "before image" cannot be obtained. Furthermore, this study can contribute for coming new satellite data such as ALOS-3 and ALOS-4.

Keywords: Landslide, ALOS, ALOS-2

CP-SAR Image Processing System using TCP / IP with Kintex-7 FPGA Board

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Abstract. We have a plan of a verification experiment for Circularly Polarized Synthetic Aperture Radar (CP-SAR) using Unmanned Aerial Vehicle (UAV). SAR sensor is used for earth observation and can observe without being affected by weather and day-night time. CP wave is less affected by the Earth's ionosphere than the conventional one using horizontal and vertical polarization wave. CP wave is expected to be used for highly accurate vegetation survey and disaster management. In general, SAR image processing was performed on the ground. In the method, the large data received from sensors is disadvantageous in terms of long communication time. Therefore, the purpose of this research is an image processing system that runs on an aerial platform, which brings on various good effects such as reducing reducing of the SAR image size and communication time.

This paper shows a SAR image processing system with KC705 FPGA board with soft core CPU and XM104 connection board. In addition, we enabled TCP/IP communication between FPGA and server. As a result, our system have smooth flow control and highly reliable transmission and reception of data. The results indicate that the proposed system is available for the near-real-time observation which generates one image within 60 seconds on UAV.

Keywords: CP-SAR, SAR image processing, TCP/IP, FPGA, Kintex-7

Modeling of erosion rate based on land cover changes using cellular automata - markov chain in DA Ci Tarik

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Abstract. DA Ci Tarik in the past 10 years has experienced changes in land cover, namely the change of tea and rubber plantations into oil palm plantations. In addition, settlements and various other facilities have also been built to support the activities of residents due to the increasing number of tourist facilities, such as outbound recreation, and water rafting. The development of built land, especially settlement, can massively increase the amount of surface runoff which results in land degradation such as erosion. The purpose of this study is to create a model for predicting erosion rates based on land cover in 2029 and 2039. The prediction model for land cover change uses the Cellular Automata-Markov Chain (CA-Markov) model with various driving factors, such as distance from the road, distance from the river, distance from settlements, and the percentage of slope, and to determine the rate of erosion using the RUSLE method. Variables that affect the rate of erosion are rainfall erosivity (R), soil erodibility (K), slope and slope length (LS), and Land Cover and Conservation (CP). Validation through field survey in 30 sample points with purposive sampling technique. The prediction model was validated using existing 2019 land cover data and showed a satisfactory kappa coefficient. The results of land cover prediction in 2029 and 2039 show that there is a change in land cover, namely a decrease in forest area and open land, while residential areas and plantation land are increasing. The erosion prediction results also show that there has been a large increase in the rate of erosion due to changes in land cover.

Keywords: CA-Markov, Erosion Rates, Land Cover Change,

Broadband X-band Patch Antenna for Circularly Polarized Synthetic Aperture Rader onboard UAV

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Abstract. This paper presents a novel design of broadband circularly polarized microstrip antenna as an element of X-band circularly polarized synthetic aperture radar (CP-SAR) sensor onboard UAV. The antenna is designed in low weight, low cost, low profile of configuration, and will transmit and receive left-handed circular polarization (LHCP) or right-handed circular polarization (RHCP). The antenna which takes a circular shape with ellipse-shaped truncation is designed to resonate at the frequency of 9.4 GHz with the minimum axial ratio bandwidth of 800MHz. The proposed antenna is deployed on a 1.6 mm thick NPC-H220A dielectric substrate. The proposed antenna is for broadening the bandwidth, prototype constructed by a double-layers substrate that has low dielectric constant and dissipation factor. The antenna adopts proximity-coupled feed stripline feed to avoid the complexity of feed network configuration. Basic characteristics of antenna parameters such as return loss, axial-ratio, and radiation pattern investigated and presented.

Keywords: circular polarization; microstrip antenna; array antenna; synthetic aperture radar; UAV SAR

Change in land use from 2000 to 2025 driven by tourism growth in Bali

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Abstract. Bali has been open to tourism since the beginning of the 20th century and is known as the first tourist destination in Indonesia. The Denpasar, Badung, Gianyar, and Tabanan (SARBAGITA) areas experience the most rapid growth of tourism activity in Bali. The rapid tourism growth in Bali certainly causes land-use to change drastically. This study mapped the land-use change in Bali from 2000 to 2025. Land-use change modeler (LCM) tool in ArcGIS was employed to conduct this analysis. The image was classified into agriculture land, open area, mangrove, forest, and built-up. Some Landsat images in 2000 and 2015 were used in predicting the built-up growth in 2025. Landsat image 2018 was utilized to verify the model. Logistic regression was trained with two influencing factors (elevation and road network). The built-up growth direction expanded from the Denpasar area to the neighborhood agency.

Keyword: SARBAGITA, Land-use change modeler (LCM), Landsat

The assessment of landslides disaster mitigations in Java Island, Indonesia: a review

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Abstract. Landslides often occur in mountainous areas with a wet tropical climate like in Java, Indonesia. Several factors that support the occurrence of landslides in Java are the following: firstly, Java has rough terrain which is composed of cliffs, hills, and mountains; secondly, a heavy rainfall is prevalent from October to April; thirdly, and 36 of 129 Indonesian volcanoes are situated in Java, and they produce volcanic materials that are intensely weathered. Java has the highest number of landslides and fatalities from 2014 - 2019 among five other large islands in Indonesia. The National Agency for Disaster Countermeasure recorded 2,766 landslides occurred in Java with 662 deaths from 2014 - 2019. From its condition, it looks like the disaster mitigation in Indonesia is still weak. This research is a review of landslides disaster mitigations in Java Island with the approach of local communities and governments efforts. Furthermore, the purpose is to highlight the driving forces of landslides disaster mitigations in Java Island, Indonesia.

Keywords: Landslides, Mitigations, Local communities, Government efforts

Effect of image radiometric correction levels of Landsat images to the land cover maps resulted from maximum likelihood classification

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Abstract. Radiometric correction of remote sensing images is required to improve the quality of image pixel values and provide a measurable physical unit of each pixel. Selection of the appropriate image radiometric and atmospheric correction level defines the success of any remote sensing-based mapping applications. This study aims to assess the effects of radiometric correction levels applied to Landsat images acquired in 1994, 2003 and 2018 to the results of their land cover classification using the Maximum Likelihood Classifier (MLC). Each of these images were corrected into four levels of radiometric and atmospheric correction; no correction (digital number), at-sensor radiance, at-sensor reflectance, and at-surface reflectance. A set of classification training sample covering five land cover classes (mangroves, inland vegetation, exposed soil, built-up area, and water body) was selected individually from each of the image. To ensure fair comparison, the training sample sets were located as closed as possible to the corresponding classes for each level of correction and year of acquisition. The results of this study show that there is no difference in the classification results of each level of correction, both in the area and distribution of the classes. This finding indicates that MLC is invariable of image correction level.

Keywords: Radiometric, Correction, Classification, Maximum Likelihood

Landslide Susceptibility Mapping Areas Using *Spatial Multi-Criteria Evaluation (SMCE)* Method in Camba District, Maros Regency.

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Abstract. This study presents the results of a GIS-based statistical model for landslide susceptibility mapping using Geographic Information Systems (GIS) and remote data sensing for the Camba District, Maros Regency. Ten factors including slope, aspect, soil type, rock type, altitude, land cover, distance from the river, rainfall, distance from faults, and distance from the road extracted. The relationship between the associated landslide location and ten factors associated with using a GIS-based statistical model namely Spatial Multi-Criteria Evaluation (SMCE). A landslide inventory map that has a total of 30 landslide locations based on field surveys used for validation purposes. The validation results by using the Relative Density Index (R-index) for very high and high classes is 55% and Receiver Operating Character (ROC) shows that the SMCE model has a total of 96.4%, for the P show method of 98%. This landslide mapping can be used for disaster mitigation and disaster preparedness planning purposes. Landslide mitigation efforts carried out have been carried out signs of landslide prone areas, disaster-related socialization, and basic disaster preparedness training on the National Disaster Preparedness Day.

Keywords: Landslide Susceptibility, GIS, SMCE, Mitigation Efforts, Camba District

The Impact Of Hydro-Wear Parts Of Pumps For Operational Efficiency Of The Pumping Station

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Abstract. During the work considered questions of the occurrence of cavitation in hydro abrasive flows, which can lead to a rather complex phenomenon that is difficult to understand the essence of this process. Today, the wear of the working bodies of centrifugal and axial pumps, depending on the mode of their operation has not been learned much, and there has been developed a technique for selecting operating modes, taking into account the wear of their parts. Also, the results of complex laboratory and field studies on the intensity of wear of the flow elements of centrifugal and axial pumps are presented. It has been established that the alternating, pulsating load leads to an increase in the force of interaction of the hydro abrasive flow with the camera surface and increases its wear by 10 %, and also reduces the capacity of the pumping unit to 9%.

Keywords: centrifugal and axial pumps, cavitation and hydro abrasive waterjet, movements process, flow, the liquid, the solid particles, technological processes, pump unit wears, elements of pumps, cavitation margin.

Improving The Operational Efficiency of Damless Water Intake

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Urazmuhammedova.Z.V, and Ruziev.S.B**

Annotation. The article discusses the improvement of hydraulic methods to improve the reliability of damless water intake. As well as the type of transformation of bottom and surface sediments during the division of the flow in the damless water intake in ABMK (Amu-Bukhara machine channel).

Keywords: water intake, damless, flow, provision, hydraulic regime, deformation, water allocation, quality, water, flow, speed, river, channel

Ground Deformation Mapping in Lombok Earthquake 2018 Using SAR (Synthetic Aperture RADAR) Technology

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Abstract. Lombok was shocked with magnitude of 6,9 earthquake on July, 29th, 2018. It was happened on the north side of the island. Many people lost their houses, family even their lives. In most cases of disaster, rapid mapping is the most powerful tools to help the policy maker to decide what things to do first and where is the safest way to do it. Remote sensing with its abilities plays big role to fulfill it. By using SAR data of Sentinel 1A and SNAP software which is free access we are going to mapping the ground deformation due to the earthquake. Two images of SAR of before-after the earthquake were co-registered together to create an interferogram. After it, the differential interferometry SAR were applied to remove the phase of topographic and unwrapped the image. On final step, filtering and geocoding were doing to register the image based on the geographic coordinate. Displaying the results using Google Earth and adding another information related with earthquake epicenter help us to evaluate the displacement. Based on the result, the ground deformation is about -0,64 m (downlift) up to 0,11 m (uplift). Comparing with similar project from NASA, the results shows almost the same number. This is tell us that open access remote sensing data and software are eligible to use to do rapid mapping in case of disaster.

A remote sensing approach to assessment of changes in vegetation ecosystem services in a tourism landscapes: A study of the Nusa Dua region, Bali

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Abstract. The Increased tourism visits and activities are likely to change the quality of the environment and ecosystem services, such as in the Nusa Dua tourism landscape, Bali, Indonesia. The Nusa Dua region has two centers of tourism activities, there are the tourism complex managed by a state-owned enterprise (ITDC) and a free-developing tourism center. In this study, satellite data from ALOS / Avnir-2 and Sentinel-2A for 2007 and 2016, respectively, used to calculate the dynamics of vegetation coverage, which can represent the condition of ecosystem services in both Nusa Dua tourism centers. Vegetation coverage divided into five classes based on Normalized Difference Vegetation Index (NDVI) values, which are full, high, medium, low, and no vegetation coverage. In general, the results indicate an increase in the area of vegetation during the study period in both centers of tourism. The total area of vegetation increased by 17.78 Ha (4.61%) in the ITDC region and 0.90 Ha (0.25%) in the free-developing center of tourism. In detail, 42.31 Ha of non-vegetation areas converted to vegetation areas at ITDC, and 29.37 Ha in the free-developing tourism center area, which be made possible through sustainable management of gardens and tree. On the other hand, the ITDC area has also lost the vegetation area of around 24.53 Ha and 28.47 Ha uncontrolled developing tourism center area, which may be caused by the construction of multi-functional buildings to support tourism activities. These studies generally show that large tourist complex

centers managed by one company are able to maintain or even improve ecosystem services, even under pressure of the growing tourist visits.

Keywords: ecosystem services, tourism, remote sensing, vegetation

Soil Moisture Mapping Using Sentinel-1a SAR Data and Measuring Instrument for Validating Soil Characteristic

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Abstract. One of the techniques in remote sensing technology that can be applied to monitor the soil is by polarizing Synthetic Aperture Radar (SAR). Sentinel-1A is a satellite SAR C-Band that can be used to monitor soil moisture conditions that have excess can be used in any weather, not dependent on the sunlight and unconstrained cloud cover. Data obtained on May 10, 2019 used for measuring and mapping the region based on soil moisture. This measurement is done by specifying backscattering coefficient which is influenced by soil moisture. To validate the data of the measurement results, soil moisture measurements are measured using a calibrating measuring instrument. Measuring with measuring instruments is performed at 30 randomly selected points and meets criteria such as the area whose coverage is wide enough and there is no vegetation. Analysis is then done to know the coefficient of determine (R^2) and Root Mean Square Error (RMSE). From the analysis carried out, the level of the collation between R^2 and the highest measuring instrument was 85% and the lowest RMSE was 0,083. The results indicated that the Sentinel-1A SAR Data presented satisfactory results for estimating and mapping soil moisture.

Keyword: Backscattering Coefficient, SAR Data, Sentinel-1A, Soil Moisture

Environmental Planning and Management in Traditional Market (a Study at Mayestik Market (Jakarta), Ibhuh Market (Payakumbuh), and Pandansari Market (Balikpapan))

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Abstract. Traditional market is an important aspect in the national trade system. At present the management of the traditional market in Indonesia is still not well implemented and is being improved on traders who pollute the environment. The research objective is: (1) analyze the risk of environmental pollution in the air and water around the traditional market (2) construct engineering models of waste management and urban forest, (3) construct a model of environmental planning and management for public space tourism. This research was conducted at Mayestik Market, Ibhuh Market, and Mayestik Market. The method used in this study is to integrate environmental information resources from thematic maps, geographic information systems (GIS), field surveys, and interviews to the management of traditional market. The results of this study indicate that all markets have a moderate risk of air pollution because of the high activity of motor vehicles and the Mayestik Market has a risk of more waste. Construct engineering model of integrated waste management i.e. composting, waste bank, BSF, and the vegetation that can absorb dust, Pb pollutants, and carbon dioxide (CO₂); and reduce the concentration of heat. Furthermore, the management construct a model of environmental management based less waste and eco-tourism development.

Keywords: Traditional Market, Environmental Management, Image Quickbird, Landsat, Thematic Mapper

Flood Inundation Mapping Using Synthetic Aperture Radar Data Dual Polarization: A Case Study of Flood in Lake Tempe, South Sulawesi - Indonesia

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Abstract. Remote sensing data can be used to help disaster management and environmental management because this data has advantages in terms of speed, is more efficient, can reach large and remote areas, has consistency in measurement, can make repeated measurements, and has measurable accuracy. Floods in Lake Tempe occur almost every year due to overflowing of Lake Tempe. This research will detect flood inundation from Sentinel-1 data with dual-polarization of flooding in Lake Tempe, South Sulawesi. The data used are Sentinel-1 data before (2 May 2018) and after (26 May 2018) flood events. Both of these data are used to identify changes from inundation that occur. The combination of RGB composite Pre_VH, Post_VH, Post_VV shows a very wide flood inundation distribution. The results of the model validation show an accuracy value of greater than 70%.

Keywords: Dual-polarization, Flooding, Radar, Sentinel-1

Epoxidation of Cyclic α,β -Unsaturated Ketones with H_2O_2 as an Oxidant Catalyzed by Ni-Zn Mixed Basic Salt

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Abstract. The precise controlling of interlayer spacing of layered Ni-Zn mixed basic salts (NiZn) can be achieved by the intercalation of various long alkyl chain carboxylate anions. The $C_3H_7COO^-$ -exchanged NiZn ($C_3H_7COO^-/NiZn$) catalyst acts as an effective heterogeneous catalyst toward the epoxidation of various cyclic enones with aqueous hydrogen peroxide in remarkably high yields. The $C_3H_7COO^-/NiZn$ -catalyzed epoxidation of 2-cyclohexen-1-one with an equimolar amount of H_2O_2 proceeds in a highly efficient manner, with 97% efficiency of the H_2O_2 utilization. Our synthesized $C_3H_7COO^-/NiZn$ catalyst can be reused without any loss of its catalytic activity and selectivity.

Determination Planned Non-Structural Mitigation using Integration Remote Sensing and Geographical Information System for Landslide in Bruno, Purworejo Central Java

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Abstract. Landslide is caused by meteorological and geomorphological factors. Landslide is one of the most common disaster that occur in Indonesia specifically in Purworejo Regency. Based on the Indonesian Disaster Information Data (DIBI) and the National Disaster Management Agency (BNPB) in the last five years from 2014 to April 2019 there have been 64 landslides in Purworejo and specifically in Bruno Sub-district. One of the factors that could be potential area that could be experiencing landslides is because the geomorphological conditions which are included in Menoreh Hills are geographically sloping to very steep. To reduce the impact of landslide and for emergencies respons, development of non-structural mitigation is the key. Determining all of the disaster period and preparing for mitigation can be done in serveral period, such as pre-disaster period, disaster period, and after disaster period. The purpose of this research is to prepare for mitigation strategies using integration of remote sensing and geographical information system, including detecting the potential area for landslide occurance in Bruno with information value model (IVM), determine the most effective evacuation routes to reduce the impact of landslide using spatio-cost parameters obtained by certain paramaters, and make disaster resistant community program to educate the people about mitigate disasters and socialized the map of evacuation routes. The parameters are physical parameters and some social parameters derived from the appearance on the surface of the earth, such as housing,

number of population, land use, slope direction, roads and also the wide of the roads with development of the community program by integrating the local government and local community around Bruno Sub-district. The expected result of this research is development of non-structural mitigation that can help people around disaster-prone areas to prepare. This on going research is important to improve disaster management in Indonesia, especially for landslide in Bruno, Purworejo, Central Java.

Keywords: Landslide, Non-structural Mitigation, Evacuation Routes, Information Value Model (IVM), Integration of Remote Sensing and Geographical Information System Method, and Disaster Resistant Community Program

Performance Evaluation of Real Time PPP based on MADOCA-LEX QZSS Signal: Status and Future Application in Indonesia

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Abstract. Nowadays the Japan Aerospace Agency has been launched 4 (four) Quasi-Zenith Satellite System (QZSS) across Asia-Oceania regions which transmitting precise orbit and clock correction. This paper presented the evaluation of L-band experiment (LEX) QZSS signal by comparing them with Real Time Kinematic (RTK) method. We had collected datasets at static method and a kinematic vehicle experiment, the authors evaluated the application of multi-GNSS advanced demonstration of orbit and clock analysis (MADOCA) products in precise point positioning (PPP) through static and kinematic data processing modes. The results show that the MADOCA-LEX products bring slightly larger root mean square and standard deviation of three-dimensional positions than the RTK technique. The initialization time for kinematic PPP positioning was longer than static mode. We have obtained the receiver positions with RMS error level of 7-10 cm using PPP MADOCA-LEX message in the real-time static test. However the positioning accuracy of the MADOCA-LEX products in the future is still improve to be better than this time. This technique is more practice comparable with the area where is not available reference station or difficult internet connection.

Keywords: Positioning, Evaluation, QZSS, Madoca-Lex, PPP

The Design of An 2×2 Subarray Microstrip Antenna for Airborne X-Band Circularly-Polarized Synthetic Aperture Radar

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Abstract. In this paper, the design of a 2×2 broadband circularly polarized microstrip antenna as a subarray element for airborne X-band circularly-polarized synthetic aperture radar (CP-SAR) is reported. The proposed antenna will be used for the ground-based experiment of the airborne X-band CP-SAR in December 2019 in Japan. The antenna operated at the center frequency of 9.5GHz, both the impedance and axial-ratio bandwidth of 200 MHz. The aim of this design is to develop the airborne CP-SAR sensor that has broad bandwidth, high gain, high efficiency, and compact size due to limited space and weight onboard airborne. In the effort to broaden the impedance bandwidth, the proposed antenna is printed on the thick substrate ($h=1.6\text{mm}$) that has a low dielectric constant ($\epsilon_r=2.17$) and constructed by double-stacked substrate. Gain increased by choosing the substrate that has a low dissipation factor ($\tan\delta=0.0005$), the additional a circle reactance patch, and arraying into an 8×24 array configuration in the next step design. The axial-ratio bandwidth enlarges by applied the serial sequential rotation technique in arraying design. The circularly-polarized wave generated by the simple shape of the square curve-truncated patch printed on the top layer of the bottom substrate and placed between two substrates. The patch feeds by proximity coupled feeding line at the edge. The characteristic of the electrical antenna parameters from computer simulation such as impedance

bandwidth, axial-ratio bandwidth, gain, input impedance, beamwidth, and radiation pattern will be presented and discussed in this paper.

Keywords: Broadband Antenna, Microstrip Antenna, Circularly-Polarized Antenna, Synthetic Aperture Radar, Airborne CP-SAR.

Hyperspectral Remote-Sensing Reflectance in Optically Shallow Waters: The Karimunjawa Coast Case

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Abstract. Karimunjawa sea have a unique characteristic as a case-1 water area but surrounded by case-2 water. In this case, Hyperspectral remote-sensing based analysis assumed to provide more accurate in-water properties compared with multispectral remote-sensing. This study examines the performance of radiative transfer models for IOP to build the diffuse attenuation coefficient (K) and above water remote-sensing reflectance (Rrs) in optically shallow waters. The simulated values were tested against Rrs and K from the on-field spectrophotometer data, and its was found that the value from the spectrophotometer and radiative transfer model agree with each other quite well, approximately 80-90 % correlated.

Keywords: Semi-analytical, Inherent Optical Properties, Hyperspectral remote-sensing, Optically Shallow Water, Karimunjawa

Vulnerability Assessment of Tsunami using GIS: Case Study on Jembrana Coastal Area, Bali Indonesia

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Abstract. Coastal area of Jembrana District is located between two earthquake sources which are the subduction zone that moves from South to North and the Eurasian plate that moves from North to South. This research aims to map the area of tsunami vulnerability in Jembrana Regency, Bali. Satellite image data used for tsunami vulnerability map processing are Digital Elevation Model National Data (DEMNAS), Landsat 8 satellite imagery captured in 2016 and Peta Rupa Bumi from Jembrana Regency. The method used in this research is the Weighted Overlay method and the Object-Based Image Analysis (OBIA) method. The parameters used in the analysis of the tsunami vulnerability level are divided into five parameters, which are Elevation, Slope, Coastal Proximity, River Proximity, and Land Use. The classification of the five parameters is classified based on High, Slightly High, Medium, Slightly Low and Low. The results showed that most of the coastal areas in Jembrana were categorized as Slightly High to Medium. This area has the highest damage potential because its coast has 2-13% slope, 5-10 meters low altitude, a range of beach proximity that relatively close to settlements, Land Use is dominated with settlements, rice fields and the rivers. This map can be used as the first step for disaster mitigation in spatial planning and reduce fatalities.

Keywords: Tsunami, Vulnerability, GIS, Landsat, Jembrana

Assessment of IMERG Rainfall Products Over Bali at Multiple Time Scale

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Abstract. Since March 2014, the Global Precipitation Measurement (GPM) Integrated Multi-satellitE Retrievals for GPM (IMERG) has provided satellite rainfall estimates across the globe. Using 6 points surface rainfall data which varied in location and elevation derived from The Agency for Meteorology, Climatology, and Geophysics of the Republic of Indonesia (BMKG) rain gauges as a reference, this study evaluated the performance of IMERG in depicting the spatial-temporal characteristics of rainfall variations over Bali Province at multiple (including monthly and daily) timescales. The analysis focused on the period of April 2014 to April 2019. Resulting statistical measures consisted of the linear correlation coefficient (r), the mean bias error (MBE), the root mean square error (RMSE) and The probability of detection (POD). In General, the results of these analyses indicate that satellite data have lower values than the rain gougues values. The validation analysis showed a very good relationship with the gauge data on monthly timescales. However, a good enough relationship was also found between the gauge data and the daily data from the IMERG products. However, better RMSE is found at Sanglah, Negara and Ngurah rai locations compared to Sukasada, Candikuning, and Besakih. The correlation and statistical error levels in the dry season was better than the wet season. The probability of detection rain event in daily time scale is very good. In general, the data from IMERG are potentially usable to replace rain gauge data,

especially to replace the monthly data, if inconsistencies and errors are taken into account.

Keywords: IMERG, rainfall, correlation

Spatial Dynamics of Sustainable Agricultural Land For Food in The City of Sukabumi

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Abstract. Agriculture is one of the important sectors for the economy of the City of Sukabumi. However, land conversion that continues to occur every year causes a decrease in paddy agriculture. Sustainable agricultural land for food is one of the conservation efforts to improve, protect and develop areas that have the potential as paddy fields. This study aims to analyze the distribution of areas that have the potential to be determined as sustainable agricultural land for food areas and prediction models of land integrity and their availability for various food needs in the City of Sukabumi. The method used is modeling using CA-MC to predict patterns of landcover change in the City of Sukabumi in 2031. Field surveys are also conducted to validate the condition of agricultural land and compare the results of the model in the study area. Information was supplemented by interviews with local government and local rice farmers to find out the development of sustainable agricultural land for food. The results of this study indicate, in 2031 landcover in the City of Sukabumi has changed, where agricultural land is converted into built up land. Coordination between agricultural actors, local governments, developers and the community is needed to protect sustainable agricultural land for food.

Keywords: CA-MC, sustainable agricultural, prediction model, land conservation, The City of Sukabumi

Why Tree Analysis to Find the Root Cause of Environmental Problem (Case Study on Geothermal Power Plant)

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Abstract. Since 1987 the world has been introduced to the concept of sustainable development by the world commission on environment and development chaired by Gro Harlem Brundtland. Sustainable development is a development process that is principled to meeting the needs of the present without compromising the fulfillment of the needs of future generations. The factor that must be faced to achieve sustainable development is how to repair the destruction of the environment without compromising the need for economic development and social justice. The 2005 World Summit outlined sustainable development consisting of three main pillars, namely economic, social and environmental interdependence and strengthening. Environmental aspects sometimes experience problems either because they are directly caused by human error or mismanagement. To find the root of the problem, root cause analysis method is needed. In this study the why tree analysis method is used with the why tree builder application to find the root cause of an environmental problem. With find the root of the problem, it can be determined appropriate and continuous improvement steps to prevent the similar event from happening again in the future.

Keywords: Why tree, environment, sustainable development

Utilization of mud from wastewater treatment plant processes as organic fertilizer in PT. Pengembangan Pariwisata Indonesia

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Abstract. Wastewater treatment at PT Indonesia Tourism Development Corporation (ITDC) Nusa Dua used waste stabilization pond system. In processing water from maturation pond to irrigation water, there is a new technology called Dissolved Air Flotation by producing the quality of irrigation water as well as by-products in the form of mud waste. The remaining mud waste is an organic mud that is potentially to be re - processed into organic fertilizer through the process of fermentation which aims to reduce the number of nutrient so it can be suit with the soil C / N of 12. The mud will be fermented by using bio-activators such as molasses, spoiled rice, as well as yeast with a determined variation of concentration. This study used quasi experimental method by using research design of Post-test Only Control Group Design. The result of laboratory test shows that the effective concentration to gain the quality of C/N soil is at the concentration of molasses 75 ml/l of mud with the ratio of C/N is 8, 1. On the other side, the concentration of spoiled rice 75ml/l of mud has 4, 59 ratio of C/N and yeast with 75gr/l of mud has 7, 55 ratio of C/N. The degree of acidity that is produced is about 6, 9 to 7, 2 where it has been fulfilled the standard of organic fertilizer which is 4 to 9. Even if that so, the total nitrogen content of all fermented products is around 1, 19% to 1, 82 and it means that this result are still below the minimum standard of 2 - 6% according to the regulation of

Minister of Agriculture No. 70/Permentan/SR.140/10/2011.

Int *Keywords: Organic Mud, Fertilizer, Fermentation, Bio-Activator*

SBAS-DInSAR monitoring of subsidence induced by extracting brine from an underground salt deposit in Tuzla, Bosnia and Herzegovina

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Abstract. The Tuzla City, Bosnia and Herzegovina, is very famous with the salt mining. The intensive extraction of brine from the underground salt deposit caused accumulative subsidence up to -12 m from 1956-2003. It induced serious damages to the residences, buildings and infrastructures. Although the activity of brine extraction was officially stopped in 2007, the subsidence was reported still on going in some areas of Tuzla City by previous study. In this study, a satellite-based method, i.e., Differential Synthetic Aperture Radar (DInSAR) is applied for subsidence monitoring induced underground brine extraction. The Sentinel-1 A/B satellite (operated by European Space Agency: ESA) SAR data and Small Baseline Subset (SBAS) multi-temporal analysis are employed to obtain the spatial distribution and temporal transition of land subsidence since October 2014. The accuracy and effectiveness of SBAS-DInSAR method are assessed and evaluated by using real-time kinematic GNSS monitoring system. DInSAR detected that the subsidence is still on going at a velocity of 40 mm/year in some area, especially in an area of the northeast part from the center of the city. This study presents the validity and effectiveness of SBAS-DInSAR as a useful subsidence monitoring tool.

Keywords: SBAS-DInSAR, Land subsidence, Salt mining, GNSS, Tuzla

Utilizing RGB Technique For Smoke Monitoring in Indonesian Region

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Abstract. Air quality problem in Indonesian region especially Sumatera and Borneo during dry season, mainly occurred due to widespread smoke resulted from massive land/forest burning. Assessing combination of three channels from Himawari 8 to detect smoke dispersion, The author aimed to be able to show smoke in distinct color for fast reliable decision. Comparing to true color RGB from Terra and SNPP, the scheme is able to emerge smoke in brown color. While pm 2.5 data from ground observation indicating smoke in some area didn't reach the surface.

Keywords: Smoke, RGB, Himawari 8

Analyzing the Effect of Regional Function on Rainwater Quality as an Alternative Source of Clean Water Supply

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Abstract. One of the environmental management in combating water crisis (in quantity, quality and continuity) that has been widely applied is the Rainwater Harvesting System (RWH). However, the successful of RWH is greatly influenced by many factors, such as the climates, geography, rainfall intensity, etc. This study aims to analyze the effect of variations in regional functions on rainwater quality and to map the potential distribution of RWH in Jakarta City. Observation and direct rainwater sampling were carried out in five regional functions: commercial, airport, residential, industrial, and coastal, every two weeks for five times. The samples were tested in laboratory to analyze the rainwater content (Iron, Manganese, Nitrite, Nitrate, Chromium, Lead, Cadmium, pH and Total Coliform). Anova Test was conducted to determine the effect of variations in regional functions on rainwater quality, while spatial analysis was carried out using ArcGIS 10.1 to map potential areas for RWH development. The results showed that variations in regional function did not affect the chemical content but had a significant effect on the physical and biological contents of rainwater ($F > F_{critical}$). The most potential areas for RWH development are residential areas, followed by commercial and coastal areas.

Keywords: Rainwater harvesting, Rainwater quality, Regional function variations, Water management

Phosphate Ion Adsorption Properties of PAN-based Activated Carbon Fiber prepared with Na_2CO_3 Activation

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Abstract. Phosphorus is one of the essential nutrients for plants and animals, while excessive discharge of phosphorus into water environment causes eutrophication. Various adsorbents for phosphate removal have been reported but activated carbon has less adsorption performance than other materials. The main objective of this study was to examine polyacrylonitrile-based activated carbon fibers (PAN-ACFs) for phosphate ion adsorption. PAN-ACFs were prepared by Na_2CO_3 activation (Na_2CO_3 / PAN-CF weight ratio of 1-5) at 800°C and then heat treatment at 950°C under N_2 gas flow using a horizontal furnace. The results showed that equilibrium adsorption capacities were more than 0.2 mmol/g , especially the PAN-ACF prepared with its weight ratio of 1 had the highest capability (0.27 mmol/g). This result was also supported by the characterization such as specific surface area ($2600 \text{ m}^2/\text{g}$) and quarternized-nitrogen content ($1.6 \text{ wt}\%$) for adsorption site. The experimental data for phosphate ion adsorption were well fitted to Langmuir adsorption isotherms and pseudo-second-order kinetic model. The calculated maximum adsorption capacity was 0.71 mmol/g and the adsorption process reached equilibrium within 1 hour, indicating that PAN-ACF has great adsorption ability as a carbonaceous material. As for regeneration performance, PAN-ACF still remained more than 60% adsorption amount of the fresh one after rejuvenation treatment using HCl, NaCl or NaOH as desorbents.

Keywords: Activated Carbon, Na_2CO_3 Activation, Phosphate ion, Adsorption Mechanism

A Comparative Study of Drought Factors in the McArthur Forest Fire Danger Index in Indonesian Forests

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Abstract. The calculation method used in Australia in assessing the forest fire hazard index is the McArthur Forest Fire Danger Index (MFFDI). One important component in the MFFDI calculation is the drought factor. The original MFFDI calculation method formulates the drought factor using parameters of temperature, relative humidity, and wind speed, or is given a constant value of 10 with certain conditions. The use of this parameter is not effective because the calculation of drought factors and index calculation, in general, is used at one time. The development of a suitable forest fire hazard index specifically implemented for forests in Indonesia is urgently needed. The character of forests in Indonesia is relatively different due to the influence of weather and climate that requires adjustments in its application. In this study, a comparative study will be conducted by comparing the original drought factor of MFFDI, the drought factor of the Keetch-Byram Drought Index (KBDI), and the drought factor of the Mount's Soil Dryness Index (MDSI). The output generated from this study is the McArthur calculation method using drought factor's KBDI is the most suitable method to be used to calculate the forest fire hazard index in Indonesia with a CR value of 0.900.

Keywords: Drought Factor, Forest Fire Danger Index, KBDI, McArthur, MDSI.

The Carbon Sequestration Potency of Agarwood (*Aquilaria malaccensis* Lam.) for Environmental Conservation

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Abstract. Climate change is a problem that most attention in the 21st century. It allegedly as a result of the increasing concentration of CO₂ in atmosphere. Many efforts have been designed to delay or halt the pace of climate change so as not to cause a significant impact on earth. The most popular efforts to mitigate climate change is to plant trees to optimize the carbon sequestration. This study aims to determine the carbon sequestration capacity of *Aquilaria malaccensis* in forests and plantations. *Aquilaria malaccensis* is an endemic tropical forests of Indonesia endangered status. The method used is allometric and analysis of non-destructive sampling CO₂ uptake obtained through multilevel plots. Uptake of CO₂ *Aquilaria malaccensis* in forests (9.57 tons CO₂ eq/year) and of the plantations (2.35 tons CO₂ eq/year). Biomass trees in forests (5.22 tons eq/year), in plantation of (1.28 tons eq/year), and the pole category in forests (0,019 tons C eq/year) ranks lowest. Carbon content of trees in forests category (2.61 tons C eq/year) were the highest, while in plantations (0.64 tons C eq/year), and the carbon content in forests pole of (0.0098 tons C eq/year) while in plantation is (0.022 tons C eq/year).

Keywords: *Aquilaria malaccensis*, carbon sequestration, climate change, forest, plantation

Evaluation of Groundwater Quality for Suitable Drinking based on Physical and Chemical Properties of Water Analysis around Mount Lampobattang, South Sulawesi

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Abstract. Bantaeng district is located in the foot of Mount Lampobattang, South Sulawesi. This area needs a huge amount of suitable drinking water for its people with their increase growth rate. So, the research about groundwater potential is really needed to do for knowing the groundwater quality that can be used to meet that need. The purpose of this research is to analyze the quality of groundwater in this area based on physical and chemical characteristics of groundwater. The parameters of this method are EC, pH, & TDS for physical parameters and Sodium, Potassium, Chloride, Magnesium, Calcium, & Sulfate for chemical parameters. Then, the data are compared to standard values recommended by the Rule of the Ministry of Health Republic of Indonesia, the World Health Organization, and Indian Standards Specification for permissible limits of drinking water quality standards. From 14 wells data, there are 7 wells that don't fulfill the rule due to the value of the pH level is low. Its mean that the wells are not good to consumed. The result of physical and chemical groundwater analysis can be processed and compared with the parameter standard for drinking water for knowing the potential and quality level of groundwater in the research area.

Keywords: Groundwater Quality, Drinking Water, Mount Lampobattang, Physical Properties, Chemical Properties.

Assessing Coastal Vulnerability Index of Tourism Site: The Case of Mataram Coast

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Abstract. Complex hazards associated with climate change are increasing the vulnerability of urban coastal areas around the globe. Many coastal areas and infrastructure suffered from unprecedented hazards such as storms, flooding, and erosion. Thus, it is increasing the vulnerability of urban coastal areas aggravated with the absence of coastal green infrastructure. Given the state of coastal environments, there is a genuine need to appraise the vulnerability of coastal cities on the basis of the latest projected climate scenarios and existing condition. Hence, to asses, the vulnerability level of Mataram coastal, the Coastal Vulnerability Index (CVI) accompanied by pre-assessment of readiness to climate disruption. The CVI used to map coastal into five classes of using GIS. As a case study, this approach applied to Mataram City: one of the tourism destinations in Lombok. Two of sub-districts in Mataram City, Ampenan and Sekarbela, laying in the shorelines have undergone coastal flooding and erosion. One of them, Ampenan sub-district, experienced flooding due to river-discharge and became the most severe location during inundation. Results indicated that along ± 9000 meters of Mataram coast possess vulnerability level in moderate to very high-risk level. The assessment also showed that sea-level rise is not the only critical issue but also geomorphology and shoreline changes, the existence of green infrastructure, also human activity parameters took important part to be assessed.

Keywords: Coastal Vulnerability Index, Mataram, Tourism, Lombok

Biomass response of *Chaetoceros calcitrans* under heavy metals stress environment as one of morphological adaptation mechanism

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Abstract. This research is a long-term and integrated research conduct to monitor the growth of *Chaetoceros calcitrans* exposed to both essential (Cu) and nonessential (Cd) heavy metals. Their concentrations are in the top spots of pollutant substance of anthropogenic waste. Working on several stages of concentration to be able to compare various growth behaviors of these microalgae responses to the heavy metals exposure. Concentration applied in 0.7; 1.3; 1.9 and control, respectively. Furthermore, focusing on 96 hours of the exposure period to record any changes in every 12hours of the experiment. Overall, steady state of biomass appears in Cu exposure during the first 48 hours and significantly increases of all concentration; except control-during the halfway to 96 hours. On the other hand, Cd treatment shows a gradual increase in cell biomass since the first hours of exposure and continues rising until the end of the test. However, control has the opposite pattern to other concentration.

Key words: Growth, Biosorbant, Bioremediation, Cooper (Cu), Cadmium (Cd)

Identification and Potential of Green Open Space Using Unmanned Aerial Vehicle in Depok City

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Abstract. Green Open Space (GOS) is a solution in anticipating future environmental crises by developing a city with a sustainable principle. The increase in the physical area of the city has the consequence of reducing the area of GOS. Meanwhile, along with population growth and economic activity in turn it will spur changes in land use in various parts of the city. Depok City faces problems related to the availability of GOS due to land conversion. The area of GOS in Depok City tends to decrease over time. Identification of the distribution of GOS that is still available needs to be done as one of the efforts to build a database to monitor the existence of existing GOS. Unmanned Aerial Vehicle (UAV) is a breakthrough in the novelty of technology in mapping a region. The aim of this study is to map existing public and private GOS areas and analyze the area that has the potential to develop GOS, especially public Green Open Space using UAV in Depok City. From the provision of GOS allocation of at least 30 percent, The Government of Depok City is able to provide 16.33 percent GOS. The figure of 16 percent is a combination of public Green Open Space (proceeds from municipal government) and private (owned by residents). Potential areas to be used as public Green Open Spaces in Depok City include the sub-districts of Pancoran Mas and Beji. The both of sub-districts are expected to increase the public Green Open Space in Depok City, in addition, some residential housing in the both of sub-district, can be created private Green Open Space such as making a field and a park.

Keywords: Depok City, Green Open Space, UAV, Remote Sensing

Application of Illegal Oil Bilge Dumping Monitoring Using Synthetic Aperture Radar Satellite Sentinel 1A Data and Automatic Identification System Broadcast Signals Over Sunda Strait, Banten Province, Indonesia

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Abstract. The existence of oil in nature is widely utilized and very useful for human needs, such as: energy. The world demand for oil is high and need to be transported from the oil producer country into oil consumers. Until now, the most common transportation to transport oil is using ships (tanker ship) passing through the ocean. On the other hand, oil is dangerous to the ocean ecosystem if they were not maintained and treated carefully. Oil is one of the pollutants that make devastating impact on ocean ecosystem. One kind activity that related to the oil pollution is called bilge dumping. Bilge dumping is the disposal of waste water from a ship's lower hull. Bilge water is supposed to be treated before it's discharged, but sometimes vessel operators will bypass the pollution control equipment and flush oily, untreated bilge into the ocean, and those activity is direct violation of marine pollution law. Application of Synthetic Aperture Radar (SAR) Satellite using Sentinel 1A data is used in this research as an approach to conduct a preliminary investigation to estimate the oil bilge source. Constant False Alarm Rate (CFAR) algorithm is used to detect ships over the surface of the ocean and Machine Learning using Support Vector Machine (SVM) algorithm is used to detect and distinguished the oil bilge that discharge by the vessel, considering the texture and morphology of the oil in SAR images. Automatic Identification System (AIS) data is

used in this research to validate the CFAR algorithm in ship detection and identify the identity of the ship. This research resulting in the detection of 178 km long of bilge oil around the southwest of Banten province, Indonesia. The CFAR algorithm and AIS Broadcasts data identifies an Indonesian oil product tanker as a suspect to the oil bilge dumping activity with at least 15 AIS broadcasts signals recorded by the satellite. Estimation of the oil bilge source is conducted by matching the ship track and oil bilge trace. Analysis in this research is utilize the Sentinel 1A data scene captured on July 2nd 2019 at 22:33 Universal Time Coordinate (UTC).

Keywords: Oil bilge, Synthetic Aperture Radar, CFAR algorithm, Machine Learning, AIS

Characterization of Laboratory Wastewater for Wastewater Treatment Plants Used Environmental Biotechnology

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Abstract. The number of wastewater parameters will affect the waste characteristics. It is biodegradable and toxic based on the value of the BOD/COD. Contaminant monitoring in wastewater is an important consideration in decision making for alternative waste management. In the other case, this information can improve the efficiency and effectiveness of the performance of wastewater treatment plants (WWTP). The research focus was identified of the parameter conditions and to classify the BOD/COD to laboratory wastewater at the University of Jember. A sampling of laboratory wastewater, i.e the Faculty of Agricultural Technology and the Faculty of Pharmacy by grab sampling method. The parameters of wastewater quality observed were temperature, pH, turbidity, TSS, COD, BOD, COD, and heavy metals. Some of these parameters were compared with quality standards refer to Regulation of Environment and Forestry Ministry No. 5 of 2014. The characterization of wastewater was identified based on the results of BOD/COD calculations. The results showed the quality parameters of pH, BOD, COD, TSS, and TDS in laboratory wastewater exceeded the quality standard. BOD/COD from the Laboratory of Faculty of Agricultural Technology was 0.3 and Pharmacy Faculty was 0.4. It was a biodegradable condition. The wastewater treatment recommendation was combination method of physical (biofilter) and biological (phytoremediation). This investigation was used as a consideration for the construction of a

Wastewater Treatment Plant at the University of Jember which has an aesthetic and environmental outlook.

Keywords: standard; preliminary analysis; biodegradable and toxic; physical and biological treatment

Analysis of Land Suitability and Land Use Planning for Corn using Geographic Information System (GIS) in Ho Watershed, Tabanan Regency

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Abstract. Corn has an important need for human life and is the second food crop commodity after rice. This study aims to evaluate the suitability of the use of corn in the Ho River Basin, to know the limiting factors for the suitability of the use of corn land and to determine or provide directions for the use of corn land in the Ho River Basin. This activity consists of a series of activities which include the collection and evaluation of secondary data, surveys, data analysis, and field tests. 3. The actual land suitability for corn in Ho Watershed is classified as non-suitable (N) and marginally suitable (S3) with the limiting factors are slope, erosion hazard, soil drainage and nutrient availability (P-available). Potential land suitability for corn is classified as suitable 2 (S2) to marginally suitable (S3) with limiting factors are temperature slopes, erosion hazards and nutrient availability (P-available).

A GIS Analysis for Flood Problem in The Big City: A Case Study In Pekanbaru City, Riau Province, Indonesia

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Abstract. Pekanbaru City, Riau Province, Indonesia is located at coordinates 0°25'29.20"- 0°39'15.22" N and 101°20'43.39"- 101°34'25.60" E. This research aims to study the common causes of flooding in Pekanbaru city which has a good geological condition. This study uses two types of data as primary and secondary data in the form of geomorphological, geological, rainfall and land use data with a geographic information system (GIS) analysis that can help spatial analysis to determine the level of flood disaster vulnerability with visual mapping models. The geomorphological analysis shows 2 types of geomorphological units found: low-land denudational and low-land structural with river flow pattern consisting of dendritic, sub-dendritic and parallel. Rainfall is quite high in 2018 with 2621.5 mm and caused flood-prone areas which are divided into 3 categories: Non vulnerable area (64.575%), Medium Vulnerable area (23,386%) and Vulnerable area (12,039%) from the entire of the research area.

Keywords: Pekanbaru city, Flood Area, Rainfall, Geographic Information System (GIS)

Contribution of the industrial sector on the decline in water quality of Cirarab River, Indonesia

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Abstract. Industries, beside settlement, is one of the most dominant activities in the Cirarab watershed and their waste potentially contributing to reducing river water quality. The purpose of this research is to assess the contribution of the industrial sector which impact the reducing water quality of the Cirarab river Curug Subdistrict segment, by focusing on two aspects, namely (1) BOD and COD pollutants load, and (2) the level of participation in managing wastewater. Industrial pollutant load was calculated based on the concentration and discharge of wastewater. The level of public participation was assessed from the WWTP ownership based on the results from secondary data of monitoring 200 industries in three locations (Curug Kulon, Cukang Galih, and Kadu Jaya) was obtained from the Environmental Agency of Tangerang Regency.

Results showed that the highest pollutant load was generated from Kadu Jaya Village amounted to 338.0 kgBOD/day and 422.5 kgCOD/day. The level of industrial participation is low, with only 22% having WWTP. Understanding the two aspects of industrial sector helps to determine the best strategy for controlling Cirarab River pollution.

Keywords: Cirarab river, Pollution load, Industrial participation.

Development of Open Data Sharing Platform for SATREPS Project using ArcGIS Hub

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Abstract. Open Data (OD) known as trending term in the era of digital world that enables scientific data to be published and re-used among internal and external partners as well. Enabling the data publicly accessible would lead to participation and innovation throughout the society. There are several Open Data platforms developed by many developers that have been utilized by government institutions, NGOs, and other institution in many countries. One of the platforms is developed by ESRI named ArcGIS Hub. ArcGIS Hub is an ArcGIS Online app that enables collaboration and sharing of content using initiatives. In this paper, the development of Open Data Sharing platform for SATREPS project using ArcGIS Hub is reported. The platform enables data sharing of spatial and non-spatial data from SATREPS Project between Indonesia consortium and Japan consortium as well as external parties. The data being published in the platform are divided into six categories as SATREPS project main research themes, which are disease, drought, flood, insurance, and production, as well as reports and scientific papers. The platform has been installed and can be accessed online through the internet. User Assessment Test (UAT) need to be done to assess the effectiveness of the platform.

Keywords: Open Data, SATREPS, ArcGIS

Metallothionein Gene Expression from Freshwater Mussel *Pilsbryoconcha exilis* induced by Mercury

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Abstract. The study of MT gene expression from the gills of *Pilsbryoconcha exilis* in this research was carried out using the reverse transcription of RNA to cDNA. The use of RNA was expected to maximize the expected results, which can identify the expression of the MT gene as a biological response of *P. exilis* to the induction of mercury. This study has succeeded in obtaining total RNA isolates from the gills of *P. exilis* with good quantity (196 - 521 ng / μ l) and high levels of purity (1,884 - 2,139). The quality of RNA and mRNA templates obtained can be used to detect and characterize the target gene (MT gene) of *P. exilis*. It was demonstrated by the success of amplifying the housekeeping gene GAPDH, which functions as a positive control. The MT gene amplified by RT-PCR with a product size of 356 bp was successfully obtained in *P. exilis*.

Keywords: metallothionein, *Pilsbryoconcha exilis*, RNA, mercury.

The Impact of Climate Change on the Shrimp Processing Industry in Tambak Rejo, Semarang

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Abstract. The location of Indonesia at the equator caused the complexity of changes in weather parameter that did come out of by climate change. The impact of of climate change is also felt by fisherman in Tambak Rejo, Semarang in terms of social and ecological aspect, create adverse effects on the form of a decline in shrimp catches. The aim of this research is to analyze fisherman's incomes and estimate the impact of climate change on the production of fishermen. The methodology used in this research is quantitative which means to determine the benefits of fishermen by calculating the difference between the revenue and cost. Another method also used in this research is R/C ratio to identify how far the result obtained from business activities during a certain period are quite profitable. Based on the results of R/C ratio, the ratio of five from eight respondents is less than one which means that they suffered losses due to climate change. It means that the impact of the climate change give a negative effect on income from most fishermen in the Tambak Rejo, which is characterized by a reduction in production output and annual income.

Keywords: climate change, impact, revenue, cost

Potential fishing grounds of Skipjack tuna (*Katsuwonus pelamis*) in west water of Sumatera using remotely sensed data and maximum entropy model

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Abstract. Fishing locations for Skipjack tuna (*Katsuwonus pelamis*) collected from Vessel Monitoring System (VMS) along with satellite-based oceanographic data of salinity, chlorophyll-*a* concentration (chl-*a*), and sea-surface temperature (SST) were employed to figure out the effects of oceanographic factors on the formation of potential fishing ground for skipjack tuna in the west water of Sumatera. Data of salinity, chl-*a*, and SST were downloaded from INDESO Project website. The relationship of those parameters to the potential fishing ground of Skipjack tuna was analyzed with maximum entropy model (maxent). The Maxent model revealed its potential for predicting the spatial distribution of Skipjack tuna in west water of Sumatera, indicated by area under the curve value by 0.846. Further, the Maxent results indicated that the spatial potential fishing ground pattern were mostly influenced by salinity (50%) followed by chl-*a* (37.7%) and SST (12.4%). Integration of multi-sensor remote sensing data and a modeling approach provides an ingenious way to establish the potential fishing ground of the Skipjack tuna in the west water of Sumatera.

Keywords: Maximum entropy model, potential fishing ground, remotely sensed data, Skipjack tuna, west water of Sumatera

Ocean Color Variability during Surface Wind Intensification Period Over Java Sea

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Abstract. Ocean color is one of important parameter to indicate physical and biological process over seawater. Previous studies have found that this parameter dynamically changed and influenced by global and regional factors such as Monsoon, El Nino / La Nina, and Dipole Mode. This study focused on ocean color changes in Java Sea water region during surface wind intensification in the area on Asian Monsoon period (October - March) that coincided with CENS (Cross Equatorial Northerly Surge). The result shows that ocean color derived from VIIRS data changed spatially and temporally during the period. When the wind speed increased, the ocean color tend to be greener indicating more productive area due to abundant amount of phytoplankton.

Keywords: Ocean Color, Java Sea, Wind

Shoreline change and its prediction of Aceh coast using remote sensing and GIS techniques

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Abstract. Tsunamis is the most devastating natural disaster in the coastal zone, shoreline change could occur significantly by tsunami wave processes. The Indian Ocean tsunami event on the 26 December 2004 severe damage in most of Aceh, Indonesia. Besides tsunami, shoreline change in Aceh also caused by coastal hydrodynamics such as tidal current and longshore current. This research presents an analysis of shoreline change and its prediction in Aceh based on remote sensing data processed by GIS (Geographic Information Systems). The paper demonstrates analysis shoreline change using Digital Shoreline Analysis System (DSAS) with the Linear Regression Rate (LRR) and End Point Rate (EPR) method is utilized to calculate the rate change of shoreline with Kalman Filter for shoreline prediction. The shoreline extraction using Tasseled Cap Transformation from the Landsat 5 TM (1988,1993,1998), Landsat 7 ETM+ (2004, 2009, 2013), and Landsat 8 OLI (2018) imagery. Total shoreline change rate/year has also been calculated and the uncertainty of total shoreline change rate was found ± 2.69 meters/year. Aceh region was divided into two zones, zone A (Lhoknga coast) and zone B (Peukan Bada coasts, Banda Aceh City, Lambada Lhok coast, and Krueng Raya coast). In the present study, the mean of the erosion rate in zone A was -1.56 meters/year during 1988-2018. In the same periods, mean erosion in zone B was -6.61 meters/year. Maximum erosion rate in zone A was -4.6 meters/year and zone B was 6.61 meters/year. Data of shoreline change rate during 1988-2018 was used for prediction of shoreline position in 2028 and 2018. This research has contributed a valuable baseline information in Indonesia and giving a comprehensive model for government

as policy makers to reduce the negative effect occurred in the shoreline area.

Keyword: *Shoreline change rate, Shoreline prediction, Tasseled cap, End point rate, Kalman Filter*

A Strategic Approach to Resilience-based Management of Coral Reef Using the A'WOT Hybrid Method: Case Study in Doreri Bay, Manokwari Regency, Indonesia

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Abstract. Resilience-based coral reef management is a new paradigm to support the ability of coral reef systems to deal with local pressures and the impacts of climate change. So far studies to determine resilience assessment indicators have made significant progress, but are still limited in the framework for formulating management strategies. This study aims to formulate priority management strategies that support the resilience and sustainability of coral reef ecosystems in Doreri Bay, Manokwari Regency. The method applied is A'WOT hybrid, which is a combination of SWOT (Strength, Weakness, Opportunities, and Threats) and AHP (Analytical Hierarchy Process). This method can increase the quantitative information base in the strategic planning process. The stages of the A'WOT analysis include the identification of relevant factors of the external and internal environment, the preparation of the A'WOT analysis hierarchy structure, pairwise comparisons, the calculation of priority of SWOT factors and alternative strategies, and consistency analysis. Based on the results of the analysis, the main strategic priorities in the management of coral reef ecosystems in Doreri Bay are increasing integration between sectors and stakeholders, building active community participation, increasing efforts to monitor the condition of coral reefs and increasing the effectiveness of law enforcement.

Keywords: Climate change, Ecosystem, Priority, Planning, Sustainability

Spatiotemporal Analysis of Marine Debris Existence in Parangtritis Coastal Area, Yogyakarta, Indonesia

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Abstract. This research is aimed to identify the marine debris types and their distribution based on morphological characteristic of the coastal area. It was conducted between Pantai Depok and Pantai Parangtritis region, Yogyakarta. Specifically, the morphological identification was carried out to characterize the morphology of the location under study and its relation to the distribution of existing marine debris. This research used survey method and it was accompanied by systematic sampling techniques. Transect lines were created perpendicular to the coastline with 100 meters intervals, accompanied by a 1x1 meter grid for marine debris identification. Descriptive qualitative analysis was done to explain the spatial temporal aspect of marine debris existence. The results of the study was presented in the form of a cross-section morphological description, analysis table, and a map showing the distribution of marine debris along with a description of the type of debris and its density. The results showed that the distribution of marine debris was spatially clustered on the west side, especially on the coast of Depok. This fact reveals that the distribution of marine debris will indirectly follow the coastal morphology, i.e. the amount of debris will increase if it approaches the river mouth. Temporally, the highest amount of marine debris was obtained in March and the lowest was obtained in July. Degradable marine debris is dominated by wood, while non-degradable is dominated by plastics and straws. The greatest amount of marine debris is generally obtained during the west season, which indicates that the supply of debris originates from the

Opak River, which is located in the western part of the study area.

Keywords: marine debris, morphological characterization, spatial temporal analysis

Chemistry and Physics Characterization of Milkfish (*Chanos chanos*) Gelatin from Tarakan, North Borneo, Indonesia

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Abstract. Gelatin of milkfish (*Chanos chanos*) from Tarakan, North Borneo, Indonesia has been extracted successfully. The gelatin was extracted from the milkfish bone. In prior to extract, the bone was cleaned with demineralized water and then dried at room temperature. Extraction process was done in several procedures. The first procedure was immersed the bone in 0.1 M NaOH for 48 hours. After that it was washed until reached neutral conditions and continued with immersing it in 0.1 M HCl for 72 hours and then washed it to get neutral condition. Next procedure is extraction process. It was using water solvents with a ratio of milkfish bone and water is 1: 3. The extraction process was carried out at 50°C for 4 hours. The obtained gelatin was characterized. The results showed that moisture content 6.39%; ash content 1.92%; pH 6.1; viscosity 5.39 cP; and color 75 PtCo. This result was proved that the gelatin extraction successful.

Keywords: Gelatin, *Chanos chanos*, Tarakan, Borneo

Suitability analysis of Tanjung Bena Waters-Bali for Dive Tourism

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Abstract. This study was aimed to evaluate the suitability of Tanjung Bena waters for dive tourism. The suitability analysis was carried out using Suitability Tourism Index (STI) method. Water visibility, coral reef coverage, lifeform, coral fish, water depth, and water current were used to analyze the suitability rate. The result showed that Tanjung Bena waters were categorized as appropriate conditional (STI = 40.74 to 42.59). The less appropriate condition at the location might be caused by the high anthropogenic activities in the land.

Keywords: Suitability Analysis, Dive Tourism, Tanjung Bena Waters

Assessing Cryptic Marine Fauna Diversity as Underwater Macrophotography (UMP) Objects in Sempu Strait, Indonesia

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Abstract. Cryptic marine fauna refer to organisms that live inside habitats that hidden from direct exposure to their outer environment. Its cryptic nature made these animals rarely observed, and hence understudied. Whereas, they are very popular among experienced diver alike as underwater macrophotography objects. The aim of this study is to assess the diversity of cryptic marine fauna on the proximity of coral reef area at Sempu Strait to bring up its underwater macrophotography tourism potential. While the definition of cryptic marine fauna itself could include any major group of marine organisms, we limit the extent of our study only into the four most popular animal groups in underwater macrophotography which are: fishes, sea slugs, arthropods, and flatworms. We conducted underwater surveys using roving diver technique spanning from October 2017 to June 2019 at eleven dive sites of Sempu Strait and yielded 83 species that consists of 45 species of sea slug, 29 Species of fish, 7 species of arthropods, and 2 species of flatworms. The overall fauna diversity shows that Sempu Strait has high diversity of sea slug and cryptic fishes, while the site-specific diversity shows that each dive site has medium marine cryptic fauna diversity.

Keywords: Cryptic fauna, diversity, underwater macrophotography

Characterizing the spectral reflectance patterns of mangrove species in Perancak Estuary, Bali, Indonesia

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Abstract. Inventory and mapping of mangrove species is very important as an effort to preserve the ecosystem and biodiversity of mangrove. Remote sensing images provide many advantages for mapping mangrove features, especially through the analysis of the spectral reflectance pattern. This study aims to collect field spectral reflectance data and characterize the spectral reflectance patterns of *Rhizophora sp.* and *Avicennia sp.* found in Perancak estuary, Bali, Indonesia. The field spectral reflectance of mangrove species was measured using JAZ EL-350 VIS-NIR spectrometer (ranges from 300 to 1100 nm). The JAZ field spectrometer was pointed at 2 cm from the target objects with 10 reading repetitions. The spectral reflectance curves resulted from the field measurement indicates the amount of solar energy reflected by targeted mangrove species as function of wavelength. Absorption features of mangrove species can be identified and compared by applying a continuum removal technique to the spectral reflectance curves. The results of the continuum removal analysis indicate that there are two absorption features of mangrove species in the range of visible wavelengths between 350-525nm and 560-750nm. Hence, these two absorption features could be potentially used as the key recognition of mangrove species from remote sensing data.

Keywords: Mangrove Species, Spectral Reflectance, Continuum Removal, JAZ EL-350, Perancak

Resiliency of coral reef in east coast Bali : ecology and social perspective.

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Abstract. Coral reef ecosystem provides environmental services for ocean balance and social community in coastal area. The effects of climate change combine with human impacts, like overfishing, destructive fishing practices and pollution, critically threaten coral reefs. Coral reefs at eastern Bali on 2016 reported to be bleach due to the phenomenon. This paper aims to revealing the resiliency of coral in ecological factor and social community factor that has dependency with coral reef in Eastern Bali. The research was conducted on November 2018 at east coast Bali. Primary and secondary data collection were used as a method for the research. Primary data has been taken were substrat composition (PIT), fish composition (UVC), community data (Questionnaire) and the addition (Interview).

Keywords: climate change, coral threat, ecological resilience, community resilience.

Anomaly in Indonesian sea surface temperature during the El Niño and La Niña events in 1982 to 2017

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Abstract. Understanding the seasonal sea surface temperature (SST) variability and their relation to regional atmosphere-ocean interactions in the Indonesian Seas is crucial for understanding tropical climate variability since atmospheric deep convection is located directly above these seas. Daily SST data from 1982 to 2017, measured and collected by National Oceanic and Atmospheric Administration (NOAA) Advanced Very High-Resolution Radiometer (AVHRR) Optimum Interpolated (OI) SST, were employed to observe the spatial-temporal patterns of SST anomalies during El Niño and La Niña events over Indonesia. In general, the spatial and temporal patterns of SST anomalies during El Niño and La Niña events are similar. However, El Niño events create a highest SST anomalies compared to La Niña, especially over Indonesian's inland sea. Widest areas and highest SST anomalies over Indonesian's inland sea are clearly seen during September-October, which is during mature phase of El Niño Southern Oscillation (ENSO) in east Pacific Ocean, began to weaken in November and disappeared in May the following year. Homogeneous area of SST anomaly was seen from June to November, but there are two polar anomalies are seen from December until May, which is positive (negative) SST anomalies in the west region and in the east region has negative (positive) anomalies during El Niño (La Niña) events.

Illegal Unreported and Unregulated (IUU) Fishing and Small Scale Fishery (SSF): A Case Study of South Java Lobster Fishery

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Abstract. SSF is preponderance to national fishery of Indonesia. IUU fishing practices conducted by SSF has caused considerable national economic lost. The study aims to examine SSF activities and the management process that drive the fishery to IUU fishing. Direct investigations were conducted at 13 fishing ports and 85 respondents have been interviewed. IUU fishing measures used were developed and generated from the International Plan of Action (IPOA) IUU Fishing and laws, legal and normative framework of the Republic of Indonesia. All information then was cross-validated and cross-checked. Lack of management practices and the absence of policy and regulation applied to SSF have made the fishery fall into IUU fishing category. The study contributes to the development of management and legal framework through the compliment in licensing, reporting, and recording process.

Keywords: Artisanal, fishing license, Javanese believe, patron-client, subsistence.

Distribution of Sea Cucumber Habitat Variations In The Waters of Nusa Lembongan Bali

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Abstract. Nusa Lembongan is a small island in the Province of Bali which has abundant marine resources, one of which is sea cucumbers. Research on sea cucumbers in Nusa Lembongan waters has not been done much so information about the existence of sea cucumbers is also very limited. The purpose of this study was to determine the types of sea cucumbers and spatial distribution of sea cucumbers in the waters of Nusa Lembongan, Bali. This research was conducted from November 2018-January 2019. The study used a survey method through the intertidal zone around the waters at 5 predetermined stations. Determination of research stations using purposive sampling method. The results showed that there were 9 species of sea cucumbers from 4 genera and 2 families (Holothuriidae and Stichopodidae). Sea cucumbers were not found in waters that function as boat moorings as well as former seaweed planting areas. At the station with substrate type in the form of coral, sand and muddy sand found 6 species of sea cucumbers, while at the station with substrate type muddy sand to sandy mud found only 2 types.

Keywords: Holothuriidae, Lembongan island, Sea Cucumber, and Stichopodidae

Effect of *R. mucronata* Antibacterial Activity on the morphology of *A. hydrophyla* cell

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Abstract. This study aimed to identify the cell morphology changes of *A. hydrophyla* using scanning electron microscopy and to investigate the antibacterial compound from *R. mucronata*. The research procedure includes extraction, antibacterial activity test, total phenol test, SEM, and LC-MS. The results showed a strong antibacterial activity (12.5 ± 0.58 mg/L) of *R. mucronata*. the total phenol test figured an increase in the total phenol of crude extract from $7.13 \pm 0.04\%$ to $8.55 \pm 0.03\%$ in the separated methanol fraction extract. The increasing of total phenol cause an addition of inhibition zone formed by the fraction of methanol extracts (13.1 ± 0.2 mg/L). the cell damage of *A. hydrophyla* resulting from exposure to *R. mucronata* leaf extract was observed by the SEM test. It described that there is some cellular damage cause by the exposure of extract (the lengthening of cell size, swelling or cellular bloat, and the formation of holes on the cell wall surface). The LC-MS indicates chlorogenic acid is responsible as the antibacterial activity of *R. mucronata*.

***Clarias batrachus* Linnaeus, 1758 (*Siluriformes, clariidae*): new record of threatened catfish from Bawean Island, Indonesia**

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Abstract. *Clarias batrachus* Linnaeus, 1758 is one of the threatened catfish in Indonesia. The spread of *Clarias batrachus* in Indonesia have generally in mainland of Sumatra, Borneo and Java. In 2019 we report for the first time the presence of *C. batrachus* on Bawean, a small, isolated island, conservation area in the middle of Java Sea. A description of morphological characters of a specimen are provided.

Keyword: Cichlid, invasive, predator fish

Contemporary records of the Javaen barb *Systemus rubripinnis* (Valenciennes, 1842) in Madura Island

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Abstract. Javaen barb *Systemus rubripinnis*, a freshwater fish species in family Cyprinidae, is known from Western Indonesia Archipalego (Sumatra, Borneo and Java). In Madura Island, east of Java, it was previously known from Lenteng river, Sumenep regency and had never been reported to occur in other rivers. On July 2019 several specimens of *S. rubripinnis* were captured from four rivers in Madura Island and completed the previous distribution record. A description of the morphological features of specimens is provided.

Keywords: Native fish, Cyprinid, distribution, fresh waters

Removal of Cyanobacteria from Lake Water Using Enhanced Buoyancy Caused by Enlargement of Colony Size

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Abstract. Water environment has been degraded worldwide due to rapid population growth, urbanization and economic development, which cause eutrophication in enclosed water area such as lakes. In eutrophic lakes, toxic cyanobacterial blooms frequently appear causing several problems such as fish mortality and odor substances/toxin productions. *Microcystis* is well known as one of the nuisance blooms-forming cyanobacteria. *Microcystis* secretes transparent sticky substances called extracellular polysaccharides (EPS), and forms colonies by aggregating tens and hundreds of cells inside the EPS. Since the density of *Microcystis* cell is generally less than 1.0, *Microcystis* can float up to water surface by growing in size of colony (Stokes' law). It is hypothesized that the colony formation and colony size expansion of *Microcystis* would be promoted if the amount of EPS secreted increases, and that *Microcystis* can be efficiently collected at water surface due to the enhanced buoyancy caused by expansion of colony size. In this study, the cyanobacterial EPS was extracted as a powder material, and then, the powdered EPS was added to cyanobacterial blooms solution to form colony and increase the colony size. We evaluated how the *Microcystis* buoyancy was varied accompanying the colony size under controlled EPS concentration in the solution.

Keywords: Buoyancy, Colony formation, Cyanobacterial blooms, EPS, *Microcystis*

Succession pattern of understory plant following tsunami catastrophe at coastal areas in Aceh, Indonesia

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Abstract. One important factor in structuring ecological communities is natural disturbance. In order to assess the succession pattern of understory vegetation caused by the 2004 tsunami, the survey was carried out at almost 1 year and 5 years after the tsunami. Four sites, namely aquaculture ponds (AP), dry lands (DL), mangrove forests (MF), and up-lifting (UL) areas were selected. Research showed that species richness increased nearly 4 times from 1 year to 5 years after the tsunami. A year post tsunami, mangrove palm *Nypa fruticans*, mangrove fern *Acrostichum aureum* and coastal herb *Sesuvium portulacastrum* were recorded growing well in tidal areas. Then, 5 years after tsunami, *Thypha angustifolia* and *A. aureum* populations colonizing open areas that were left by mangrove plant communities or unmanaged aquaculture ponds. Most of the disturbed habitats, including dry lands and up-lifting areas were occupied with weedy species such as *Calotropis gigantea* and the noxious weedy species *Mimosa pigra*. This result indicated that understory species with wind-dispersed seeds played a major role in the succession of coastal vegetation recovery. The different succession patterns along the environmental gradient could result from different strategic approaches in the establishment ability and the growth rate of the dominant plants which are closely depended on the four habitat types.

Keywords: tsunami, understory vegetation, seed dispersal, succession, Aceh

Ontogenetic variation in feeding habits of *Trichiurus japonicus* in the waters surrounding of Guei-Shan Island, northeastern Taiwan

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Abstract . The purpose of this study was to explore the feeding habits and trophic position of *Trichiurus japonicus* in northeastern Taiwan. During March 2018 to February 2019, we using trawler to collect *Trichiurus japonicus* samples. The sum of the samples are 435, among the female samples are 194, and the rest of the samples are 241 of the male. Pre-anal length (PL) and body weight of the specimens ranged from 37 to 390 mm and 0.24 to 800 g were taken, respectively. The stomach contents showed that the empty stomach was 29.43%, and the main feeding species of *Trichiurus japonicus* were the fish and crustaceans. It had significant differences by body length range and seasonal food organisms composition, and the tendency was rising by the increase of the body length. By the increase of the body length, the mouth size and individual, food organisms had never been a clearly change. The mean trophic position was 3.83 by the stable isotope analysis. At last we hoped to construct the ecosystem of the food web and the energy flow ecosystem to the northeastern Taiwan, and hoped the science evidence of fishery resource management could base on the ecosystem in the future.

Keywords: *Trichiurus japonicus*, *Stomach content*, *Stable isotope*, *Trophic position*

Identification of Tuna Species (*Thunnus* spp.) Collected at Benoa Harbor using Molecular Genetic Methods

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Abstract . Tuna is one of the biggest fisheries commodities in Indonesia along with shrimp and demersal fish. Tuna from the genus *Thunnus* is the group that dominated 80% of the tuna commodity in international market. Benoa harbor is one of the places for tuna landing in Indonesia, with various species of tuna were collected. In several cases, similar morphological characters have lead to misidentification of tuna species. Within this research, the samples collected were tuna samples that morphologically identified as *Thunnus tonggol*. Therefore, this research aim to collect the information of tuna species collected in Benoa harbor and builds its phylogenetic relationship. The genetic molecular methods including: extraction, Polymerase Chain Reaction (PCR), electrophoresis, sequencing, and phylogenetic analysis. Phylogenetic analysis was build using the Neighbor Joining method with the evolution model of Kimura 2 parameter. Result from this study showed five species collected during the research, including *Thunnus albacares*, *Thunnus tonggol*, *Thunnus obesus*, *Thunnus maccoyii*, and *Thunnus alalunga*. Genetic distance within species showed the value ranging from 0.013 - 0.085; while genetic distance between species showed the value of 0.075 - 0.212. Despite the similar morphological characters, molecular genetic methods can be use as an additional identification for tuna species.

Keywords: Molecular genetic, Tuna, Benoa, Phylogenetic

Effect of Temperature on the movement of water currents in the Prigi Bay, Trenggalek - Indonesia

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Abstract . Prigi Bay has the potential for marine fisheries, with total fishery production reaching 4,108,57 tons / year. Prigi bay potential, also balanced by the movement of nutrients caused by current movement. The purpose of this study is to find out how the temperature distribution patterns are affect the movement of current in Prigi Bay from a depth of 1 meter to a depth of 5 meters. This current movement will determine how the distribution of water quality in the Prigi Bay. The current condition at Prigi Bay generally moves towards the northeast with speed $\pm 0.8-1.4$ km / hour. Water temperature conditions at prigi bay on the surface of the water and on 5 meters depth ranging from 28-29°C. In general, the highest temperature is at mouth of the bay so that the movement of current originates from the beach towards the outer bay of prigi. The temperature difference causes a difference in pressure so that it forms the wind. The wind that causes water masses to move from one place to another in the territorial waters.

Keyword : Prigi, temperature, current

The Prospects of the Marine and Coastal Tourism Development in Ukraine

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Abstract. The state of the marine and coastal tourism development in Ukraine has been analyzed. It has been substantiated that in Ukraine marine tourism has significant potential for the development. In this context, the paper objective is to identify the problems of marine and coastal tourism in Ukraine and to develop the directions of their solutions. In the paper, the social, economic, environmental and institutional problems of the marine and coastal tourism development have been researched. The justification of stimulants and restraints of the marine and coastal tourism development in Ukraine have been also considered. The authors of the article have developed and proposed a conceptual model of the marine and coastal tourism development in the context of the sustainable development strategy using the methodology of structural analysis and SADT design. The proposed model takes into account the specifics of the Ukrainian conditions.

Keywords: marine tourism, coastal tourism, stimulators and restraints of the tourism development, of the tourism development.

The Composition, Size Distribution, and Growth Patterns of Tiger Shrimp (*Penaeus monodon*) and White Shrimp (*Penaeus merguensis*) at the Estuary of Tukad Aya, Jembrana, Bali

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Abstract. Estuary ecosystems play an important role in supporting the life of shrimp. High productivity and the availability of natural food in the estuary ecosystem, will indirectly affect the growth of shrimp. *Penaeus monodon* and *Penaeus merguensis* were two types of shrimp that have economic value with high demand. The purpose of this study was to determine the biological aspects of *Penaeus monodon* and *Penaeus merguensis* shrimp at the Tukad Aya estuary, Bali. Data collection was carried out in February-March 2019 using quantitative descriptive research methods. The determination of the research station was done by purposive sampling. The results showed the total number of shrimps was caught 1,756 individuals, were consist of *Penaeus monodon* 151 individuals, *Penaeus merguensis* 224 individuals and 1,325 individuals of other shrimp. The composition of the catch of *Penaeus monodon* shrimp (8.6%) is less than *Penaeus merguensis* (12.76%). Shrimp length measurements were divided into 9 classes with a range of values of 55.15-189.95 mm in tiger shrimp and 31.3-140.1 mm in white shrimp. The results of length and weight regression in both types of shrimp obtained $b < 3$ value so that the growth pattern of shrimp was categorized as negative allometric where long growth was faster than weight gain.

Keywords: Shrimp; Composition; Size distribution; Growth pattern

Laser puncture for improving the quality of sperm abalone

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Abstract. Abalone is one of the marine commodities that have economic value with high demand, but in its development in Indonesia, farmers have not been interested enough because of its very long maintenance period, so technology is needed to shorten the abalone reproduction cycle in accelerating production results. The purpose of this study was to determine the effect of laser shoots of lightning on male abalone gonads on the quality of sperm abalone sperm types *Haliotis squamata*. The method used is experimental with complete random design. The treatment is given on 3 parts of the abalone gonads, namely anterior, mid anterior, and posterior. Control is used in this study to be used as a comparison. The results obtained showed that the shooting of laser puncture for 150 seconds in the posterior section gave a picture of the best sperm quality compared to other treatments. This is due to a large number of nerve cells scattered in the posterior part so that the stimulus in the form of laser light can be responded to quickly and have an impact on the reproductive condition of the male abalone.

Keywords: laser puncture, gonadal maturation, mortality, motility, viability, Haliotis squamata

Impact of vertical land motion on relative sea level rise on Semarang, Central Java

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Abstract. Vertical land motion is an important indicator in obtaining information about relative sea level rise in the coastal environment, while these studies have not been done well in Indonesia. The purpose of this study was to find out how the vertical land motion and relative sea level rise have a significant influence on inundation and erosion. We address this issue for Semarang, Central Java by estimating vertical ground motion using the Small Baseline Subset Time Series Interferometry SAR method of 24 Sentinel 1 satellite data during the period July 2017 to July 2019. The InSAR method is used to see the phase difference between two SAR images with two repetitions of a satellite track at different times. The result of this study indicate that land subsidence occurred significantly, particularly in residential areas. This study also obtained a correlation between land subsidence and expansion of inundated areas. With the limitations of remote sensing technique, further research is needed by using a permanent GPS station to produce more accurate information.

Keywords: interferometry, SBAS, Semarang, relative sea level, vertical land motion

Indonesia's fishery online scale for fisheries sustainability: pilot project in Karangantu fishing port

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Abstract . The demand for accurate, real time and relevant on capture fisheries data are very high, but how to collect it always being a problem in Indonesia. The use of technology is an answer to these needs. Technology means the way of data that can be integrated through applications and infrastructure as well as the improvement of applications and infrastructure used. This paper aims to discuss the technological system of online scales and how effective and efficient these fishery online scales for collecting fisheries data. The result shows using this fishery online scales can shorten the reporting time and the results can be seen in real time. The incoming data will be immediately sent and stored in Jakarta MMAF Server and in real time can be viewed by interested data users.

Keywords: fisheries technology, one data, fisheries sustainability, data processing.

Current Condition of Seagrass Ecosystem in Lembeh Island Waters, North Sulawesi

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Abstrak. Seagrass ecosystem contributes to the coastal environment health, including in Lembeh Island waters. This ecosystem is vital marine ecosystem that has the potential to buffer land-based pollutants and other antropogenic factors. Study on current condition of seagrass ecosystem in Lembeh Island waters was carried out on July 2019. The purposive sampling method was applied to determine eight sampling stations that distributed around Lembeh Island: four stations were located in the western part (facing the Lembeh Strait and Bitung City) and the rest were in the Eastern part (facing the Maluku Sea). Data on the number of seagrass species, percent cover, number of algae species, and water quality were collected in each station. Scoring and weighting methods were used to determine the current condition of seagrass ecosystems. Sattelite data of Sentinel-2 (2014 and 2018) were also analyzed to describe the changes of seagrass coverage. The increasing population and anthropogenic threats in the coastal area may lead to rates of change to the seagrasses ecosystem. The results showed that there were eight seagrass species found in the study area with range of percent cover is 0 - 100%. The station in the West side are dominated by *Enhalus acoroides* (monospesific), while on the East side has greater density and diversity of species. Based on scoring and weighting, seagrass conditions on the West side of Lembeh Island were in poor condition compared to those in the East side. Information on the current condition of seagrass ecosystems can be a scientific justification to support the sustainable management of Lembeh Island waters as part of Bitung Marine Protected Area.

Keywords: Seagrass Ecosystem, Current Condition, Bitung Marine Protected Area

Biology Characteristic, Abundance Index and Fishing Aspect of Donkey Croaker (*Pennahia anea* Bloch, 1793) In The Tangerang Waters.

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Abstrak. Donkey croaker (*Pennahia anea*) fish in Tangerang waters have a forklength range are 9.4-23 cm, with an average of 18.9 cm and modus 18-18.5 cm. Growth type is isometric with correlation $R^2 = 0.7266$ and $b = 3.2251$. The sex ratio of female: male = 1: 0.9. Level and index maturity of gonad are highest in February and lowest in March. It is suspected of the peak spawning of the donkey croaker fish occur in March. The length first maturity of donkey croaker at 15.8 cmFL. The length of the first caught (Lc) by danish seine net at 16,76 cmFL and by rampus at 17.60 cmFL. Asymptotic length (L_{∞}) at 23.89 cmFL and growth rate (K) = 0.84 per year. Mortality rate; total (Z) = 4.01, natural (M) = 1.73/year and by capture (F) = 2.28/year. Exploitation rate (E) of donkey croaker fish is 0.57. CPUE the smallest in July was 0.41 kg/trip/day, the largest was in June 9 kg/trip/day, averaging 3.3 kg/trip/day. The fishing season from July to January with its peak in November and the famine season occurs in February-June with a peak in February. The main fishing gear for catching samge fish in the waters of Jakarta Bay is the cantrang net. The highest production of donkey croaker fish in June

Keywords; Donkey croaker, gonad maturity, population parameter, catch per unit effort, fishing season

Macrozoobenthos Community and Physical, Chemical of Water Tukad Badung Denpasar.

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Abstract. The increasing population of Denpasar city has an impact on increasing non-agricultural land use which indirectly affects the water quality of Tukad Badung and affects the life of aquatic organisms, one of which is macrozoobenthos. The existence of macrozoobenthos can be used as an indicator of pollution because it is very sensitive to environmental changes. This study aims to determine the status of Tukad Badung Denpasar City water quality, the relationship between physics, water chemistry with abundance of macrozoobenthos and spatial distribution of water quality through water quality distribution maps. The research method used was a survey method. The results of macrozoobenthos observations found consisted of 4 phyla, 6 classes, 13 orders and 21 families with abundance of macrozoobenthos ranging from 180.56 - 2005.56 Ind / m², diversity index ranged from 0.87 to 1.47, dominance index ranged between 0.29 - 0.59 and the BMWP-ASPT index ranges from 2.7 to 4.71. The water quality status of Tukad Badung is in the moderate polluted category because most of the parameters exceed the quality standard (TSS, COD, ammonia and dissolved oxygen). The parameters of temperature, dissolved oxygen, current speed and ammonia significantly influence the abundance of macrozoobenthos. Based on the water quality distribution map shows the level of pollution in the Tukad Badung flow caused by human activities that are influenced by land use around the river so that all forms of waste from these activities have a negative impact on the waters which can reduce the status of water quality. Thus the need for efforts to control pollution in a preventive and repressive manner so that the use of water in accordance with its designation.

Keywords: macrozoobenthos, pollution, Tukad Badung.

Waveform Retracking Of Altimetry Satellite With Fuzzy Logic System In Natuna Waters

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Abstract. Waveform retracking analyses have been proven to increase the accuracy of sea surface height (SSH) estimation from satellite altimeters data in coastal areas. However, it seems that each retracking algorithm has its strength and weakness so that no dominant algorithm can be found that can be applied in coastal regions. This purpose of this study was to obtain the best SSH estimation from altimeter satellite data using retracking waveform analyses with fuzzy logic system. The fuzzy logic system was used to select the best SSH values from the results of retracking. The data used in this study was level-2 SGRD data from Jason-2 and Jason-3 in Natuna waters in 2017 obtained from <ftp://avisoftp.cnes.fr/AVISO/pub>. Waveform retracking with fuzzy logic system can reduce standard deviation of SSH estimation up to 23.3 cm from the on-board standar deviation. The highest IMP value from each observation track was constantly generated by retracking with fuzzy system up to 70.3%. The result showed that retracking waveform analyses using fuzzy logic system can produce SSH estimate values with the best accuracy in each observation track.

Keywords: waveform retracking, fuzzy logic, Jason-2, Jason-3, altimetry

Study Infection of Argulus Parasite on Carp Broodstock From Aquaculture Facility (Case Study : Bontomanai Installation Service of Fish Seed, Gowa, Indonesia)

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Abstract. Argulus is a cosmopolitan ectoparasite in fish that can lead to the occurrence of secondary infection of other pathogens. The case of Argulus infection in Indonesia still has less attention compared by virus and bacteria infection. The aim of this study is to examine the infection of Argulus sp on broodstock carp from Bontomanai Installation Service of Fish Seed, Gowa, Indonesia. The study was conducted from March-August 2019. Argulus species were isolated from 10 carp broodstock every month. The result showed that the highest infection happens on March with 100% prevalence and intensity 12.50 parasite/individual while the lowest rate of infection is on May with 30% prevalence and intensity of 2.33 Parasite/Individual. In term of microhabitat, the most infected part is the fin with the average abundance of 2.68 parasites/body part while the less preferred microhabitat is head. Argulus foliaceus is the only species found in this study. It is clear that Argulus infection is one of the treats to the sustainability of freshwater aquaculture, especially in broodstock management.

Keywords: Argulus, Aquaculture, Infection, Pathogen, Indonesia

Ectoparasites infection rates in hybrid grouper from the marine aquaculture facilities of Situbondo, East Java and Gondol, Bali.

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Abstract. The health status of fish is very important for improving disease control systems and aquaculture development because the disease is a serious problem in the aquaculture sector. Disease agents that are often found in fish are parasites. Parasites infections are quite dangerous because they can cause secondary infections. This study aims to determine the type and level of infection of ectoparasites in groupers. The study was conducted on July 2019. The fish was measured in length and weight. Ectoparasites from the body surface, fins and gills were examined microscopically using the smear method. Data analysis was performed descriptively. Each of the 30 fish samples was examined with an average length and weight 3.09 ± 0.35 cm, 0.58 ± 0.21 gr from Situbondo and 3.19 ± 0.42 cm, 0.51 ± 0.15 gr from Gondol. The results showed that all the samples were infected by *Trichodina* in the gills. The prevalence of *Trichodina* reaches 100% in fish from each location. The intensity of *Trichodina* in samples from Situbondo was higher (115.87 parasites/fish) than from Gondol (19.33 parasites/fish). Infection rates of *Trichodina* in samples from all location was classified as very severe based on prevalence but based on intensity was classified as severe in samples from Situbondo and moderate from Gondol.

Keyword : Ectoparasites, gills, grouper, Trichodina.

Monitoring of Mangrove Using Multitemporal Landsat Imagery as an Anticipation of Green Belt Area Damage in Banyuasin Coastal Area, South Sumatera Province, Indonesia

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Abstract. The existence of mangrove has a very important meaning both in terms of physical, biological and economic even as a green belt in the coastal area. The aim of this study is mapping spatial and multitemporal changes in mangrove as a basis for monitoring damage to the coast green belt area. The method used in this research was the remote sensing method and field survey. Landcover classification using the supervised classification method, and the width of the green belt is measured based on 130 * the difference between the highest tide and the lowest ebb of seawater, The results showed that the mangrove area decreased from 2006 to 2019 of 13,684.45 ha. Changes in the area of mangroves caused by the conversion of mangroves into the harbor area, fish pond, open land, and agricultural land. The difference of seawater tides is 3.5 m, so the width of the green belt in the Banyuasin coastal area is 455 m. The green belt area has experienced a setback with a distance of 42.44 m - 455 m in 2006 - 2019. Government supervision is needed to prevent damage in the green belt area to protect the coast from damage.

Keywords: Mangrove, Multitemporal, Landsat, Coastal area, green belt

Reference Point and Exploitation Status of Mud Spiny Lobster (*Panulirus polyphagus* Herbst, 1793) in Sebatik Waters, Indonesia

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Abstract. The important information that was needed for determining the sustainable management of mud spiny lobster (*Panulirus polyphagus* Herbst, 1793) in Sebatik Waters were the exploitation status and the reference point. The aims of this research was to study the reference point and the exploitation status of *P. polyphagus*. This research was conducted from March 2016 to December 2018 and the total samples of 1.261 female lobsters had been collected monthly from the traditional gillnet fishers in Sebatik. Reference point was determined from the Beverton and Holt yield per recruit and the exploitation status was estimated from the length based spawning potential ratio (LB-SPR). The results showed that a lot of *P. polyphagus* caught by the gillnets were still immature. The annual spawning potential ratios from 2016 to 2018 were still lower than the reference point of 24% that showed the overexploited status of *P. polyphagus* in Sebatik Waters. The minimum legal size of 87 mmCL or the minimum weights of 500 grams and not increasing the quota vessels following by the monitoring study of its stock for the next several years were some recommendations for the sustainable *P. polyphagus* management in Sebatik Waters.

Keywords: Overexploited; *P. polyphagus*; Spawning Potential Ratio

Changing abundance and shifting depth distribution of common ponyfish, *Leiognathus equulus*, in Fangshan, Southwestern Taiwan

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Abstract. From 2008, the demersal fish community off Fangshan, Pingtung County, Southwestern Taiwan is surveyed by chartered artisanal bottom trawler 1~3 times each year. Each time the depths of 10, 15, 25, 35, 50, 75 and 100 m were trawled within two days besides bad weather conditions. A total of 202 species, 871,669 individuals, and 2,049 kg of demersal fish were caught by 64 hauls between November 2008 and May 2012. Results show that the abundances of pelagic species were increasing, but those of demersal species were decreasing, and some economically important demersal fishes like *Leiognathus equulus* have shifted in mean depth distribution more than 40 m from 2010. Due to the changes of relative abundances and depth distributions of economically important demersal fish in marine ecosystem, the fishing grounds and depths of traditional fishing target species have changed. Those phenomena may explain why Taiwanese fishermen have no fish to catch recently. Changes in hydrographic conditions induced by climatic change might contribute to changing fish abundance and distribution.

Keywords: Demersal fish, Depth distribution, Trawl, Abundance

Mapping Potential Fishing Ground for Skipjack tuna in the Central Makassar Strait

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Abstract. This study aimed to identify the relationship between the skipjack tuna catch and oceanographic variables and to map out the Potential fishing ground for skipjack tuna in central the Makassar Strait. We used the survey method to collect the fishing and oceanographic data from July to October 2018. The data were analyzed using the GAM function in R language to find out the relationship between the skipjack tuna catch and oceanographic variables namely Sea Surface Temperature (SST) and Chlorophyll-a. Potential skipjack tuna fishing grounds were map using ARCGIS 10.6 software. The results showed that the high catches were associated with chlorophyll-a (0.20 - 0.25 mg m⁻³) and SST (28.5 - 30.5 °C). Spatial potential fishing grounds for skipjack tuna fishing were mostly located at the areas of 3° 20' 28.30" S to 5° 30' 19.30" S and 117° 0' 40.25" E to 119° 30' 30" E. This research can be used as an important consideration in the management of skipjack tuna fishing in the central of Makassar Strait.

Keywords: Skipjack tuna, potential fishing ground, chlorophyll-a, SST, GAM

Effect of Harvest Time on *Eucheuma cottonii* Seaweed Production in Takalar Waters during East Moonsoon

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Abstract. The right harvest time in a particular season needs to be discovered to develop the right strategy in seaweed farming activities. This study aimed to analyze the effect of harvest time on *Eucheuma cottonii* seaweed production in the Takalar Waters during east monsoon. This research was an experimental research with 3 factors of harvest time, namely 35 days, 45 days and 55 days, which were analyzed with the weight of the wet seaweed produced. The method used for seaweed cultivation was longline and was carried out during the east monsoon (June to August). The primary data collected in this study were the wet weight data of seaweed. Oceanographic parameter data in the form of temperature, chlorophyll-a concentration, current velocity, salinity, and pH of the waters were also collected. Descriptive statistical analysis and analysis of variance were performed to determine the effect of the factors on the seaweed production. The results of this study indicated that the harvest time with the highest seaweed production was at 45 days, with an average weight of wet seaweed per sample was around 65,1 grams. Based on the analysis, there was a significant effect of harvest time on the production of seaweed ($p < 0.05$). During east monsoon, seaweed production tended to decrease after passing 45 days of planting time because the condition of the waters in Takalar Regency tended to be less suitable for *Eucheuma cottonii* seaweed farming activities. The results of this study could be used as a reference for stakeholders in composing an appropriate seaweed farming strategy in Takalar Regency.

Keywords: Eucheuma cottonii, wet weight, oceanography, Takalar waters, east moonsoon

Spatial-Temporal Potential Fishing Ground for Skipjack Tuna in the Bone Gulf, Indonesia

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Abstract. Skipjack tuna (*Katsuwonus pelamis*) is an important species targeting by pole and line fishery in the Bone Gulf, Indonesia. The purpose of this paper was to analyze the spatial and temporal potential fishing ground within the Bone Gulf. We combined pole and line fishery and oceanographic data of sea surface temperature (SST) and chlorophyll-a derived from satellite to figure out the potential fishing areas. The results showed that potential fishing grounds were mostly found in May and October in good association with SST of near 30.5°C and Chl-a of near 0.25 mg m⁻³. Most of the spatial pattern of the productive fishing grounds were predicted along the contour levels of both oceanographic factors. This suggested that this is very important to improve fishing strategy and conservation within the study area.

Keywords: skipjack tuna, potential fishing grounds, spatial and temporal scales, Bone Gulf

Bigeye Tuna Habitat Model Preference Based on Oceanographic Feature Using Fuzzy Inference System in Eastern Indian Ocean

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Abstract. Bigeye is one of valuable tuna in Indian Ocean. Analyses were used 2010-2017 fisheries data and oceanographic features with monthly resolution. Fuzzy inference system was implied in this method to know the preferences bigeye tuna in eastern Indian ocean off java in 105 - 120° E and 5-20 °S. Hookrate or total catch per total hooks can be inferred as total catch per unit effort. Fuzzy has much application for any field, but have not yet been applied for habitat preference model of bigeye tuna habitat. The purpose of this research was to evaluate performance bigeye tuna preference based on oceanographic feature, namely subsurface temperature on the vertical distribution (subsurface), Sea surface height and chlorophyll-a with upwelling approached. The result of fuzzy inference system as a model was showed that subsurface was the main factor which influences for bigeye fishing layers. The result of this research based on oceanographic feature, the subsurface temperature was the dominant factor and based on the model, the optimum layer of bigeye tuna fishing layer in 200 m

Integrated Coastal Vulnerability Assessment using ICSEA-C-Change Method: Case Study of Semarang City, Central Java, Indonesia

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Abstract. Integrated Coastal Sensitivity, Exposure, and Adaptive Capacity for Climate Change (I-C-SEA Change) tool is a built-in assigning scores to the sensitivity and adaptive capacity components of vulnerability, particularly for coral reef, seagrass, and mangrove habitats, along with fisheries and coastal integrity. The tool was developed mainly to help coastal manager on managing the complexity information of coastal area into more comprehensive yet simple and easily understood assessment results. As most typical coastal areas in Indonesia Semarang also threatened by many natural and anthropogenic activities. Human activities in the coastal area of Semarang City, such as land conversion, reclamation, construction of industrial and settlements, pollution has serious impact to the surrounding coastal ecosystem. The coastal area has physical environmental problems such as tidal-flooding, land subsidence, erosion, salt intrusion etc. It is compounded by global climate change which causes sea level rise and threatens coastal ecosystems, especially mangrove ecosystems. This study aims to identify vulnerability assessment of coastal area in Semarang city, and the result hopefully could provide important information for better management of the city's coastal area.

Keywords: Coastal, Vulnerability, Semarang

Analysis of Change in Coral Cover Areas and the Factors Affecting in Menjangan Besar and Menjangan Kecil Waters, Karimunjawa National Park

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Abstract. Karimunjawa National Park is one of the tourist destinations in Indonesia in Central Java. Karimunjawa National Park consists of 27 islands including Menjangan Besar Island and Menjangan Kecil Island which have beautiful coral reefs which are the main attraction for tourists to visit. This study aims to map the extent of coral cover and analyze changes in the extent of coral cover so that changes occur every year. The method used is stop and go and processing of Landsat satellite image data from 2010 to 2016. The results obtained indicate that the results of this study indicate the highest area of live coral in 2010 amounted to 259 Ha, while the lowest area of live coral was found in 2012 of 218 hectares. The highest non-coral area in 2012 was 190 Ha and the lowest non-coral area in 2016 was 118 Ha. The highest area of sand was found in 2011 of 151 hectares, while the lowest amount of sand was found in 2014 of 93 hectares. Changes in coral area are influenced by climate change, natural phenomena El-Nino and La-Nina which cause anomalies in sea surface temperature, human activity in terms of tourism and the presence of satellite errors on Landsat 7 sensors.

Keywords: Karimunjawa, Remote Sensing, Coral Cover, Landsat

State of the Coasts as an Indicator of ICM Implementation: Case Study of Semarang City, Central Java Province

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Abstract. Integrated coastal management (ICM), is a natural resource and environmental management framework which employs an integrative, holistic approach and an interactive planning process in addressing the complex management issues. The ultimate purpose of ICM is to increase the efficiency and effectiveness of governance in terms of its ability to achieve the sustainable use of coastal resources and of the services generated by the ecosystems in the coastal areas. It aims to do this by protecting the functional integrity of these natural resource systems while allowing economic development to proceed. Through integrated planning, ICM aims to address competing conflicts and conflicts arising from multiple use of limited space and resources. The State of the Coasts (SOC), a reporting system developed primarily to assess the progress and impacts of ICM implementation by local governments. Finally, when used to evaluate ICM program performance, indicators offer feedback on action plans and provide parameters for subsequent actions that may prove useful in justifying further investments in ICM. Semarang has been choose as the study site since its coastal area playing important area in term of economic and ecological but yet seriously threatened by several natural and anthropogenic activities such as flooding, land subsidence, erosion, salt intrusion, pollution etc. By conducting comprehensive and regular SOC assessment hopefully the coastal management of Semarang City will be improved.

Keywords: ICM, SOC, Semarang

Diversity And Wild Fish Status Conditions In Batur Lake, Bali

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Abstract. Lake Batur is the largest and deepest lake in Bali. The purpose of the study was to determine the diversity and current status of fish species found in Batur Lake. The method used was purposive sampling in determining the point of catching fish samples. At each station gill nets were spread with different nets size in the morning and evening, with the length of time for lifting the net was 12 hours after the net was laid. Fishing gear was only as an additional tool in catching fish. Questionnaires and interviews were also conducted with residents and fishermen. There were four types of dominant fish caught, namely Java Tilapia Fish (*Oreochromis mossambicus*), Tilapia (*Oreochromis niloticus*), Yellow Tilapia (*Oreochromis niloticus*), and Tawes (*Barbonymus gonoionotus*). From 22 fishermen, there were 265 fishes caught with the highest composition of Java Tilapia Fish 49% and the lowest Tawes Fish was 1%. Two types of fish that have experienced a decline in population and tend to be very few, namely Rasbora Fish (*Rasbora* sp.) And Snakehead Murrel Fish (*Channa* sp.). Based on the length of the captured fish, it was found that 49% of the Java Tilapia Fish sample, 59% of the Tilapia sample, and 89% of the Yellow Tilapia sample were still below the Lm value which meant that it was still classified as gonad immature fish and was not suitable fish for captured.

Keywords: Lake fish, Snakehead Murrel fish, Tawes fish, Tilapia fish.

Temporal variation in coral reefs ecosystems through Autonomus Reef Monitoring Structure (ARMS) in Pemuteran Bali

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Abstract. Indonesia is in the center of the Coral Triangle, which contains the world's most biologically diverse, most threatened, and least studied marine ecosystems. With the importance of this mega- biodiversity, study on this diversity has been increasing. However, it is still only for the specific taxa and specific organism that lived in coral reef ecosystem. We used Autonomus Reef Monitoring Structure (ARMS) to study the temporal variation and successional process occurs in coral reef ecosystem. Eighteen (18) ARMS were deployed in Close Encounter site, Pemuteran, Bali. Every two months for a year period, 3 ARMS were retrieved and analyzed from that site. Each ARMS's plate were photographed and measured for its diversity and percent cover for each sessile organisms attached on the ARMS. Brown fleshy algae, crustose coralline algae (CCA), and bryozoan were among the most abundant sessile organisms found living on the ARMS's plate for every recovery. Result also indicated slight changes of the variation of sessile organisms found within every recovery. Brown fleshy algae and CCA were mostly found within the first 6 months of recovery, while coral was dominant for the last recovery. As for the motile organism, represented by decapod, indicated that Portunidae, Philumnidae dan Xanthidae were among the three families that

mostly found. However, there was no correlation between decapod body sizes with the temporal changes.

Keywords: ARMS, Temporal variation, Pemuteran

Community Structure of Echinoderms and Their Surrounding in Segara Samuh Beach, Nusa Dua, Bali

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Abstract. Echinoderms are one genus of invertebrates that generally live in the form of polyps. The existence of echinoderms in a region illustrates the status of the area around them. Segara Samuh Beach is one of a variety of ecosystem areas in Bali Island where echinoderms are found. Since the limited information and the complex activities at Segara Samuh Beach make research about associations of Echinoderms with their surroundings, this research seems to be important to be conducted. This study was aimed at determining the density of species, species composition, and visual description of their surroundings. At the end of the study, we identified ten species of sea star (Asteroidea), one species of brittle stars (Ophiuroidea), one species of sea cucumbers (Holothuroidea) and three species of sea urchins (Echinoidea). Sea star (Asteroidea) is the most dominant species were existed in Segara Samuh Beach. Every species had each surroundings characteristic, such as brittle rocks, sands, smooth sands, and smooth-rocks sands for Asteroidea, Ophiuroidea, Holothuroidea, and Echinoidea, respectively.

Keywords: community structure, echinoderms, Segara Samuh Beach, surrounding

Drying Characteristic of *Eucheuma cottonii* Seaweed Using A Greenhouse Type Solar Dryer

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Abstract. This study aims to analyze the drying characteristics of *Eucheuma cottonii* seaweed using a greenhouse type solar dryer. The use of a solar dryer as a heat source especially the greenhouse type can accelerate the process of drying seaweed by taking into considering indicators of drying characteristics. *Eucheuma cottonii* with harvest time 45 day is dried by the thin-layer method in a greenhouse type drying room for 3 days. Weight measurements were carried out on 5 samples of whole seaweed every hour. Measurement of temperature and RH of the drying room is done by using a thermometer and hygrometer. Besides, the moisture content test was carried out before and after drying by the oven method. The results showed the highest drying rate occurred in the first hour of drying at 11,206 g of evaporated water/hour. The moisture content during drying decreased from the initial level of 88.39% to 6.88%. The amount of water that comes out during the drying process is influenced by the temperature and RH of the drying room with an average of 49.89°C and 23.18%. the result of drying has an impact on the quality of physically dried seaweed based on its color and texture.

Keywords: drying rate, humidity, moisture content, temperature

The Condition of Mangrove Community at Coastal Area of Pangkalpinang City, Bangka Island

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Abstract. Pangkalpinang is the provincial center of Bangka Belitung Islands which has an area of 89.4 km² with a coastline of 36 km² and overgrown by mangrove ecosystems which tend to be varied. As provincial capitals, development activities and equitable development in Pangkalpinang City especially the development of industrial estates and warehouses also increasing. Besides the high anthropogenic activity in coastal areas, the proliferation of port activities, and the existence of mangrove land conversion activities are thought to affect the existence / survival of mangroves in the coastal areas of Pangkalpinang City. Therefore there is a need for research related to the assessment of mangrove ecosystem conditions in the Pangkalpinang Coastal Area. This study aims to assess the status of mangrove conditions in the research area. This study uses a purposive sampling method. Data was collected using the line and plot transect method (LTP) and hemisphere photography agreed upon for mangrove monitoring in the COREMAP-CTI. The results showed that in general the condition of mangroves in the Coastal Area of Pangkalpinang City was still relatively good-poor based on the Decree of the Minister of Environment No. 201 of 2004.

Keywords: Pangkalpinang, Mangrove Condition, Hemispherical photography

Perspectives on Sustainable Management for the Poso Lake Endemic Ricefish *Oryzias nigrimas*

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Abstract. The ancient lakes of Sulawesi are renowned for their endemic freshwater fishes. Recent research on *Oryzias nigrimas*, a ricefish endemic to Poso Lake, has revealed several aspects of the biology, ecology and exploitation of this species. The data reinforce pre-existing fears regarding threats to this species, and highlight the urgency of measures to prevent further decline of the *O. nigrimas* population. This study evaluated the data and information available from a holistic conservation management perspective, with the aim of providing guidance on potential measures to prevent the extinction and promote recovery of the endemic ricefish *O. nigrimas*. Options to promote sustainable fisheries management include spatial and temporal limitations to minimise the catch of gravid or brooding fish. Habitat protection should include measures to minimise impacts from activities which can reduce water quality and disturb or kill aquatic vegetation. Further research is recommended, inter alia on the direct and indirect interactions between alien species introduced to Poso Lake and this endemic fish. *Ex-situ* conservation, in particular the development of captive breeding, could also contribute to a holistic *O. nigrimas* conservation strategy.

Keywords: Sulawesi, Ancient lakes, Endemic freshwater fish, Sustainable fishery, Conservation strategy

Jaguar Cichlid *Parachromis managuensis* (Günther, 1867) (Perciformes, Cichlidae): an introduced exotic fish in Blombanggede reservoir, Indonesia

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Abstract. The entry of exotic invasive fish had the potential as a disease vector and damaging food webs that would have a systemic impact on the ecosystem. This study discussed the first record of the existence of Jaguar cichlid, *Parachromis managuensis* from Central America in the freshwater waters of East Java, Indonesia, precisely in the Blombanggede reservoir. These records are among first of this species from a reservoir in the region. A description of morphological features of sampled specimens is provided.

Keywords: Jaguar guapote, invasive fish, predator fish

Application of Generalized Linear Model (GLM) to analyze phytoplankton community structure based on nutrient availability in Ranu Pakis, Indonesia

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Abstract. Phytoplankton is considered as one of key organism in aquatic ecosystem. The main role of phytoplankton is as the primary producer in aquatic food chain. The abundance of this organism depended on nutrient availability in form of nitrate and phosphate. Moreover, the community structure of phytoplankton in certain ecosystem may indicate the fertility and quality of the water. This study aims to analyze the relationship between phytoplankton composition and nutrient availability in Ranu Pakis, Indonesia, by utilizing Generalized Linear Model (GLM) method. GLMs are models in which response variables follow a distribution other than the normal distribution. Specifically, this research used Poisson distribution. The results showed that Chlorophyta division predominates any others phytoplankton in Ranu Pakis, in which both the surge of nitrate and phosphate level cause a considerably increase of Chlorophyta biomass. In contrast, the other divisions (Cyanophyta, Chrysophyta, and Euglenophyta) saw merely a slightly rise.

Keywords: phytoplankton community, nutrient, GLM, Poisson regression

A Comparative study of various indices for extraction of urban impervious surface based on spectral characteristic of Landsat 8 OLI Imagery

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Abstract. Impervious surface is one of the major land cover types of urban and sub-urban environment. Conversion of rural landscapes and vegetation area to urban and suburban land use is directly related to the increase of the impervious surface area. The expansion of the area of impervious surface is straight-lined with decreasing green areas in urban areas. Impervious surface is one of indicator for detecting urban heat islands. This study compares various indices for mapping impervious surface using Landsat 8 OLI imagery by optimizing the various spectral characteristics of Landsat 8 OLI imagery. The research objectives are (1) to apply various indices for impervious surface mapping; (2) to identify impervious surface in urban area based on various indices; and (3) to provide recommendation and find the best index for mapping impervious surface in urban areas. In addition to utilizing the index, land use supervised classification method, namely maximum likelihood is used for extracting built-up and non-built-up area. Field data collection is used for calculating accuracy assessment of various indices based on kappa coefficient, producer accuracy, and user accuracy. The study can also be extended to find the land surface temperature and correlate the impervious surface extraction data with urban heat islands.

Keywords: impervious surface mapping, urban area, urban heat island

Flood Vulnerability Mapping Areas Using *Spatial Multi-Criteria Evaluation (SMCE)* Method in Minraleng Sub-watershed, Maros Regency.

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Abstract. A flood vulnerability map is an important tool for assessing the vulnerability of flood-prone areas. This study focuses on the assessment of flood-prone areas in the Minraleng Sub-watershed, Maros Regency, where the area experiences floods every year. Spatial analysis in the Geographic Information System (GIS) environment has been applied to estimate flood-prone zones using six relevant physical factors, such as rainfall intensity, slope slope, area height, river density, land use and soil type. The relative importance of physical factors has been compared in paired matrices to obtain weight values using the Spatial Multi-Criteria Evaluation (SMCE) method. After the flood prone map was made, it was found that the Camba Subdistrict had the most extensive flood-prone areas with the most extensive. The total area with high and very high vulnerability classes has a percentage of 0.83% (436.25 ha) and 11.78% (6,168,035 ha). Some of the flood mitigation efforts carried out were making disaster risk studies, installing signs in disaster-prone areas, sediment dredging, building reservoirs, and building dikes on the banks of rivers.

Keywords: Flood Vulnerability Map, SMCE, GIS, Minraleng Sub-watershed, Mitigation Efforts

Coral Reef Rugosity: Comparison of in-situ measurement and Acoustical technique Using Benthic Terrain Modeler in Pasir Putih, Situbondo - Indonesia

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Coral reef ecosystems are vulnerable due to natural and anthropogenic-induced stressors. Monitoring coral reef ecosystems condition somewhat tricky and needs a huge resources and time limited. The promoted method to assess this ecosystem is by using rugosity or the roughness of coral reef surface. Rugosity data collected by in situ measurement using chain transects and using acoustic by means of single-beam echosounder. Then the data collected by the later technique analyzed by Benthic Terrain Modeler method. Rugosity obtained by in situ measurement ranges from 0.035 to 0.450 with average chain links 3 and 5 cm respectively 0.23 ± 0.10 (mean \pm SD) and 0.14 ± 0.10 (mean \pm SD). Rugosity using BTM Arc-Chord Ratio has average value of 1,0099. Rugosity using BTM Surface Area to Planar Area has average of 1,00014. Rugosity using BTM Terrain Ruggedness has average of 0.00012. The relationship between rugosity by in situ measurement and Benthic Terrain Modeler shows strong and positive correlation. The results of linear regression revealed that in situ rugosity is significantly related to BTM which the strongest relationship is BTM Terrain ruggedness 5 cm chain links $r^2 = 0.503$. The correlation of coral diversity with rugosity

has weak , while coral cover and rugosity has a highest correlation value ($r = 0.460$, $p < 0.05$, 3 cm chain links) ($r = 0.303$, $p < 0.05$, 5 cm chain links), genera richness ($r = 0.339$, $p < 0.05$, 3 cm chain links) ($r = 0.268$, $p < 0.05$, 5 cm chain links), followed by diversity ($r = 0.202$, $p < 0.05$, 3 cm chain links) ($r = 0.114$, $p < 0.05$, 5 cm chain links), and evenness ($r = -0.063$, $p < 0.05$, 3 cm chain links) ($r = -0.149$, $p < 0.05$, 5 cm chain links). Therefore, the effect of coral diversity on in situ rugosity is weak.

Key words: Coral Reef Rugosity, Echo-Sounder , Benthic Terrain Modeler

Population Structure of Longtail Tuna (*Thunnus tonggol*) across Indonesia and South China Sea

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Abstract. The increasing number of artisanal fisheries has become a threat to the Longtail tuna (*Thunnus tonggol*) population. Despite the increasing numbers of fisheries catch for this tuna species, the fisheries landing report for *T. tonggol* is probably underestimated due to misidentification. Therefore, this research aim to provide the information regarding the population structure of longtail tuna within Indonesia and South China Sea (SCS) using molecular genetic methods. The samples were collected from 17 locations across Indonesia and South China Sea for the period of 2018 - 2019, with the total of 593 samples collected. Mitochondrial control region DNA fragments were obtained with the length of 476 base pairs. Result indicated that there is population structure within longtail tuna population in Indonesia & SCS, with the AMOVA value of 0.02507 ($p\text{-value} < 0.05$). Population genetic result also indicated a unique genetic signal within the east Indonesia population (Aceh and West Sumatra), which showed

similar genetic characteristic with longtail tuna population in West India.

Keywords: Longtail tuna, *Thunnus tonggol*, genetic, population structure.

Presence of the Javanese Ricefish *Oryzias javanicus* Bleeker, 1854 (Beloniformes, Adrianichthyidae) in Tunda island, Indonesia

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Abstract. *Oryzias javanicus* (Bleeker, 1854) a species in Adrianichthyidae, is native brackish water and freshwater fish from Sundaland. In Indonesia, it was previously known only from mainland and had never been reported to occur in Tunda Island, north of Java. This paper provides the first record of *O. javanicus* from mangroves swamp (freshwater) in Tunda Island, thereby extending the distribution of the species approximately 20 km north from the mainland of Java. The specimens of *O. javanicus* were characterized as follows: dorsal fin rays 7-8; anal fin rays 22-25; pectoral fin rays 10-12; pelvic fin rays 6; principal caudal fin rays i, 5/6, i..

Keywords: Native fish, Java medaka, remote area

**First Record of Emerald Tree Skink
Lamprolepis smaragdina (Lesson, 1830)
from Masalembu island, East Java,
Indonesia.**

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Abstract. We report a new distribution record of Emerald tree skink (*Lamprolepis smaragdina*) in Masalembu island, East Java, Indonesia. This is important to give a new information about this species distribution range which is known before only in eastern part of Indonesia (Sulawesi, Maluku, Flores, and Papua), east of Wallacea line.

Keywords: Southeast Asia, Indonesia, lizard, Scincidae, reptilia.

Poecilia velifera Regan, 1914 (Cyprinodontiformes, Poeciliidae): an introduced exotic fish in Tunda island, Java Sea, Indonesia

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Abstract. The entry of non-native fish had the potential as a predation and damaging food webs that would have a systemic impact on the aquatic ecosystem. This study discussed the first record of the Sail-fin molly *Poecilia velifera*, exotic fish native to Central America at mangroves swamp in the Tunda Island, West Java, Indonesia. These record are among first of this species from a remote island in the Java Sea. A description of morphological characters of sampled specimens is provided.

Keyword: Biological invasion, Yucatan molly, non-native fish, Java

Influence of El Nino Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) on Coastal Upwelling in South Coast of Java Sea

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Abstract. The South Coast of Java are areas with an intensity of coastal upwelling caused by the Monsoon Winds (Trade Winds). Coastal Upwelling phenomenon will affect oceanographic conditions, especially in areas near Coastal. Also, this region are affected by several regional climate anomalies such as El Nino Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD). This study will analyze how the strength of these two phenomena on the intensity of coastal upwelling and their impact on several oceanographic parameters such as Sea Surface Temperature (SST), Sea Surface Height (SSH), and Chlorophyll-a. Coastal Upwelling is calculated based on Cross Shore Ekman Transport, Upwelling Index (UI), and also Coastal-Offshore SST gradient in South Coast of Java. Based on Partial Correlation Analysis is showed the impact of each of these phenomena on coastal upwelling and oceanographic parameters in both the near coastal and offshore regions. Based on the results of the analysis using partial correlation shows that the effect of IOD is more significant than ENSO on the intensity of Upwelling and Variability of Oceanographic Parameters in South Coast of Java.

Keywords: ENSO, IOD, Coastal Upwelling, South Java

Distribution of Fishing Vessels derived Visible Infrared Imaging Radiometer Suite (VIIRS) Sensor and their Relationship on Chlorophyll-a Concentration in Java Sea

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Abstract. This study aims to analyze the distribution of fishing vessels and their relationship on the distribution of Chlorophyll-a (Chl-a) concentration in the Java Sea. The fishing vessels distribution derived VIIRS were downloaded from NOAA Center for Environment Information. The Chl-a concentration distribution provided by RDDAP Easier access to scientific data. The fishing vessels that use light for the fishing operations in the Java Sea are Purse seine and Lift net boats. The DNB data shows that the fishing boats concentrated in the Java Sea around 250-2000 vessels per day. The overlay between the fishing vessels positions and Chl-a concentration shows that the fishing vessels were concentrated in the area with high Chl-a concentration (0.2 to 0.4 mg/m³). This area was predicted as a good fishing ground in the Java Sea.

Keywords: fishing vessels, fishing ground, Chl-a, VIIRS, Java Sea

Evaluation of maceration length on antioxidant potency of *Sonneratia caseolaris* leaf

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Abstract. Diabetic and cancer, as an examples of degenerative diseases in human may arise as consequences of free radicals, i.e. highly reactive molecules. The reactivity of free radicals can be constrained by a substance, known as antioxidant. Mangroves that inhabitant of highly dynamic waters of estuary is likely have defend activity by produce some substances those known as bioactive compounds that may have potency of antioxidant. The quality and quantity of bioactive compounds may affected by extraction method. This study aims to evaluate antioxidant potency of *Sonneratia caseolaris* leaf with three different length time (24, 48 and 72 hours) of maceration by applying of DPPD (1,1-diphenyl- β -picryl hydrazyl) method. Result based on 50% of inhibition concentration (IC₅₀) value suggest that the best maceration time is 24 hours (IC₅₀ was 6.35 ppm), following by 72 and 48 hours (IC₅₀ were 11.5 and 17.4 ppm, respectively). In addition, overall of different maceration time show IC value low than 50

ppm, indicate that *Sonneatia caseolaris* leaf have very strong potential of antioxidant activity.

Key words: *Sonneratia caseolaris*, antioxidant, mangrove, leaf

Application of multi satellite data to make long-term observation on the monthly variations of sea surface temperature in the Southern Indian Ocean

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Abstract. Sea surface temperature (SST) is the water temperature close to the ocean's surface. Air masses in the Earth's atmosphere are highly modified by sea surface temperatures within a short distance of the shore. Warm sea surface temperatures are known to be a cause of tropical cyclogenesis over the Earth's oceans. One of the major application of multi satellite data is to evaluate the climatological variations in the sea surface temperature. In the present study, we investigated the long-term SST variability of all months in the Southern Indian Ocean using the GLBu dataset of 20 years. The GLBu dataset consists of 0.08° latitude/longitude grid data derived from Hybrid Coordinate Ocean model (HYCOM) for the area of interest between the years of 1993 and 2012. The SST trend demonstrated climatological variations; average SST in the month of January was highest and in the month of October was lowest during 1993-2012. In addition, month wise climatological pattern was shown using ArcGIS version 10.2.

Keywords: SST, Satellite, Climatological, ArcGIS

Assessing The Accuracy of Coastline Developed By Using Multi-Source of Data

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Abstract. Coastal is a very potential area to be developed. Many big cities in Indonesia are in the coastal areas. But to carry out development along the coastal area it is necessary to consider a safe distance from the beach. The definition of a beach is very closely related to the coastline. Combining land height contours, sea depth contours are then referenced to one Mean Sea Level (MSL) reference value into one alternative method for coastline determination. The resulting DEM model needs to be tested before it becomes a reference for determining the coastline. One of the ways to test the accuracy of the model is to compare the delineated coastline on the model with the coastline owned by the Geospatial Information Agency. There is a gap between the two coastlines, because it might be influenced by the source of the data used, the resolution of the model, and the method of data collection. Given the many needs related to the coastline, the method of determining the coastline continues to be developed. The coastline has a dynamic position. Many things affect such as the contour of the land along the coast and the condition of the tides. Both conditions are easy to change, so defining coastline positioning requires a dynamic model as well. Determination of the coastline using DEM results from multi-source data modelling is still very rarely done. Combining land height contours, sea depth contours are then referenced to one Mean Sea Level (MSL) reference value into one alternative method for coastline determination. The resulting DEM model needs to be tested before it

becomes a reference for determining the coastline. One of the ways to test the accuracy of the model is to compare the delineated coastline on the model with the coastline owned by the Geospatial Information Agency. There is a gap between the two coastlines, because it might be influenced by the source of the data used, the resolution of the model, and the method of data collection.

Keywords: coastline, DEM, modelling, coastal area, bathymetry

Biology And Composition Of The Stomach Content Of Skipjack Fish (*Katsuwonus pelamis*) That Are Captured In The Region of Fisheries Management Of The Republic of Indonesia 573 East Jawa

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Abstract. Based on the management aspects of skipjack (*Katsuwonus pelamis*) is a potential large pelagic fish resource in the south of East Java and has ecological and economic value. However, if the effort to catch fish in the territory of the Republic of Indonesia 573 fisheries management continues to increase, there will be overfishing. Therefore, the concept of the management of Skipjack fish resources (*Katsuwonus pelamis*) greatly requires a link between aspects of biology and food, so that fish stocks in the sea can be utilized with the principle of sustainability.

The food composition of skipjack fish uses analytical methods that are Relative Length of Gut (RLG) and Index of Preponderance (IP). The RLG value of skipjack fish ranges from 0.3600 - 0.4859 which means that skipjack is a carnivorous fish. The main food of skipjack fish is from groups of fish (*Exocoetidae*, *Ostraciidae*, *Zeidae*, *Parazenidae*, *Clupeidae*, *Carangidae* and crushed fish) with an IP value of 55.89%, complementary foods are Crustacea (crab megalopa) with an IP value of 34.39%, while food addition is *Cephalopoda* (*Loliginidae*) with an IP value of 2.50%. Whereas unidentified foods have an IP value of 7.22%. In addition, plastic was also found from the hulls of skipjack tuna. The biology observed was the length of the skipjack (Fork Length) ranging from 23 cm to 60 cm with the weight obtained from 320 gr to 323.6 gr analysis of the long heavy relationship showed negative allometry (-), 63% were caught before gonadic ripeness.

Keywords: Food chain, relative intestinal length, level of gonadal maturity

Size Composition And Length-Weight Relationship Of The Yellowfin Tuna (*Thunnus albacares*) In Bone Bay

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Abstract. This research sets out the size composition, length-weight relationship, and condition factor of yellowfin tunas (*Thunnus albacares*) were examined in Bone Bay. Sampling was conducted at two stations, i.e., Station I at Cimpu Village in Luwu Regency and Station II at Lonrae Village in Bone Regency between July 2018 and June 2019. 10246 and 2651 yellowfin tunas were captured in Station I and Station II, respectively. Measurement of the fork length ranged between 20 and 192 cm with an average length of $81,257 \pm 33,456$ cm in Station I, and between 26 to 162 cm with an average length of 95,479 cm in Station II. The weight measurement ranged between 0,35 and 99,21 kg with an average of 14,539 kg in Station I, and between 0,46 and 97,35 kg with an average of 26,978 kg. Calculation of the relationship was based on the formula $W = 5,5^{-5}FL^{2,7454}$ ($R^2 = 0,963$) in Station I, and $W = 4,1^{-5}FL^{2,9103}$ ($R^2 = 0,761$) in Station II. The values in condition factor at Station I and Station II were 2,1395 and 3,4374, respectively. It is quite evident that the growth pattern of the yellowfin tunas at Bone Bay was negatively allometric, indicating that the length increased faster than the weight.

Keywords: yellowfin tuna, Bay Bone, WPPNRI 713, length-weight, condition factor

Improving Functional Properties of Fishball by Adding of Carageenan and Rice Bran Flour

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Meatball or meatballs are round meat paste and served warm and have a chewy texture. Meatballs initially use pork ingredients, then because of the halal aspect, then the pork is replaced by beef and chicken meat and fish meat. Meatballs are usually made with ground beef, added with tapioca flour and salt. Meatballs are very popular foods and of all ages many are very happy. Usually consumed as food or snacks and can be served at various events in the community. Besides having the advantage of meatballs, it also has a low value of food fiber, and this study aims to increase the value of food fiber in various types of fish meatballs (tilapia, catfish, pangasius) so that consumers will get greater benefits from consumption of fish balls. The method used is a qualitative descriptive experimental method, and data are analyzed with ANOVA and Simple RAL. In addition to the proximate test, organoleptic tests were also carried out. The results of this study were the provision of rice bran and carrageenan flour to significantly increase the value of fish meat dietary fiber.

Keywords: fishballs, dietary fiber, carrageenan, rice bran flour

Policy Strategy for *Marine Recreational Fisheries* Activities in Desa Pesisir, Situbondo Regency East Java

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Abstract. Policy is a series of actions or activities proposed by a person, group, or government in a certain environment where there are obstacles and opportunities for the implementation of the proposed policy in order to achieve certain goals. In addition, policies are concepts and principles that form the basis and basis of plans in the implementation of a job, leadership, and way of acting. Recreational fishing is an activity of fishing for aquatic animals that do not damage resources and fulfill satisfaction and freedom for someone who does that. These activities include fishing for freshwater and seawater located in coastal areas in all countries. Estimated recreational fishermen reached 200 million to 700 million. The purpose of this study was to determine and analyze 1) Marine Recreational Fisheries Activities in Desa Pesisir of Situbondo Regency, 2) Policy Strategy for Marine Recreational Fisheries Activities in Desa Pesisir of Situbondo Regency. The method used in this study is a qualitative research method. The sampling technique uses purposive sampling.

The results of the study were in the form of comparative regulations including the Laws, Government Regulations, Presidential Regulations, Ministerial Regulations, Governor Regulations, Regional Regulations, and Regency Regulations. The regulation is a strong foundation for recommending a regulation or policy. The issue is based on related institutions such as the Tourism Office, Fisheries and Maritime Affairs Office, and the Environment Office based on specific regulations in accordance with the subject matter. AHP policy analysis includes the preparation of the hierarchy, priority

results for each level of the hierarchy, combined results, and sensitivity results.

Keywords: Policy, Marine Recreational Fisheries, AHP

UAV Mapping and Monitoring Mangrove Replanted Area, Case Study in Pasuruan and Probolinggo, East Java, Indonesia

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Abstract. Mangroves are typical vegetation that grows on the beach or river mouth, grows affected by tides and can adapt to brackish water in tropical and sub-tropical regions. The area distribution and mangrove forest in East Java Province are dominant on the north coast such as in Lamongan, Gresik, Surabaya City, Sidoarjo, Regency and Pasuruan City, Probolinggo Regency and Probolinggo City. The last few decades, the most popular mapping of mangrove areas is to use the remote sensing method. Various types of sensory satellite images are used for mapping areas, types and densities, estimating the mangrove biomass. Meanwhile, UAV (Unmanned Aerial Vehicle) or drone technology is now easy to obtain. Many photo service providers with this UAV. Therefore, utilizing UAVs for capturing mangrove areas can be an effective solution to identify area where rehabilitation should be conducted. The result shows that for capturing 92.62 ha mangrove area in Pasuruan took about 2 hours with flight altitude 75 m above sea level. At the other hands, in Probolinggo for capturing 143.62 ha of mangrove area took almost 6 hours due to strong winds. Through technical arrangements, good aerial photographs of mangrove area can be obtained. Also, it could be obtained with low cost, time effective if compared with process to get new high-resolution satellite imagery or terrestrial surveys.

Distribution and Health Status of Seagrass Bed in Lamongan Coastal Area

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Abstract. Lamongan is one of the districts included in the Gerbangkertosusilo National Strategic Area, this will greatly affect government policy, so that the development carried out becomes egocentric. This condition is certainly not good for the balance of ecosystems, including seagrass beds in coastal areas which are known to have an ecological role and economic value, one of which is important as a store of carbon in the ocean. The important role of ecology and the high economic value of a seagrass beds are strongly influenced by its health status, so that the seagrass health status in Lamongan District is important to know. The purpose of this study are to 1. Know the distribution, extent and type of seagrass in the coastal village of Lamongan; 2. Knowing the seagrass covering and density in the coastal village of Lamongan; 3. Knowing the health status of seagrass in the coastal village of Lamongan. This research was conducted in July to August 2019, along the coast of Lamongan Regency. Stages of research conducted include: tracking to determine the distribution and extent of seagrass beds, quadratic transects to determine seagrass covering and density, and analysis of seagrass health status. Lamongan consists of two coastal districts, namely: Paciran (9 coastal villages) and Brondong (9 coastal villages). Of the 18 coastal villages there are three coastal villages that have seagrass beds, namely: Banjarwati (7.7 Ha), Kranji (12 Ha), Tunggul (3.8 Ha), with the same type of *Enhalus acoroides*.

Seagrass covering in the three villages were 96.67%, 75%, and 80%, while the density value were 216 stands/m², 116 stands/m², and 150 stands/m². Referring to the covering data above, it is known that the seagrass beds in research location were classified as healthy (> 60%).

Keywords: Seagrass, Distribution, Health Status, Lamongan

Modelling the potential habitat zone of albacore tuna (*Thunnus alalunga*) in the temperate Oceans using the satellite and longline fishery data

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Abstract. Albacore tuna (*Thunnus alalunga*) is one of the important commercial species of the longline fishery in the temperate Oceans. Satellite remote sensing (SRS) of the marine environment has become instrumental in ecology for environmental monitoring and impact assessment, and it is a promising tool for ecosystem-based fishery management issues. The SRS data and the Taiwanese longline catch data during the period of 2009 to 2016 were used to develop the habitat suitability of albacore tuna using the habitat models (e.g., GAM, MaxENT and empirical HSI models). The higher nominal CPUE of Albacore tuna was mainly distributed in the waters of 25 to 40°S and 25 to 40°N in the wintertime. The spatial habitat patterns were varied in different temperate oceans and explained predominantly by sea surface temperature in wintertime in the temperate oceans. The potential habitat formations were also possibly related to the sea surface salinity, chlorophyll concentration, sea surface height, and mixed layer depth. EKE is the influenced factor for habitat formation in the Pacific and Indian Ocean, but not for Atlantic Ocean. We discovered a significant positive relationship between the suitable habitat area and nominal CPUE of albacore in the temperate Oceans. Overall, both temperature (SST) and forage density play a major role in the stimulation of potential albacore habitats. Finally, SRS data, in conjunction with automated in situ e-logbook data-acquisition

systems, can provide the scientific community with a major source of information for ecosystem modelling, a key tool for implementing an EBFM.

Keywords : Albacore (*Thunnus alalunga*), GAM, maximum entropy model, Habitat suitability index.

Identifying Whale Shark (*R. typus*) Aggregates in Saleh Bay, Sumbawa, using Photo-ID

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Whale shark (*R. typus*) categorized as the biggest elasmobranchii fish which is included into IUCN Redlist species. Teluk Saleh in Sumbawa represents one of the most important habitat for *R. typus* in Indonesia. Preliminary studies on the characteristics of the whale shark population including the number of individuals, size, sighting-resighting, sex ratio and physical condition would be very useful for efforts to species protection and conservation area management. Data used in this research were obtained from a Conservation International program (started in September 2017), completed with field observation using Photo-ID method which was carried out in July to August 2018. Result shows the appearance of 49 whale shark individuals with average length size of 5 meters (juvenile), consist of 42 male and 7 female. The percentage of this size class indicates the role of Saleh Bay as whale shark nursery area. Percentage of resightings is only 49%, but it shows a consistent number each month. There are 43 individuals with scratch scars, most are resulted from accidentally hit by fishing nets or boats, considering that whale sharks like to swim around of fishing gear to catch the fish disposed of by fishermen. Saleh Bay is certainly a habitat for whale sharks. This finding is expected to be used as a consideration to draw up local regulation for whale shark

protection, as well as for the development of community based-whale shark ecotourism in Saleh Bay.

Keywords: *Rhincodon typus*, participatory monitoring, marine ecotourism, MPA

White band disease associated bacteria in the scleractinian corals of the Sempu Strait, South Java Sea, Indonesia

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Abstract. Reef-building corals are among the most diverse ecosystems on earth yet highly vulnerable to climate change impacts as well as coral diseases. The diseases affect the living tissues and lead to the devastation of the whole coral colonies. The purposes of this study were to estimate the prevalence of white band disease (WBD) as well as to isolate, molecular characterize, and sequence analysis the bacteria associated with WBD in the Sempu Strait, South Java Sea, Indonesia. The field sampling was performed by diving, while streak method was carried out in order to isolate and purify the bacteria. Result showed that the diseases affected more than 50% of the coral colonies. BLAST homology indicated that the bacteria associated with WBD were likely related to *Methylobacterium sp*, *Altererythrobacter sp*, and *Streptomyces sp*.

Keywords: White band diseases, bacteria, Sempu strait, coral diseases.

Potential impact of global warming on Pacific saury (*Cololabis saira*) habitat in the western North Pacific

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Abstract. Pacific saury (*Cololabis saira*) is one of the most important epi-pelagic fish and extensively dispersed in the subtropical and subarctic waters of the western North Pacific. Its spatio-temporal distribution is believed influenced by the changes of oceanographic conditions. In the present study, we evaluate the changes of the potential habitat Pacific saury under global warming. To understand the future condition, we used future SST projections from the IPCC-CMIP5 RCP4.5 scenario. The present-day distributions derived from habitat model predictions were used to analyse the future potential habitat of Pacific saury. The habitat models were developed using the Pacific saury presence data from the nighttime visible images (October - December, 2005 - 2013) and remotely-sensed environmental factors. The jackknife test results revealed SST as the highest contribution to Pacific saury distribution, illustrating the sensitivity of Pacific saury to temperature changes. In addition, this study showed considerable changes in the spatial and temporal potential habitat pattern under global warming, characterized by an

increasing degree of poleward displacement from present to 2100. The latitudinal displacements of the poleward shift increased by 0.5° - 1° per 25 years. The changes of its potential habitat under warming conditions may have consequent socio-economic implication for fishery management strategies in the future, especially for Pacific saury

Potential yield economic sustainability of skipjack tuna (*Katsuwonus pelamis*) in Prigi waters, Trenggalek, East Java, Indonesia

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Abstract. Skipjack tuna (*Katsuwonus pelamis*) is one of high potential fisheries resources in Prigi waters, Trenggalek East Java. The skipjack in this area is usually caught by purse seine, gillnet, troll line and seine net. Research purposes were to estimate value of maximum sustainable yield (MSY), total allowable catch (TAC), maximum economic yield (MEY), and open access (OA), and identify utilization rate and status of the skipjack. Data analysis consisted of conversion of fishing gear, surplus production model by Schaefer, Fox, and Gordon-Schaefer model. Fishing effort was determined based on troll line as standard fishing gear. Result showed that sustainable potential yield of skipjack tuna (*K. pelamis*) in MSY condition was around 2,032 ton/year and 7,378 trip/year with value of catch in TAC condition was 1,626 ton/year. While bio-economic analysis in MEY condition was 1,689 ton/year and 4,347 trip/year with total amount of profit earned was 10.67 billion Indonesian Dollar Rupiah (IDR). In addition, social economic analysis indicated that value of catch and effort in OA condition was around 1,967 ton/year and 8,693 trip/year. Another analysis informed that utilization rate of the stock was 60% so that the status of the stock was categorized as moderately exploited.

Keyword: Moderately exploited, Utilization rate, Maximum Sustainable Yield, Skipjack tuna, Troll Line.

The record of non-native Sailfin Molly *Poecilia petenensis* Günther, 1866 (Cyprinodontiformes, Poeciliidae) in Tunda Island, Indonesia

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Abstract. The entry of non-native fish had the potential as a predation and damaging food webs that would have a systemic impact on the aquatic ecosystem. This study discussed the first record of the Sail-fin molly *Poecilia petenensis*, exotic fish native to Central America at mangroves swamp in the Tunda Island, West Java, Indonesia. These record are among first of this species from a remote island in the Java Sea. A description of morphological characters of sampled specimens is provided.

The Role of Ease of Doing Business in Mediating the Relation Between Governanace and Foreign Trade

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Abstract-- The aim of the research is to explore the intermediating role ease of doing business plays in the relation of governance and international trade. The partial least square structural equation model (PLS-SEM) was used to test the hypotheses on a sample of 181 nations. The performance of nations in ease of doing business critically effects its global trade, but the governance of a nation has a significant indirect influence on its foreign trade. As a final point, the results indicated a full mediation, meaning governance indirectly effecting foreign trade and it is fully mediated by ease of doing business. The study will assist in developing governance and business regulatory atmosphere with the purpose of expediting foreign trade.

Keywords: Governance, Foreign trade, Mediation, World Governance Indicator, Ease of Doing Business Index, PLS-SEM

Developing of STEM Based Learning Models for Economic Education Student for facing Industry Revolution 4.0 in East Java.

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Abstract. The Government of Indonesia has established Making Indonesia 4.0 to deal with R.I 4.0. To realize this, education should also develop strategies for achieving quality education. Quality education can be realized by increasing the skills possessed by a teacher. In this case economic education includes students who will become teachers. To become a professional teacher requires special skills in RI 4.0 era. One of them is by doing more creative and innovative learning, namely by STEM. STEM is an acronym for science, technology, engineering and mathematics. This study aims to: 1) develop STEM-based learning models for students of economic education in East Java in the face of the R.I Era. 4.0; 2) determine the effectiveness of the implementation of STEM-based learning models for students of economic education in measuring teacher skills in the R.I era 4.0. The method consists of: 1) Potential and Problems; 2) Gathering information; 3) Product design; 4) Design validation; 5) Design improvements; 6) Product trials; 7) Product revision; 8) Trial usage; and 9) Product revisions. The results of this study are: 1) STEM-based

learning models can be implemented and in accordance with the characteristics of R.I 4.0 and 2) This model is effective in increasing the skills of students of economic education in the R.I 4.0 era.

Keywords: STEM, R.I 4.0, Economic Education, Professional Skill of teacher

Community Perception and Participation in Mangrove Ecotourism Development in Lembar Area West Lombok Regency

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Abstract. In 2015 the area was developed into a mangrove ecotourism area as a form of proper management to ensure the conservation and economic sustainability of local communities. Community perception and participation will determine the success of developing a mangrove ecosystem area for ecotourism activities. Community participation in management is not always high for each coastal region due to differences in community characteristics that can affect the level of community perception and participation. This study aims to determine and describe the community perception and participation in mangrove ecotourism development in the Lembar Village of West Lombok regency. The research method was carried out through a qualitative research approach with the technique of determining informants based on purposive sampling techniques. The results showed that the overall community perception and participation in mangrove ecotourism development in the Lembar area be categorized low was caused by the community characteristics who did not have good knowledge and understanding of the mangrove ecosystem and the benefits of its development. Low community perception has an impact on the low level of community participation. Community perception has a

significant relationship to the level of community participation with correlation values (r) and determinants (R^2) respectively 0.73 and 53%.

Keywords: Community, ecotourism, perception, participation

Predicting a terrorist attack in Indonesia: a spatial machine learning approach

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Abstract. Since 1977, Global Terrorism Databased record more than 750 terrorists attack happen in Indonesia. This issue is one of the national security threats that could give a significant problem for national stability. In several previous studies, the terrorism act shows a spatial pattern that related to the vulnerability of an area. This study develops and tested a new approach for predicting terrorist attack using spatial machine learning: Support Vector Machine (SVM) and Random Forest (RF) algorithm. The prediction model is built using past attack as predicted variable and several explanatory variables, namely the arrested area, domicile of the perpetrators of the attack, police/military facility, government facility, business center, densely populated area, and worship. The proposed knowledge can help policymaker to fight terrorism in Indonesia more effectively.

Keywords: Terrorism, Machine Learning, SVM, Random Forest, Indonesia (maximum 5 words)

Reveal of Household capabilities through Financial Literacy in Community Based

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Abstract. Technology developments have changed the way people think about financial knowledge, but there are still many people who have not adapted to financial developments that have occurred. The tourist area is a place that faces a very rapid financial change due to the diversity of tourists from outside the area, which contributes income and demands for financial needs. This is a good opportunity to be able to provide knowledge to Community-Based Tourism actors about the importance of financial literacy. The purpose of this study is to determine the extent of the condition of household financial literacy in community-based tourism which has continued to develop. Another thing that is also being studied knows the right way that households in the community-based tourism area are more empowered by increasing their financial literacy. In this research, the approach used is descriptive quantitative by conducting field studies to explore information from questionnaires given to respondents who are households in the community-based tourism area. Then conclude the calculation results with statistics to be able to draw conclusions. The findings of this study indicate that not many households in community-based tourism are well literate with a low level of financial knowledge, so they are still unable to optimize the income they receive. There is a scheme from the

government to help improve the welfare of the community in community-based tourism areas with financial assistance and financial knowledge. This research only conducts studies in certain areas in the area around Junrejo municipality, Batu, East Java. The location is an area that has community groups that mostly have livelihoods as provider of tourism services.

Keywords: Financial Literacy, Financial Knowledge Level, Community-based Tourism, Household

Participatory Policy Making Towards Competitive and Sustainable Diving Tourism in Bali

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Abstract. The sustainability of diving tourism in Bali now faces a serious threat along with the increasing trend of coral reef damage. Appropriate management is needed to lead to competitive and sustainable Bali diving tourism through planning that involves key stakeholders. The purpose of this paper is to find out the most influential key variables and the most appropriate policies towards competitive and sustainable Bali diving tourism based on participatory scenario planning. The methodological framework for participatory scenario planning integrates the focus group discussion method with the participatory analysis from LIPSOR model, specifically MICMAC and MULTIPOL modules. Structural analysis shows that the key variables that are most influential in efforts towards competitive and sustainable Bali diving tourism are law enforcement, zoning implementation, carrying capacity, effective conservation, destination management, and diving management. Meanwhile, the highest performance policy with respect to scenarios obtained from multi-criteria analysis is the application of carrying capacity. The results obtained from the application of the framework in this study shows the importance of a structured discussion process to optimize the crossing and exchange of knowledge among stakeholders.

Keywords: *diving tourism, stakeholders, scenario planning, carrying capacity.*

Mathematics Teachers Creativity in Designing Mathematics Assessment: Phenomenology of Creativity to Support Education for Sustainable Development

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Abstract. Based on experienced by mathematics teachers in designing mathematical assessments, the teacher is not confident to provide mathematical problems that can develop students creative thinking skills by designing creative mathematical problems. Therefore, teachers tend to design problems that are monotonous and not varied especially the problems that are applied in social, economic and environmental aspects. This study aims to analyze the creativity of mathematics teachers in designing mathematical assessments. This research was conducted in a qualitative type of phenomenology with 13 respondents, namely high school mathematics teachers. Based on the results of in-depth interviews and teacher design mathematics assessment documentation, the results showed that mathematical problems designed only followed mathematical problems in the mathematics textbook or were slightly modified. Problems are not focused on the context of application in social, economic and environmental aspects but are limited to problems that require an algorithmic solution. Information was also obtained that mathematics teachers had difficulty in designing mathematical test instruments in the form of descriptions, especially the description questions applied in daily life. This difficulty is caused by the teacher having difficulty in finding relevant ideas and difficulties connecting the material/mathematical concepts with their context in everyday life.

Keywords: Mathematics Assessment, Teachers Creativity, Education for Sustainable Development

Management of Coastal Resources in Mandalika in an Era of Disruptive Innovation Waves

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Abstract. The development of maritime tourism in Central Lombok is still dependent on Bali tourism. The natural beauty and socio-cultural values of the coastal communities in Mandalika, differs from Bali, and has the potential of being developed into an attractive centre for tourists. One of the disruptive innovations in coastal areas in Mandalika is the increase in online travel centres which provides cheap and easy traveling packages. However, this system only prioritizes economic aspects, and fails to take into account the ecological sustainability aspects. This research, therefore, aims to identify the types and meanings of maritime culture in the form of rituals and traditions of coastal communities which is developed to increase and estimate Mandalika's economy. Data collection was carried out using in-depth interviews and questionnaires, with the descriptive analysis of multiplier effects used for analysis. The results showed that the rituals and traditions such as the Bau Nyale tradition, Madak Mare, and the Ruwah Segara developed in Central Lombok are packaged into maritime culture-based tourism centre. This also requires the support of all stakeholders and the readiness of the local community. The type of business which grows in the presence of marine tourism includes hotel businesses, cafes, restaurants, and souvenir shops, while the direct, indirect, and continued economic impacts are estimated to be around IDR 8 M per year. This tends to have a multiplier effect on employment and economic growth in Central Lombok.

Keywords: economic impact, nature, culture, marine tourism, Mandalika

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Institutional Study Of Waste Issues And The Community Health Impact In Putri Cempo Surakarta Landfill

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Since the enactment of regional autonomy, Indonesia's economy has become more dynamic and growing, and has made it more ideal to manage economic development at the regional level. The real impact of economic growth is economic development, the most prominent indicators are population growth and increasing volume of waste. The city of Surakarta has a landfill in Mojosongo, called Putri Cempo landfill. This research aims to find out the impact of pollution generated by Putri Cempo landfill on the health status of residents who live near the landfill area, reviewing institutional arrangements, operational management techniques for waste management, financing, regulations, and community participation.

The method used is a regression analysis to assess the extent to which the condition of the waste management system in Putri Cempo landfill affects the health status of the Putri Cempo community. The data analyzed are primary data obtained from the questionnaire. The outcome is that leachate seepage has polluted the residents' groundwater, so that it cannot be used for residents' consumption activities. Waste management techniques are still not integrated effectively, and pollution from the Putri Cempo landfill affects the health of residents, such as typhoid, stomach ache, and shortness of breath suffered by local residents.

Keywords: institutional, Putri Cempo landfill, health status

Does Education Raise Productivity and Wages Equally?

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Abstract. This paper estimates the effects of education on productivity and wages in Indonesia to compare those other countries studied by Hellerstein *et al.* (1999a, 1999b), van Ours and Stoeldraijer (2011), and Kampelmann *et al.* (2018). The educational categories divided by the sixth level of education. This research applies the labor wage's data based on educational categories from the Central Bureau of Statistics of Indonesia. Results show that the effects of education raise productivity and wages vary across educational categories, job field categories, and gender. University graduates' male worker earns an average wage higher than university graduates' female worker. It supports the existence of a glass ceiling on female's career development from reaching top positions in Indonesia, Belgium, and Israel. However, the male worker is more dominant than the female worker in Indonesia than in Belgium and Israel. Which seems to be attributed to the culture and Muslim's way of the Indonesian itself supports that man should work and be a provider for the family, not the woman.

Keywords: Education, Productivity, Labour wage, Gender

A Model of Bajaw Economy

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Abstract. Bajaw, Ocean people emigrated mainly from Philippines, Indonesia, and Malaysia, and engaged in trade among those countries. Bajaw have been studied in Sociology or Cultural Anthropology(e.g., Stacy et al (2018)), but not in Economics, in spite of the importance of their economic activities such as trade, smuggling, migrations, poaching, etc., that seriously affect the surrounding countries. This paper presents a theoretical model of Bajaw in a general equilibrium framework of Economic Theory. The model consists of two countries and one ocean tribe, in which two country-specific goods exist. The ocean people are emigrated from the two countries, and engaged in trade between the two countries, through collecting transportation fee. The main results are as follows. First, The increase in population and output will cause the decrease in the output and the population of the other country. Second, the increase in the transportation fee will cause the decrease in the output and the population of each of the two countries as well as the decrease in everyone's welfare. These results seem to be contrary to conventional view of Economics, and to suggest the necessity of new policy implementations based on a new framework for analyzing such an economic region.

Keywords: Bajaw, Economics, migration, trade, Equilibrium

Surviving tsunamis: Tsunami Early Warning System (TEWS) based on local knowledge in Offshore Islands, West Coast of Sumatra

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Abstract. The December 2004 and March 2005 tsunamis killed more than 120 thousand people in Northern Sumatra. It should be noted that no one in Lahewa of North Nias and only 7 people in Simeulue Island were perished during the natural hazard, however, Simeulue Island and North Nias are known as nearest location from the 26 December 2004 and the 28 March 2005 earthquakes and tsunamis, respectively. The communities in the areas have knowledge based on their grandfather history on the natural hazard which tsunami is known as *smong* in Simeulue and *galoro* in North Nias. The similar history is also recorded from Mentawai Islands which they called *teteu*. The previous islands have also historical earthquake and tsunami. Their knowledge provided an extraordinary powerful mitigation tool that save human lives from the giant coastal hazard and the tool is very cheap compared than a high-tech tsunami early warning system.

Keywords: tsunami, mitigation, local wisdom, tsunami early warning system

Psychological Preparedness for Potential Disaster: A Descriptive Study

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Abstract. Indonesia is recognized as one of the countries that geographically located in a disasters prone area. It is been recorded that there were 11.274 disasters happen during 2015 until 2019 period. Psychological preparedness for disaster is one of the factors that could help people in coping with stress after disaster strike. Thus, identifying the psychological preparedness for potential disaster is necessary in order to reduce the impact of disasters. Therefore, this study aimed to identify the psychological preparedness for potential disaster. The study was conducted in Sidoarjo as one of the coastal region in East Java Province. Survey research was applied using a Psychological Preparedness for Potential Disaster scale as a mean to identify the psychological preparedness of the Sidoarjo people. The result shows that the psychological preparedness for potential disaster of the participants need to be improved.

Keywords: Psychological Preparedness for Potential Disaster, Descriptive Study, Natural Disaster, Indonesia.

Sidoarjo Mud Disaster Victim Happiness: A Study of The Impact of Prolonged Natural Disaster on Psychological Wellbeing

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Abstract. Disaster could bring a devastated impact for the affected societies. It has been acknowledge that disaster not only could give a economic destruction but also psychological destruction. Research shows that impacted societies could experience stress, anxiety, post traumatic disaster and other psychological related problem. One of prolonged disaster that happen in Indonesia is Lapindo mud disaster in Sidoarjo city. The disaster has affected all of the families that lived in the area and also the community that reside around or near the mud site. Research indicated that the impact of disaster could influence psychological wellbeing of the affected people. Research has confirmed that low level of psychological wellbeing could lead to mental illness. Thus, identifying the psychological wellbeing of the people that affected by the mud disaster is important to reduce the risk of the disaster. This is a quantitative study that employ descriptive statistic approach which aimed to investigate the impact of the mud disaster on the victim psychological wellbeing. It is found that

people psychological wellbeing were significantly impact by the mud disaster and therefore there is a need to improve the psychological wellbeing state of the affected population.

Keywords: Psychological Wellbeing, Lapindo mud disaster, Prolonged Disaster Impact, Descriptive Statistic, Indonesia

Increasing Stakeholder Engagement in Sustainable Natural Resources Management in Indonesia

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Abstract. Forest and land degradation in various areas of Indonesia require serious attention and action to prevent further damage. Forest and land fires, especially on peatlands, also need appropriate ways to solve the problem. The involvement of all related parties is needed so that natural resource management can be carried out sustainably. This study aims to describe steps to engage stakeholders in managing natural resources sustainably and explore factors influencing their involvement. Field surveys and interviews to the stakeholders were implemented to collect data and information related to the objective of the research. The data obtained were analyzed by using descriptive qualitative method. The results proved that providing clear information to the stakeholders about the goals to be achieved in natural resource management activities is the first step that must be carried out. A detailed description of what stakeholders can do to participate is the next step. The third step is to convince stakeholders that they can participate easily and their role is very important in managing this natural resource. Updating information about what has been done, how the results are, and what things are still needed to do to reach the goal is the final step that must be completed. Stakeholders will actively participate in natural resource management activities if they know clearly the objectives to be achieved, one of these objectives must be related directly or indirectly to the interests

of these stakeholders and providing benefits both material and or non-material to them.

Key words: Stakeholder engagement, sustainable, natural resources management

Relationship between Gratitude and Psychological Well-being around Lapindo mudflow resident

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Abstract. The Lapindo Mud is a natural disaster occurred 13 years ago and still erupts today. Of course this disaster affects the people who live around it. The people who are the victims of the mud disaster is still survive. Therefore, it is important to understand how this people could survive in this disaster situation. Thus, the purpose of this quantitative, correlational study is to investigate the relationship between gratitude and psychological well-being for the resident around Lapindo mudflow. This research used quantitative method with survey. The scale used was GRAT - Short Form developed by Watkins to measured the level of gratitude and Javanese Psychological Well-being Scale developed by Palupi to measured psychological well-being. The result showed that there is relationship between gratitude and psychological well-being in the population/resident around Lapindo mudflow.

Keywords: Gratitude, Psychological Well-being, Lapindo mud, disaster

Green Campus Implementation Based On 4 (Four) Main Pillar Developments: Green Rose, Green Attitude, Green Lifestyle, and Green Infrastructure In Sebelas Maret University

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Abstract. The recent Green Campus program is increasingly being promoted in Indonesia, one of which is at Sebelas Maret University. Green campus is carried out to create a UNS campus that is comfortable, safe, energy efficient and environmentally friendly. This study aims to determine the application of the green campus and determine the behavior of the academic community at UNS towards the program. As an environmentally friendly campus, UNS continues to improve and care for a clean, green and friendly environment. The research method is descriptive qualitative. As a result, the UNS green campus program is a program aimed at every faculty, both students, lecturers, and employees. The results of this study are based on four (4) main pillars of the development of Green Rose, Green Attitude, Green Lifestyle, and Green Infrastructure. With this program, changes in attitudes, mindsets, concepts, and thoughts about the green campus will be very useful in the future for balanced human survival with supportive nature. The implementation of eco-campus has a good impact on students. Because students begin to build new habits.

Keywords: green campus, environment, academic civitas, lifestyle, infrastructure

Analysis Of Entrepreneurship Based On Local Authority To Increase Marketing Performance In Keben Craftsmens In Banjar Tanggahan Peken Village Sulahan Sub-District Of Susut Bangli District

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The application of entrepreneurial orientation is important for economic actors. The intense competition requires businesses to innovate continuously. The innovations made, of course, do not forget the values of local wisdom found in the local community. This condition led the keben craftsmen in the Banjar Tanggahan Peken to implement an entrepreneurial orientation based on local wisdom. Studies on local wisdom are mostly associated with positive values, habits and traditions of a society from a social, cultural and environmental perspective. Keben as one of the tools for Hindu offerings to God Almighty is also commonly used at other traditional events, so keben has a meaning that is closely related to the implementation of ceremonies and customs. Innovation in the making and design of keben is very necessary considering that the craft of keben is the mainstay of the people's economy in the Banjar Tanggahan Peken which is the majority of the people's livelihoods there. Every form of keben and style that decorates it is taken from the values of the local wisdom of the local community. This study aims to analyze the entrepreneurship orientation based on local wisdom as an effort to improve the marketing performance of keben craftsmen in Banjar Tanggahan Peken. This study uses a qualitative method using interview research instruments, observation and documentation studies. The results of data analysis in this study used descriptive qualitative. The results of

the study explained that 1) the development of keben handicraft business in the Banjar Tanggahan Peken experienced ups and downs, from the number of craftsmen having decreased, but from the number of collectors experiencing an increase. 2) The application of entrepreneurship orientation based on local wisdom can improve the marketing performance of keben craft business, this requires the craftsmen to always innovate, be proactive and be brave to take risks.

Keywords: Entrepreneurship Orientation Local Wisdom Value Marketing Performance Keben Craftsmen

Analysis Of Consumer Behavior Factors On Visiting Interest Labu Pade Beach, Utan - Sumbawa-West Nusa Tenggara

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Currently, tourism is much in demand by people, both local and non-local, namely tourism that leads to nature such as marine tourism. Tourism development, like the development of other businesses, requires demands to consider potential market tastes. Consumer satisfaction or dissatisfaction with tourist objects influences the interest of visiting tourists as consumers. Then the manager must know consumer behavior. To attract visiting interest, it is necessary to do good management of tourism objects and analyze visitor behavior in decision making and meet visitor needs so that they can influence the decision to visit. The purpose of this study is to find out and analyze the characteristics of visitors, the factors that influence consumer behavior towards a simultan and partial interest in visiting. The research method uses quantitative methods. The determination of the sample is incidental sampling with a sample of 45 respondents. The analysis uses multiple linear regression analysis using the SPSS 16.0 for Windows application tool. The results of the study and discussion showed that cultural factors (X_1), social factors (X_2), personal factors (X_3), and psychological factors (X_4) simultan influenced the interest in visiting (Y) at Labu Pade Beach. On cultural factors (X_1) and social factors (X_2) have no significant effect partially on visiting interest (Y) while personal factors (X_3)

and psychological factors (X_4) partially influence the visiting interest (Y) in Labu Pade Beach Tourism and the dominant variable is a psychological factor (X_4).

Keywords: consumer behavior, eco-tourism, beach

Social Mapping of Conflict in the Management and Ownership of Production Forest in Dharmasraya District, West Sumatra

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Abstract. In the last two decades the rate of deforestation in the Kesatuan Pengelolaan Hutan Produksi (Production Forest Management Unit of Dharmasraya/PFMU Dharmasraya) is very high. Forest cover has been reduced from 90 percent to 15 percent between 2000 and 2018 in the area of 33,000 ha. This study aims to identify the causes of deforestation and map those who play a role in deforestation in the PFMU Dharmasraya region. The research was conducted in the PFMU Dharmasraya, West Sumatra from January 2015 to August 2017. This research used a qualitative research approach with multiple cases method. Data collection techniques were used includes in-depth interview, field observation, documentation, and secondary data analysis. Informants were identified using snowball sampling. Data analyzed with qualitative methods. The study found that deforestation begun since the concession was given to PT. Ragusa with the area of 66,000 ha in 1972, industrial forest concession (HTI) PT. Inhutani of 40,000 ha in 2002, and forest

conversion through large scale plantation which started in 1986 covering 19,966 ha. After the end of timber concession in 2002, there was a vacuum condition of forest management by HTI license holders. The vacuum of forest management leads to deforestation initiated by local communities. Deforestation is caused by forest clearing into plantations by local communities who claims the forests as customary community land. Deforestation is supported by the process of buying and selling of communal land by local people to other parties. Generally, there are four actors who have a role in deforestation, including local people, non-local, government and private actors. They are classified as ulayat land sellers, buyers, and supporters. The four actors have created a social network of deforestation and using the customary structures to gain the recognition of forests ownership.

Keywords: communal land, deforestation, ownership, and parties

Business Feasibility Study Of Milkfish (*Chanos chanos*) Processed Products On Ukm Anugerah Mina Lestari Malang, East Java

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Abstract. Milkfish is one of the aquaculture products consumption materials for the society. UKM Anugerah Mina Lestari one of the bussines in processing fishbone and smoked milkfish since 2015. The purpose of this research to analyze whether this business is feasible to be developed. The sampling technique uses purposive sampling. Data analysis methods is descriptive quantitative of technical aspect, management aspect, marketing aspect and financial aspects . The results of this study indicate that the technical aspects and the management aspect used are still simple, the marketing aspects have used social media, the financial aspects of the UKM Anugerah Mina Lestari result is profitable and feasible that shows from R/C ratio value is 1,25 and RTC value is 22% (short term) and NPV value is Rp. 47.540.129, Net B/C ratio value is 1,5 IRR value is 24% (long term)

Keywords: feasibility study, milkfish, fisheries processed product

Natural Rubber Price Decline, and Forest Clearing Up for Oil Palm Plantation: A Case Study in Dharmasraya District, West Sumatra, Indonesia

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Abstract. Indonesia is a world largest producer of natural rubber and palm oil. Eighty five percent of the 3,062,931 ha of rubber plantations in Indonesia is smallholder plantations, and 41.54% of the 10,956,231 ha of oil palm plantations is smallholder plantation. In the last five years, natural rubber prices decline significantly. Natural rubber prices at farm level 2011 was around IDR 20.000 per kg, but currently only IDR 5.000 per kg. Declining in rubber price have led to a decrease in the farmers' income since they rely on rubber for livelihood. In Dharmasraya Regency, West Sumatera, the fall in the price of natural rubber caused farmers to cut down rubber trees and replace it with palm oil. Oil palm plantation choosen because its price of FFB is more stable than those of natural rubbers'. In addition, due to sharp decline in natural rubber price, many local people cleared forests in PFMU (Production Forest Management Unit) Dharmasraya to grow oil palm. Although rubber prices low, many farmers still crop the rubber trees as anticipate in the future if rubber prices rise again. As a result of the forest encroachment into FMU Dharmasraya caused forest cover to decline as low as 18.89% of the total forest area of 33.550 ha

Keywords: rubber price decline, oil palm plantation, cut down, and forest encroachment

The Economic Role of Cassava in Farmers' Households in Central Lampung Regency, Lampung Province

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Abstract. This study aims to analyze the economic role of cassava in farm households in Central Lampung Regency in the span of 1998 to 2018. The research was conducted in Terusan Nunyai Sub District, Central Lampung Regency, Lampung Province. The study was conducted in July to September 2019. The number of respondents are 78 households. Data collection using surveys and in-depth interviews. Data were analyzed descriptively qualitatively using tabulation method. The results of the study provide information that there has been a decline in the economic role of cassava in farm households in Central Lampung District from 86 percent to 43.39 percent (range 1998-2018). There has been an increase in the share of on-farm income outside cassava (sugar cane, chicken, goats, and cattle) and the share of off-farm income (farm laborers) and non-farm income (employees, drivers, coolies and traders) in line with the growth of the sugar processing industry since Past 10 years. In 1998, the economic role of cassava on household income was 86 percent, non-cassava income was 3 percent, off-farm income was 7 percent,

and non-farm income was 4 percent. In 2018, there was a change in the role of cassava on the household economy of farmers in Central Lampung Regency. At present the contribution of income from cassava farming is 43.39 percent, non-cassava income is 39, 13 percent, off-farm income as farmer income is 8.52 percent, and non-farm income is 8.96 percent. The shift of the primary sector to the secondary and tertiary sectors occurred because in Terusan Nunyai Sub-district, Central Lampung District, sugar cane factories and pineapple factories had been established, so farmers preferred to become farm laborers, employees, drivers, coolies and traders to increase their incomes. The income and productivity of the agricultural sector causes farmers to switch to the non-agricultural sector.

Keywords: cassava, income, farming, farm households

Fishermen's Household Food Security Against Climate Change in The Lampung Coast Area

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Abstract. One of the effects of global climate change is shifting the beginning of the rainy season, which has a huge impact on farmers and fishermen. Food security is an issue that is very closely related to the phenomenon of climate change. One of the impacts is the disruption of community food that promotes decreasing food security. The Tanggamus Regency is a coastal area of Lampung which is affected by climate change, so in this study, we want to analyze the resilience of fisherman households to climate change. Survey method was used in this research. Qualitative data was also collected through in-depth interviews, Focus Group Discussions (FGD) and observations on field conditions. The impact of climate change on household food security of fishermen who depend on sea product was caught. Improving the processing system, marketing system, efforts to strengthen local wisdom are needed to support aquaculture activities. In the context of developing diversified livelihood activities relying on capture fisheries, the development of diversification of postharvest activities has more added value for fishery products, and the role of women is very important to support this type of business diversification. Improvement in management will increase the resilience of fisherman households to climate change.

Keywords: Climate change, coastal area, fishermen's household, and food security

Analysis of Country's Competitiveness Factors Based on Inter-State Rating Comparisons

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Abstract. Within the framework of the research was conducted an analysis of the modern level and problems of development of competitiveness, taking into account various aspects and system of advantages. In the article it was proved that despite the wide elucidation of the conceptual apparatus, methodological bases and ways of ensuring the competitive advantages of the respective objects of research, single, generalized point of view on this subject today doesn't exist. It was done the analysis of the factors that ensure the country's competitiveness on the basis of interstate rating comparisons, which made it possible to organize the factors according to the degree of influence by the Pareto's method and to determine priority directions of state development.

The Socio-Economic Impacts of Gillnet and Longline Fisheries on Cetaceans in the Savu Sea

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Abstract. Recommendations of cetaceans to maximize the protection of cetaceans in the Savu Sea through a ban on the use of gillnet and longline fishing gear that operate in cetacean protection zones in the Savu Sea National Marine Park because both of them have a high history of by-catch. Data from the Marine and Fisheries Agency shows that around 19.73% and 4.95% of fishermen in the Savu Sea National Marine Park use gillnet and longline fishing gears, respectively. Therefore, this study was conducted to assess the social and economic impacts of gillnet and longline fisheries on cetaceans. This study uses a participatory mapping method in 10 locations within the Savu Sea National Marine Park. Fishermen are grouped into 13 groups based on the type of fishing gear and their fishing area, the number of respondents in this study were 453 people from 10 locations. The data were analyzed using SPSS 17. The results of the Analysis of Variant showed that the acquisition of 13 different groups of fishermen was significantly different, meaning that each use of fishing gear and the area of operation affected the fishing income. Based on the Least Significant Difference (LSD) test shows that the mean difference is significant at the 0.05 level, which means that the difference in income between groups of fishermen is

significantly different at the level of 0.05 or the confidence level of 95%. The difference can be positive (+0.33895) and negative (-0.33395). This means that if the policy is to limit the use of gillnets and longlines as well as the area of operations it will have an impact on fishing income. The analysis of the difference results between the groups of fishermen who catch fish in and outside of the cetacean protection zones are significantly meaning the restrictions on the use of fishing gear will have an impact on the decrease in the income of the group of fishermen. To maximize protection against cetaceans, it is recommended to limit the use of gillnet and longline fishing gears that operate in cetacean protection zones in the Savu Sea National Marine Park and require closer monitoring of the existence of fishermen during operations using any techniques and methods.

Keywords: Socio-Economic, Gillnet, Longline, Cetacean, Savu Sea.

The Comparative Advantage Dynamics of Fisheries Commodities between Indonesia and Japan

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Abstract. Indonesia and Japan are endowed with rich marine biodiversity as well as a fast-growing economy. This makes those countries prioritise for both conservation and sustainable development. This research examines the dynamics of fisheries commodities in Indonesia and Japan during the last decade. The purpose of this study is to understand the dynamics of comparative advantage for fisheries commodities in both Indonesia and Japan. This study utilizes data on export four-digit in the Harmonized System (HS) and Standard International Trade Classification (SITC) based on UN-COMTRADE and International Trade Center (INTRACEN) database from 2007-2018. In calculating the country competitiveness, this study use Balassa Revealed Comparative Advantage (BRCA) combined with Trade Balance Index (TBI) for analysis. The primary finding shows that dynamic shifting for particular fisheries product have occurred both in Indonesia and in Japan. To improve sustainable marine resource, stakeholder should promote the use of market and supply chains incentives. Creating better policy

climate for effective fisheries management and marine conservation will be essential future agenda for Indonesia.

Keywords: comparative advantage, fisheries commodities, international trade, marine conservation

Preliminary Assessment for Coastal Climate Adaptation and Resilience in Kepetingan Hamlet, Sawohan Village, Sidoarjo District

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Abstract. The climate change has been occurring in every part of the world for the last two decade, including Indonesia. This phenomenon poses a key threat to marine ecosystems and fisheries resources as well as to communities that depend on these systems for food and livelihood. Nowadays, adaptation to climate change is one of the greatest challenges for coastal communities. The east coast of Sidoarjo district has one of the widest mudflat areas in East Java, with high sedimentation rate which is originated from Brantas Watershed. This area, specifically in Kepetingan Hamlet, Sawohan Village, is heavily impacted by tidal flood twice a year and this is the most vulnerable place in Sidoarjo coastal area. In terms of a climate change adaptation measures, it is important to assess the resiliency of these communities. This paper discusses on recent condition of Kepetingan Hamlet and present a community-based adaptation needed. We conducted this research by undergoing field observation including interviews with related stakeholders. Therefore, through the socio-economic resilience approach to dealing with the impacts of climate change, ecotourism development can provide

economic strengthening as an alternative source of decent livelihood for Kepetingan Hamlet.

Keywords: Climate Change, Adaptation and Resilience, Community-based, Livelihood, Kepetingan

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08.2**

Validation of High-Resolution and Simple River Survey Technique Using UAV-SfM Method

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Abstract. This study tested the accuracy and precision of the UAV-SfM method, an automated photogrammetry technique called SfM (Structure from Motion) using multiple pictures taken by UAV (Unmanned Air Vehicle), in a section of Saba river, Yamaguchi, Japan. The method was applied in the submerged area as well as in the exposed area, taking into account the refraction at the water surface, for the first time in domestic rivers. When the resultant DEM (Digital Elevation Model) is considered as the map of riverbed elevation, the RMS error and R^2 of UAV-SfM were 0.165 m and 0.93, respectively. In pixels with thick algal cover, large apparent overestimations reaching 0.351 m at maximum were observed because UAV-SfM actually measures the algae surface elevation, not the riverbed elevation. Error analyses also

showed that the refraction correction method adopted in this study is working well in spite of its simplicity.

Keywords: underwater photogrammetry, fluvial topography, Digital Surface Model, drone

Analyzing Pre- and Post-Earthquake Changes using Optical and SAR Satellite Images

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Abstract. On 28 September 2018, a [magnitude](#) of 7.5, shallow [earthquake](#) struck in the [Central Sulawesi](#), Indonesia, located 77km away from the provincial capital [Palu](#). A localized tsunami hit Palu after the mainshock, this worldwide deadliest earthquake in 2018 led to the deaths of an estimated 4,340 people. The impact area surrounding the Palu region had been measured using pre- and post-disaster satellite images in this paper, including SAR images of Sentinel 1A taken on July 7 and Oct. 5, and optical images of Sentinel 2 taken on Sep. 27 and Oct. 2, 2018. The results for three test regions show that the changed area approached to 171.83, 126.8, and 26.6 ha, respectively. The phenomenon of soil liquefaction caused by the earthquake can be estimate clearly by the multi-temporal polarimetric synthetic aperture radar images.

Keywords: Optical, Polarimetric, Synthetic Aperture Radar, Geohazard

Precipitable water vapour estimation using the permanent single GPS station in Makasar and Bitung, Indonesia

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Abstract. Meteorological investigations using the global positioning system (GPS) are based on expensive permanent networks and they are not developed globally on the Earth. In this study it is confirmed that single station GPS meteorology is feasible where there is no possibility for development of a sophisticated dense GPS network. Since 2009 a GPS station has been installed by Geospatial Information Agency Indonesia in Makasar and Bitung, Indonesia, where upperair meteorological data are available. The GPS data were processed in order to estimate the zenith total delay (ZTD) of GPS signals due to the troposphere. The estimated ZTD was then transformed to precipitable water vapour (PWV) using goGPS software. Two kinds of validation were applied to the estimated PWV and all of them reasonably proved the validity of the GPS results: (1) the PWV measured using radiosondes in Makasar and Bitung with nearly the same climatic regime show 96.5 and 83.0% correlation respectively with the GPS PWV time series, and (2) the global reanalysis datasets show 60.1 and 75.3% correlation respectively with the GPS results. These validations indicate that, in the absence of permanent GPS networks, if proper data processing strategies are adopted the low cost single station GPS meteorology can be considered as a possibility for meteorological monitoring.

Keywords: single station GPS meteorology; precipitable water vapour; radiosonde

Impact of Radar Data Assimilation on the Accuracy of Heavy Rain Events Prediction in Bangka Island (Case Study: Flood 8-9 February 2016)

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Abstract. Numerical weather prediction (NWP) is a prediction method that now become the world standard weather predictions. However, the use of NWP does not necessarily increase the accuracy of predictions. Data Assimilation using radar is one of improvements effort to initial condition considered to be able improve the accuracy of weather prediction. The purpose of this study is to determine the impact of radar data assimilation on Weather Research Forecasting (WRF) model in predicting the phenomenon of heavy rain on Bangka Island. In this study we employ the numerical model WRF to perform experiment model without assimilation and with radar data assimilation using WRFDA (WRF data assimilation) model with 3DVar systems. The model outputs consist of refelektivty and rainfall distribution value are verified with qualitative observational data. Quantitative verification is also done by testing the skill and accuracy of the model against observations. The results obtained show that WRF with radar data assimilation provides better spatial and points simulation results and improved prediction results compared to WRF without assimilation.

Keyword : NWP, Data Assimilation, WRF, WRFDA, Radar

Estimation of Rice Yield Based on Satellite Images and Field Observation

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Abstract. Rice is one of the important agricultural crops in Asia and the primary food source for more than three billion people. It is one of the most important primary staple foods in the world and thus estimation of rice yield before harvest time is important to supporting national food security and development evaluation. Remote sensing is one of a powerful technique that can be used to obtain rice production information. The objectives of this study are to develop a model for estimation of rice yield based on spectral information from satellite images and to create a distribution map of estimated rice yield based on the model. In this study, multiple linear regression analysis was performed using the several spectral information such as visible bands and near infrared band, and Normalized Difference Vegetation Index (NDVI) extracted from Sentinel-2 images. The formula was verified by 10-fold cross validation, and the predictive errors of this regression equation was derived from the estimated yield and the observed rice yields.

Keywords: Rice yield, Estimation, Remote sensing

Beach litter distribution density mapping using Unmanned Aerial Vehicle (UAV) on Parangtritis beach, Yogyakarta

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Litter is a common problem on various beaches, some activities that occur on the beach such as fisheries, peddle and tourism are the main sources of waste deposits on the beach. The number of negative impacts caused by the presence of waste makes this problem must be addressed quickly and appropriately. Monitoring activities with the aim of knowing the extent area and distribution of litter that is on the beach allows us to take the right steps in overcoming the problem. This activity can be done through a remote sensing approach by utilizing an Unmanned Aerial Vehicle (UAV) combined with the GIS method. Some advantages of Unmanned Aerial Vehicles (UAV) are that it provides real time as well as high resolution data at a low cost. These advantages are very benefical in monitoring activities that usually be done regularly. This study was conducted at Parangtritis beach which is a beach with tourism as its main activity. Parangtritis beach visitors are increasing over the year with total 2,771,766 visitors in 2017. The high number of visitors on the beach has the potential to influence the extent area and distribution of existing beach litter.

Keywords: Beach litter, UAV, Remote sensing, Monitor, Parangtritis

Spatio-Temporal Analysis Waveform Retracking of Altimetry Satellite Data in Halmahera

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Abstract. The accuracy of estimated sea surface height (SSH) from altimeter satellites is strongly influenced by waters condition. Generally, SSH estimation in offshore are accurate. However, in coastal, shallow, and small island waters, SSH estimation are inaccurate due to the reflection of signal interfered by land and need to be reprocessed with the other algorithms (retracking). The purposes of the study was to find the dominant retracking algorithm spatially and temporally in the Halmahera Sea. The data used for this study were SGDR-D of Jason-2 and Jason-3 satellite altimetry from 2016 until 2018. To retrack waveform, we used several algorithms such as OCOG, Iced, Threshold, and Improved Threshold. The best retracker used in Halmahera Sea for the shallow and narrow bay was Threshold 10%, for the deep and wide bay was Threshold 50%, and for small islands waters were Threshold 10% and Threshold 20%. The dominant algorithm in Halmahera Sea is the Threshold 10% both spatially and temporally with percentage of occurrence of 33% for two years. However, the smallest RMS for tide gauge data is the Improved Threshold 50% with value of 0.395649.

Keywords: waveform, retracking, Jason-2, Jason-3, altimetry

Surabaya Strategy to Answer Air Pollutant Improvement

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Surabaya as metropolitan city and 2nd biggest city in Indonesia has a challenge especially in air pollutant. Increasing population, mass transportation, industry and regional economic give bad result in air pollutant. Increasing population from 2014 to 2017 goes up until 7.75%. Increasing the population can also increase the level of air pollution. Problems in this research is to present of result and analysis of Kota Surabaya in management of green open space to achieve air pollutant control. Focus of this research not only on biology and environment reviewed aspect but also interface with present main economic, population and climate in Surabaya. This research was conducted using qualitative research methods from observation and official documents of related instance. This research concludes that green open space management with data comparison 2014 and 2017 that are managed by Dinas Kebersihan dan Pertamanan (Park and Sanitary Office) Kota Surabaya has good strategy in plant selection to increase the quality of air. Although area of green open space had minor reduction and increase population as well as economic sector. In 2017, Surabaya can archive 90.26 value of air pollution index or increase 6.83% from 2014. This condition present the quality of green open space can be reached beyond plant selection.

Keywords: Surabaya, Air, Pollutant, Index, Green

Microplastics Types and Its Abundance Distribution in Kali Surabaya in Wonokromo, Dukuh Pakis, Wiyung, Karangpilang, and Lakarsantri

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This research aimed is to determine types, to quantify the abundance, and to know microplastics distribution in Wonokromo, Dukuh Pakis, Wiyung, Karangpilang, and Lakarsantri District segment. The samples were taken using plankton net in 12 km which were divided into four sampling areas. The samples were filtered using 5 mesh, 40 mesh, and 200 mesh multilevel filters. Then extracted using Catalytic Wet Peroxidation Oxidation (CWPO), 0,05 M FeSO₄ dan H₂O₂ 30% to degrade the organic matters. Microplastics identification and types separation was carried out with optical microscopy method using Olympus SZ2-ILST stereo microscope, Dino-Eye (Microscope Eye-Piece Camera), and DinoCapture 2.0 software with a 40x magnification. Microplastics density were measured by density gradient solutions, combination of ethanol 96%, aquadest, and ZnCl₂ which have 0,8-1,8 g/cm³ density range. The results showed that microplastics were found in Kali Surabaya in fragments, films, pellets, granules, filaments, and foams types. The abundance of each types, namely fragments 20.345.556 particles/km², films 1.024.444 particles/km², pellets 64.444 particles/km², granules 1.492.222 particles/km², filaments 408.889 particles/km², and foams 5.371.111 particles/km² which were distributed in four sampling areas. The density of

each microplastics types, namely fragments 0,8-1,0 g/cm³, films 0,8-0,9 g/cm³, pellets 0,8-0,9 g/cm³, and foams <0,8 g/cm³.

Keywords: Abundance, Density, Distribution, Kali Surabaya, Microplastics

***In Vivo* Immunomodulatory Activity Of Faloak Bark Extract (*Sterculia quadrifida* R.Br)**

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ABSTRACT

Background: Faloak (*Sterculia quadrifida* R.Br.) is widely used as traditional medicine in Indonesia to improve stamina (reduce tiredness for heavy workers). However, no scientific reports so far on the immunomodulatory effect. **Objective:** Determine the effect of the bark of faloak as immunomodulatory agents by evaluating their effect on BALB/c mice lymphocytes proliferation, the activity of macrophage, nitric oxide production, and the immunoglobulin G titer by *in vivo* techniques. **Materials and Methods:** Decoction of the faloak bark was used for the *in vivo* assay. BALB/c mice were divided into five dose groups, each consisting of 5 mice. One group was chosen as the base-line, three groups were used for the group treated with the test substance at doses of 7,5; 11,75 and 17,5 g/Kg of body weight of mice (p.o), and a positive control group was treated with *Phyllanthus niruri* Linn. (PN) extract (Stimuno®) 0,585 g / Kg

BW (p.o). The test samples were given every day. All mice were induced by hepatitis B vaccine at day 7 and 14. The activity of *in vivo* assay was determined at day 19. The activity of immunomodulatory effect is expressed in phagocytic capacity, phagocytosis index, nitric oxide, OD of lymphocyte proliferation and IgG titers. **Results:** The macrophage phagocytic capacity and phagocytosis index were significantly increased ($p < 0.05$), nitric oxide production were altered significantly ($p < 0.05$), but OD of lymphocyte proliferation and production of IgG titers were unchanged ($p > 0.05$). **Conclusion:** This study showed that the Faloak bark could increase the macrophages phagocytic activity, but no effect on lymphocyte cells and therefore did not influence the adaptive immune response.

Keywords: Faloak bark, immunomodulatory, *in vivo* study

Optimization of Gold Nanoparticles (aunps) as Platform to Imobilization with Probe Molecular Beacon (MB) for DNA Detection Applications with Colorimetric Method

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Abstract. Gold nanoparticles are platforms that can be immobilized with probe, so they can be used as biosensors. In health sector, biosensors are used for biomedical applications, such as for DNA marking and cell isolation. In addition, it can be used as a method for Halal Authentication applications for meat products. This study aims to determine the optimum conditions for the synthesis of gold nanoparticles as platform for immobilization and application of AuNPs-MB as biosensors with the colorimetry method for Halal Authentication applications for meat product. This research was optimize gold nanoparticles using 6 series of HAuCl₄ concentration, there are 0.0635; 0.127; 0.19; 0.254; 0.635; dan 1.27 (mM). The most optimum concentration, then immobilized with probe MB and measured using Uv-Vis Spectrophotometer to see the absorption and using Scanning Electron Microscope (SEM) to see the size and distribution of nanoparticles. The results showed that 0.19 mM of AuNPs, gave the best results, which was stable for 3.5 months, has good results by measured using SEM with an average size of 21.7 nm. The value absorbance before to after immobilization was decreased, from 0.226 to 0.167 and indicate that the proses is success. The conclusion of this study is AuNPs-MB is proven to be a biosensor for Halal Authentication applications using colorimetric method.

Keywords: Gold Nanoparticles, Molecular Beacon, Biosensor, Immobilization, Colorimetry

Cytotoxic Effect of Bandotan (*Ageratum conyzoides* L.) Chloroform Fraction and 5-Fluorouracil as Co-Chemotherapeutic Agent on HeLa Cervical Cancer Cell Line by *In Vitro* and *In Silico* Assay

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Abstract. Cervical cancer is the biggest Indonesian female cancer with 91.692 cases in 2013. On the other side, cancer therapy induced many side effects for patient during the treatment. Further, its need to increase cancer drug efficacy or minimize side effect by developed as co-chemotherapy agent from nature. One of them is bandotan (*Ageratum conyzoides* L) that containing flavonoid group such as nobiletin is estimated could inhibit cancer cell proliferation and viability. The aim of this study is to determine co-chemotherapy activity of chloroform fraction of *Ageratum conyzoides* L. (CF) and its combination with 5-Fluorouracil (CF-FU) based *in vitro* and *in silico* assay. Ethanolic extract of bandotan were fractionated with chloroform. Thin Layer Chromatography (TLC) used to identified active compound qualitatively and *in vitro* study with MTT Assay method to find out the viability of HeLa cell line after treatment. *Molecular docking* with Autodock Vina for *in silico* study to visualized molecular interaction and affinity between nobiletin and 5-fluorouracil with Bcl-XL (an anti-apoptotic protein receptor). The result of TLC for CF had Rf value 0,75, it has the similar value with quersetin standard and indicated that CF contained flavonoid compound. The molecular docking had ΔG for nobiletin and 5-FU are -8,0 and -4,7 kcal/mol, respectively. This result showed that affinity and interaction of nobiletin with Bcl-XL protein higher than 5-FU.

From single cytotoxic assay the IC_{50} value of chloroform fraction of bandotan was 30 $\mu\text{g/ml}$ and 5-FU was 45 $\mu\text{g/ml}$. From combination assay of CF and 5-FU showed CI value was 0.36, it means it had synergistic effects. Based on the result, CF have good effect to inhibit HeLa cancer cell line and potential to develop as co-chemotherapy agent with 5-FU.

Keywords : *Ageratum conyzoides* L., nobiletin, Bcl-XL protein, *molecular docking*, cytotoxic assay

Piperine of *Piper nigrum* Linn. Antagonized Acetyl choline uscarinic 3 Receptor: In vitro and In silico Study on Isolated *Cavia porcellus* Trachea.

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Abstract. Piperine is an alkaloid compound which can be found in blackpepper (*Piper nigrum* Linn.). Previous studies and empiric use reported that piperine has pharmacological effect on bronchospasm medication. Apart from Histamine 1 receptor (H₁), acetyl choline muscarinic 3 receptor (AChM₃) also involved in the mechanism of bronchoconstriction. The aim of this study was to determine antagonism property of piperine on the isolated *cavia porcellus* trachea. The method used was in vitro (isolated organ bath) and in silico (molecular docking). During in vitro study the contraction of trachea was induced by Acetyl- β -Methylcholine in a serial concentration. In the in vitro study, piperine at the concentration of 10 μ M could shift contraction curve to the right, as the result of bronchodilatation effect. furthermore, the contraction can not return normally to the 100 % of E_{max}. In the reversibility study, the trachea was rinsed every 30 minutes and the E_{max} of contraction still stood at 68,49% (the characteristic of noncompetitive). pD₂ score of control group was 5,50, while piperine 10 μ M group was 4,67. This pD₂ shift was statistically different. From the in silico test (Autodock), piperine shown the antagonizm activity in the AChM₃ receptor which the docking score stood at -115, while native ligand (tiotropium) score is -120. Based on this result, we conclude that piperine has noncompetitive antagonist on AChM₃ receptor.

Keywords: Piperine, Antagonized, in vitro, in silico, AChM₃

Determination Of ED50 AEW1 As Anti-Inflammatory In Rats Induced Caragenin

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Abstract. AEW1 is a derived synthetic compound. This compound is the synthesis product of pyridin-2-carbaldehyde and 2,5-dihydroxyacetophenone without solvent with K₂CO₃ catalyst using microwave method. AEW1 has anti-inflammatory activity with percentage of Anti-Inflammatory 50.05 ± 16.244% not much different from Ibuprofen antiinflammatory drugs. This study was conducted to determine the dose of effectiveness ED₅₀ of this compound. This study used induced paw edema method, which measured edema at rat foot with. The test used animals were Wistar rats. A total of 25 rats, divided into 5 groups. Group I: negative control (CMC-Na 0.5%). Group II: compound comparing diclofenac sodium dose 13.5 mg / KgBB. Group III, IV, V: AEW1 at doses of 50; 100 and 200mg / KgBB. The result of edema volume measurement was calculated value of Area Under Curve (AUC) and % anti inflammatory, then data were analyzed to know the difference between groups. In the treatment group, anti-inflammatory and logarithmic doses made a linear regression curve to determine the ED₅₀ value. The result of this research get linear equation $y = 29x - 19.20$ with value of R² or linearity is 0.997. From the linear regression equation of compound AEW1 an ED₅₀ value of 243.33mg / KgBB.

Keywords: AEW1, induced paw edema method, Antiinflammatory, ED50.

Correlation of Timbal (Pb) Towards The Number of Stomates on The Plant *Dracaena Marginata Tricolor* in Several Places of Surabaya City

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Abstract. This research is an observational study that aims to determine the characteristics of stomata in the leaves of *Dracaena marginata tricolor*. This is based that many *Dracaena marginata tricolor* plants are planted on the roadside as road shade plants and as ornamental plants in parks of Surabaya City . This research is descriptive analysis. Sampling was carried out at three locations which had different levels of motor vehicle density, namely at the location of the Bundaran Dolog which has a high density of motorized vehicles, Gading Ketabang street which has a medium density of motorized vehicles and location of Kebun Bibit 2 which has a low density of motorized vehicles. The results showed that each location had a different amount of stomata. This difference in results is caused by the effect of vehicle emissions in each location. The higher amount of stomata, the more polluted air quality, while the lower amount of stomata, the better the air quality. The calculation of the average Pb lead level in the *Dracaena marginata tricolor* leaf from the highest was obtained at the Bundaran Dolog Surabaya 2.01 µg / g. Calculation of the average Pb lead level in the at the *Dracaena marginata tricolor* leaf location of Jl. Jalan Gading Ketabang was obtained at 1.06 µg / g and at Kebun Bibit 2 Surabaya obtained an average Pb lead level in the leaves of *Dracaena marginata tricolor* of 0.82 µg / g. The highest calculation of the number of leaf stomata is at the Bundaran Dolog Surabaya location of 21. At the location of Jl. Gading Ketabang obtained an average number of stomata of 18 and at the location Kebun Bibit 2 Surabaya the

results of the calculation of the average number of stomata were 16.

Keywords: *Dracaena marginata tricolor*, *Pb lead*, *stomata*

Potential Local Food Use Insect as a Source of Protein in The Future

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Abstract. Global warming and food security are two important objects that have received attention in recent years. The issue of methane gas (CH₄) and nitrous oxide (N₂O) caused by the livestock sector is still being debated until now. In addition, the increasing population makes the demand for food of animal origin increases. This is not comparable to agricultural land that is increasingly narrow due to industrial land and residential areas. Other sources considered be rich in protein are algae, mycoproteins, cultured meat, vegetable protein, and insects but insects considered to resemble meat because of its high nutrient content. Sociocultural problems make food from insects difficult for people to accept. Making local food made from insects be a solution to overcome this problem. Some types of insects that be used as sources of animal protein are grasshoppers, crickets, caterpillars, bees, ants and beetles. Local food made from insects be a solution for global warming and food security in the future.

Keywords: Global warming, Insect, Local food, Protein, Security food.

Utilization of Fly Ash and Bottom Ash from Coal Fired Power Plant by Involving Community

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Abstract. The development of power generation capacity in Indonesia is directed to meet the load growth and planned addition to build coal-fired power plants (CFPP) will dominate the type of power plant, reaching 31.9 GW or 53.0% in the year 2017 to 2026, and by 2019 the addition of very high-power plants reaches 18.7GW. Coal demand continues to increase every year, until the year 2026 reached 152.8 million tons per year. The CFPP operation produce solid waste as Fly Ash and Bottom Ash (FABA) or generally named by Coal Combustion Products (CCPs). Formation of the CCPs in general is 3-5% of total coal used, then will required wide land for the placement of FABA product if it cannot be utilized. Characteristics of the CCPs could substitute cement for infrastructure. The utilization of the CCPs in Indonesia only 0,47% of total waste. In the other side there is problem 5.61% unemployment people in Indonesia. Lessons from the 'sound material cycle society' policy of Japan, recycling is not only about technical solutions or engineering of resource-recovery from waste. Rather, it is an issue of how to systematically organize institutional infrastructure and physical infrastructure to sustain recycling mechanisms. This article purpose to analyze opportunity how the CCPs could be utilized by involve community around the CFPP as sound material cycle society.

Keywords: Fly ash, Bottom Ash, material cycle, community.

Spatial Dynamics of Agricultural Land in Banyuasin Regency, South Sumatera: Its Opportunities and Threats.

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Abstract. The availability of agricultural land, especially paddy fields, is an inseparable part in efforts to maintain national food security. Changes in land cover/land use can occur due to several factors including social, political, economic, cultural, natural, and technological. Geographic Information Systems (GIS) operate as a tool to comprehend the changes related to the driver's factors. Along with the rapid development of the region, the need for agricultural land is one important aspect to consider. The purpose of this study was to examine the spatial dynamics of paddy land cover in Banyuasin Regency for more than 2 decades using the Markov Chain approach and to analyze the inhibiting and supporting factors in developing paddy farming in the region. The inhibiting factor discussed in this study is the potentiality of floods on agricultural land, especially paddy fields. The results showed that paddy fields in Banyuasin District experienced the widest decrease of 2,863.80 ha and encountered the largest increase of 14,463.45 ha in the period 1990-2003. Changes in the area of agricultural land were also influenced by the threat factor in the form of inundation. The flood inundation crisis peaked in 2010 where 13,965.98 hectares of agricultural land was flooded. It was positively correlated with the La Nina phenomenon that has an impact on high rainfall based on Southern Oscillation Index data. However, the potential for developing lowland rice farming in swamps in Banyuasin Regency is considerably beneficial. This could be assessed from the wide market

potential and can increase national rice production. Based on the farm business analysis, rice production is profitable and feasible. This can be examined from the value of Revenue-Cost Ratio (R/C Ratio) averaging 3.65 and Benefit-Cost Ratio (B/C Ratio) of 2.65 with an average production of 5-7 tons/ha/season.

Keywords: Spatial Dynamic, Agricultural, Swamp, GIS, Markov Chain, R/C Ratio

Prevalence And Intensity *Dactylogyrus* sp. And *Gyrodactylus* sp. On Nile Tilapia (*Oreochromis niloticus*) In Badung River, Bali Province For Biomonitoring Of Health Ecosystem

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Abstract. Badung river located in the Denpasar City, which is one of the biggest river characterized near industrial and anthropogenic activities. Parasites can also play a role as a bioindicator that can show environmental changes due to aquatic environmental stressors (Marcogliese, 2005). This study was conducted in April 2017. This research to observe the prevalence and intensity level of ectoparasite *Dactylogyrus* sp. dan *Gyrodactylus* sp. and in the Nile Tilapia fish. The research method was carried out with the descriptive method. Twenty five fishes were taken randomly from the Badung river. The parasite of the fishes was observed at the Fisheries Laboratory, Udayana University. The result showed that there were 25 fishes were infected by *Dactylogyrus* sp. and 5 fishes were infected *Gyrodactylus* sp. Total number of *Dactylogyrus* sp. found was 91 individual from the infected fish. Total number of *Gyrodactylus* sp. found was 10 individual from the infected fish. The prevalence and intensity of *Dactylogyrus* sp. were 100% and 3.64 individual/fish. The prevalence and intensity of *Gyrodactylus* sp. were 20 % and 2 individual/fish.

Keywords: Nile Tilapia, Badung river, Prevalence, Intensity, *Dactylogyrus* sp., *Gyrodactylus* sp.

Identification of Genetic Variation and Phylogenetic analysis of Longtail Tuna (*Thunnus tonggol*) at Pabean fish Market, Surabaya

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Indonesia is one of the biggest tuna exporter countries in South East Asia with the high number of catch per year. The increasing number of tuna catch can lead to the depletion of tuna population within Indonesia, especially for longtail tuna (*Thunnus tonggol*) species. *T. tonggol* is also one of the tuna species that become the target for commercial purpose. Therefore, in order to maintain the sustainable fisheries of longtail tuna species, detail information regarding this species is needed to protect the species. This research aims to study the genetic variation and phylogenetic of longtail tuna (*T. tonggol*) within Pabean fish market in Surabaya using mitochondrial control region marker. Genetic analysis was conducted in several stages including DNA extraction, polymerase chain reaction (PCR), electrophoresis, sequencing, and software analysis. The result of 28 samples showed high haplotype diversity (H_d) and low nucleotide diversity (π) with the value of 1 and 0,1939, respectively. This result indicated that this tuna species collected at Pabean fish market, Surabaya has a high genetic variation. Phylogenetic reconstruction indicated that all of the samples collected were the species of *T. tonggol*, with the genetic distance within

species is 0 - 0.035. This result can be use as additional information for longtail tuna species within Indonesia regions.

Keywords: longtail tuna, *Thunnus tonggol*, genetic, phylogenetic

Recreational Fishing in the Exclave Kaliningrad Region: Problems and Challenges

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Abstract. The exclave Kaliningrad region situates on the coast of the Baltic Sea between Poland and Lithuania. It has a rather small territory but despite its small area, the Kaliningrad region is rich in natural resources including numerous waterbodies and variety fishery resources. In the article authors contemplate a complex of regional problems which require speedy political, ecological, institutional and research decision making for ensuring the sustainable development of region. In addition, the article summarizes and analyzes the available scientific and practical information about the state of recreational fishing in the Kaliningrad region and its possible inclusion in the tourism product.

Keywords: Kaliningrad region, recreational fishing, ecological state of waterbodies

Biodiversity of Sharks and Rays in Morotai Waters during Interaction with Self-Contained Underwater Breathing Apparatus Divers

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Abstract. Morotai has been known for its famous world war II relics and wrecks, including those remains underwater for more than 70 years. Not until recently, the SCUBA diving tourism grows significantly in Morotai waters - with helps of increasing shark watching and shark diving. Morotai is among the famous site for shark diving in Indonesia and contributes to strengthen Indonesia position as rank-fourth in the global shark watching economy, only behind South Africa, the Bahamas, and Maldives. Other elasmobranchii infraclass, rays, have also been sighted in this area. However, the precise number of number of elasmobranchii species living in Morotai's is unknown. The knowledge of biodiversity of elasmobranchii living in Morotai waters is valuable for developing conservation management, shark diving carrying capacity, ecological assessment, and elasmobranchii behavior observation. Visualization and species identification has been conducted with DOV (Diver Operated Video) methodology. Hundreds of photographs and video of the elasmobranchii were analyzed and identified during SCUBA diving - from February 2013 to May 2019 - reveals the diverse species of elasmobranchii living in Morotai waters. Study also unveils that at least six shark species and four ray species were consistently

encountered in their specific dive site during SCUBA diving on that period.

Keywords: elasmobranchii, Morotai, shark, ray

Analysis of Squid Fisheries Bioeconomic Models (*Loligo* spp, Lamarck 1798) In Pelabuhan Perikanan Nusantara Kejawanan (PPNK) Cirebon City, West Jawa

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Abstract. Based on the 2016 statistics on Pelabuhan Perikanan Nusantara Kejawanan (PPNK), almost half or 47% of the volume of production per species of landed in PPNK is squid (*Loligo spp*). This is due to the large number of fishermen who use bouke ami (squid nets) as well as the demand for supply of squid (*Loligo spp*) from inside and outside the PPNK, so that in this case it has driven economic growth in the fisheries sub-sector. In Indonesia the squid resources have not been managed optimally, even in some areas that have considerable squid potential as only a side catch. The use and marketing of squid (*Loligo spp*) landed at PPN Kejawanan is expected to run efficiently so that the products quickly reach the consumers with good quality and affordable prices and can be managed sustainably. The problems mentioned above need to be studied, both in terms of biology and economics, namely Gordon-Schaefer's bioeconomic approach to determine the value of MSY, MEY, and OAE by including economic aspects (capital, costs, depreciation, income and profits) and the RAPFISH approach by considering biological constraints in managing fisheries resources. With this approach, management efforts can be taken to maintain the squid's resource potential and marketing flow.

Keywords: Bioeconomics, identification of biological and economic aspects, management of squid fisheries resources (Loligo spp)

Analysis of Genetic Variation and Phylogenetic of Longtail Tuna (*Thunnus tonggol*) at Sagulung Fish Market, Batam-Riau using Mitochondrial DNA marker.

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Abstract. Longtail Tuna (*Thunnus tonggol*) is one of the neritic species of tuna from the Scombridae family. *T. tonggol* is oceanicromus and usually found in tropical and subtropical waters in the Indo-Pacific region. Although known as one of the tuna species, the information of this species is very lacking, especially in Indonesia. Therefore, this study aims to determine the genetic variation and phylogenetic of longtail tuna (*T. tonggol*) collected at Sagulung fish market, Batam, Riau Islands. Molecular analysis were conducted using mitochondrial control region DNA marker, with the process including DNA extraction, PCR (Polymerase Chain Reaction), electrophoresis, sequencing, and data analysis. A total of 21 longtail tuna samples were identified using molecular genetic methods and confirmed as *T. tonggol* species, with the sequence fragment length of 482 - 523 bp (base pairs). Haplotype diversity (Hd) indicated a high value of 1,00000; while nucleotide diversity (π) was low with the value of 0.01654. Phylogenetic tree was constructed using Neighbor Joining method (Kimura 2-parameter), and showed that all the longtail tuna samples grouped into 1 clade with the genetic distance ranging from 0.000 - 0.023. This result can be use as additional information for longtail tuna species in Indonesia.

Keywords: genetic diversity; phylogenetic; *Thunnus tonggol*

Identification and Genetic Variation Analysis of Longtail Tuna (*Thunnus tonggol*) landed at PPI Kedonganan and PPP Muncar using Mitochondrial D - loop Region

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Abstract. Longtail tuna (*Thunnus tonggol*) is one of the oceanodromus neritic species and the migration pattern follows the water currents. Currently, this species has not been widely studied in Indonesian waters, so it is necessary to study the identification of morphology and genetic diversity. This study can explain the importance of species genetic information in stability and resilience. This study aims to determine the identification of morphology, phylogenetic and genetic diversity of longtail tuna at two locations in PPP Muncar, Banyuwangi and PPI Kedonganan, Bali. The molecular analysis was done in several stages, i.e DNA extraction, Polymerase Chain Reaction, electrophoresis and sequencing. Based on the result of sequencing and analysis, 33 samples of longtail tuna was found. The result of phylogenetic tree reconstruction from two locations showed one clade with genetic distance value among longtail tuna species ranging from 0.000 - 0.042 for all close kinship samples. The haplotype diversity (*Hd*) value of longtail tuna was 0.9905 and nucleotide diversity was 0.020. The high value of genetic diversity indicated that two longtail tuna populations have a high survival ability to adapt on environmental changes. Index fixation analysis (*Fst*) has a value of 0.0299, p - value > 0.05. The fixation index value indicate no significant population difference. The result of this study can be use as basic data in

planning genetic conservation strategies with sustainable fisheries management efforts.

Keywords: Longtail Tuna, Genetic Marker, mtDNA; Sequencing

The Potential Harmful Algae Bloom (HAB) In Floating Net Cages of Sumberkima Village Water, Gerokgak Sub District, Buleleng Regency

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Abstract. Sumberkima Village is one of the villages in the Gerokgak sub-district that has fish cultivation land using the most floating net cage cultivation method in Buleleng district. The development of fish cultivation activities using floating net cage techniques has an impact on the waters. The remainder of the feed that is not consumed, and the metabolic wastes produced by aquaculture increase water fertility so that it is feared that there is a phytoplankton that has the potential to cause the Harmful Algae Bloom (HAB) phenomenon in the floating net cage aquaculture area of Sumberkima village which can have an impact on water quality, aquatic biota and cultivator income. . This study aims to identify the genus phytoplankton that has the potential to cause Harmful Algae Bloom (HAB) as well as the abundance of phytoplankton that has the potential to cause the Harmful Algae Bloom (HAB) phenomenon. This research was conducted in February 2019 at the floating net cages of Sumberkima village, Gerokgak district, Buleleng regency. The research is spread over 10 points of floating net cages determined randomly to represent floating net cages in Sumberkima village. Data were analyzed descriptively with the calculation of phytoplankton abundance using APHA 2005 method. From the research conducted, it was found that the type of phytoplankton suspected to have HAB potential was found in 2 class groups namely Dinophyceae with a percentage of 15% consisting of: Prorocentrum, Dinophysis, Alexandrium and Peridinium then Bacillariophyceae with a percentage of 85% as many as 7 genera include: Thalassiosira, Pseudonitzschia, Biddulphia, Nitzschia, Skeletonema, Chaetoceros and Ceratium. The highest abundance of phytoplankton with the potential HAB

from the red tide maker group at KJA no 2 was 13,580 cells / Liter and toxic producer at KJA no 2 was 6,228 cells / Liter

Keywords: Aquaculture, Harmful algae bloom, Floating net cage, Phytoplankton abundance, Sumberkima village

Adaption strategy of grey mullet fishing fleet possibly influenced by climate variability in the Northwestern Pacific

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Abstract. The Grey mullet (*Mugil cephalus* L.) is a cosmopolitan species distributing in tropical and temperate zones at latitudes 42°N–42°S (Thomson 1963). It is one of the most important commercial species of fish in the coastal fisheries of Taiwan. It migrated into the coastal waters of the southeastern Taiwan Strait (TS) around 22–25°N. for spawning in wintertime, while the feeding grounds are located in the coastal and estuarine waters of China around 25–30°N. The PDO and ENSO index play a role in affecting the migration of grey mullet, but increases in SSTs may be a main reason for the decreased catches after 1980. Annual catches considerably dropped and continually remained at an extremely low level during the period of 1986 to 2010. This work investigate impacts of climate variability in fishing conditions and fishing variability of mullet fishing grounds in the coastal waters of western Taiwan. Due to the subsequent decreased catch, the types of fleet with fishing methods in the coastal waters of Taiwan were changed from the purse seiner with two boats before 1986, to the drift net and trawl net as the abundance was at the low level between 1990 to 2010. According to the factors of cost benefit, the fleet using the drift net was dominant when the abundance increased since 2012. It suggested that the fishing fleet was significantly changed and autonomously adapted with the catch of grey mullet in the Taiwan waters.

Keywords: Grey mullet, migration, annual catches

The Effects Of Seagrass Density On Fish Abundance In Seagrass Beds In Southern Bali : Benoa Cape Case Study

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Abstract. Seagrass had contributed for the life of fish, for instance as a feeding ground, spawning ground, nursery ground, and shelter. Seagrass had a positive correlation against a fish abundance, where diversity and fish abundance were found more associated with seagrass compared on an empty substrate. This research aimed to know the relationship of seagrass density and fish abundance which is important to maintain the long term sustainability of fish in Southern Bali. This research was carried out along Tanjung Benoa and done in four station points started from Tanjung Benoa Beach to Nusa Dua Beach which has characteristic white sandy beaches, big wave beach facing Indian Ocean. Data collection of seagrass used line transect method with 50 x 50 cm² quadrant and fish sampling used the method of visual censuses in 50 x 5 meters. The analysis of the data used in this study included analysis of seagrass density, fish abundance, linear regression, and statistic test correlation. The results showed the condition of seagrass meadow conditions in Southern Bali that could be categorized very tight. The total range of fish abundance on a 0.18 - 0.28 ind/m² was 10 families of fish, they are Apogonidae, Nemipteridae, Pinguipedidae, Fistularidae, Cepolidae, Labridae, Diodontidae, Pomacentridae, Scorpaenidae, Chaetodontidae, and highest abundance of the family is Apogonidae. A dependent variable (fish abundance) were able to be explained by independent variable (seagrass density) and seagrass density could describe its effects on the fish abundance. The test results of the regression analysis between fish abundance and seagrass density also indicated weak correlation level between the two variables connected.

Keywords: Seagrass, Fish Abundance, Southern Bali

Morphometric and Meristic Ratio of Seagrass *Cymodoceae serrulata* at Sanur and Tanjung Benoa, Bali

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Abstract. *Cymodoceae serrulata* is a type of seagrass that has a slender and round-toothed shape on the tips of leaves that can live in a variety of substrates ranging from rocky to muddy sand. Morphometrics and meristic can describe the environmental conditions of living seagrasses which can be seen from leaf morphology, stem morphology, rhizome morphology and root morphology. Morphometrics is a measurement to determine the quantitative morphology of an organism while meristic is a calculation of the number of parts of an organism. This research was conducted in January-April 2019 using a purposive sampling method at 8 observation stations in the waters of Sanur and Tanjung Benoa. Data were analyzed by Sturges criteria and Principal Component Analysis. Based on the results of the study, leaf length ranged from 13.4-246.6 mm, leaf width ranged from 3-18.5 mm, stem length ranged from 1-130.3 mm, root length ranged from 10.1-134.1 mm, rhizome length ranged from 10.1-78.8 mm, rhizome diameter ranged from 1.2-3.73 mm, the diameter of the leaf stalk ranged from 1.11-3.63 mm and the number of leaves ranged from 2-5 strands. The principal component analysis showed that texture of the substrate (sand, dust, and clay) that most influences the morphometric-meristic seagrass *C. serrulata* is the texture of dust and clay texture. Where the dust texture affects morphometrics-meristic such as the length of the leaf, leaf width, stem length, rhizome length, root length and number of leaves. While of the stem diameter and rhizome diameter and root length are influenced by clay texture.

Keywords: *Cymodoceae serrulata*, *morphometric*, *meristic*, *Sanur*, *Tanjung Benoa*

Communities Structure of Echinoderms in West Season and Transition I in Seagrass Ecosystem of Tanjung Bena, Bali.

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Abstract. *Echinoderms* in marine ecology have a role as deposit feeders and live on the bottom of the waters to maintain the fertility of sediments. This shows the diversity of the *Echinoderms* phylum found in seagrass ecosystems. Seagrass beds serve as protection and a source of nutrients that maintain the food chain. Tanjung Bena waters are located in the waters of South Bali which has a seagrass ecosystem. *Echinoderms* as invertebrate animals can be influenced by abiotic factors, namely salinity and temperature which are affected by the season. This study aims to determine changes in the structure of the Echinodermata community in the western and transitional seasons I in seagrass ecosystems and determine the environmental factors that influence the structure of the Echinoderms community in the waters of Tanjung Bena. *Echinoderms* data collection method used is the Underwater Visual Census (UVC) method and documented using a camera. Data is taken by using purposive sampling technique. The calculations used in data analysis use the formula of density, diversity, uniformity and dominance. Environmental factors measured were temperature, pH, salinity, DO, nitrate, and phosphate. The results showed that in both seasons, the western season and the transitional season I, the phylum of *Echinoderms* found consisted of 4 classes namely *Holothuroidea*, *Ophiuroidea*, *Echinoidea* and *Asteroidea*. The diversity index and uniformity of the Echinoderm phylum found in both seasons shows stable diversity and uniformity. Based on the index of dominance there is one genus that dominates, namely the genus *Diadema*. Based on the analysis of the Main Components (PCA) in the west season, the density of *Echinoderms* is

influenced by phosphate, nitrate, DO, salinity, pH and temperature. Whereas in the transitional season I density is influenced by phosphate, salinity, temperature, nitrate and pH.

Keywords: Echinoderms;Community Structure;Season;Seagrass.

Marine Benthic Habitat Mapping Using Pleiades Satellite Imagery in Pannikiang Island, South Sulawesi

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Abstract. The mapping of benthic habitat needs to be done as an effort to manage marine resources. It needs detailed surveys that consume a huge amount of time, cost, and workforce. Remote sensing is a method that can be a solution for benthic habitat mapping seen from time, cost, and the wide range aspects. Research is done in Pannikiang Island, Barru Regency, South Sulawesi. The purpose of this research is to map benthic habitat using Pleiades imagery and to do an accuracy test for the resulted map. The research is done with photo transect method, with taking photos on the straight transect track as samples on the field based on object variation in the imagery. The result of this research shows that benthic habitat in Pannikiang Island includes live coral, dead coral, algae, seagrass, rubble, and substrate. The areas are 266,358 ha for live coral, 151,57 ha for dead coral, 148,578 ha for algae, 89,364 ha for seagrass, 195,389 ha for rubble, and 577,434 ha for substrate. The accuracy value with the amount of 41,20% and a kappa coefficient of 0,3144.

Keywords: benthic habitat, photo transect, Pleiades, remote sensing

Carrying Capacity of the Beach Tourism Area in Pandawa Beach, South Kuta Sub District, Badung Regency, Bali

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Abstract. Tourism is one of the developing sectors in Bali especially beach tourism, which has an impact on the surrounding community, especially the economy of the community. Pandawa Beach is famous beach tourism, located in the Kutuh Village, South Kuta Sub District, Badung Regency, Bali. This beach is very famous for both domestic and foreign. Carrying capacity is an important thing that is considered to develop a sustainable tourism area, this is to prevent environmental damage that can be caused by humans in the utilization of the environment for tourism. Research on the carrying capacity of the area needs to be done to find out whether an area has a carrying capacity that is appropriate or not, especially in Pandawa Beach during high season. The method used in this study was carried out by field observations for primary data collection by interviewing tourists, while secondary data were obtained from the beach manager and literature study. Based on the results of the study obtained the value of the area (Lt) required by tourists in carrying out tourism activities on the Pandawa beach is 95.09, the time required for tourists to carry out activities (Wp) on the Pandawa beach is 2.08. The carrying capacity of the area in Pandawa Beach is 9907 people / day or 307,111 people / month, 3,685,327 people / year. Good utilization of carrying capacity is only around 5000 people/day. When conditions are high season in January, July, August, December the number of tourist arrivals at Pandawa Beach is still in a reasonable condition or classified as under carrying capacity.

Key Words: Pandawa Beach, carrying capacity, large area, visiting time

Shallow Marine Water Habitat Mapping Using SPOT-7 Satellite Imagery on Nusa Lembongan Island, Bali

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Abstract. Shallow marine water habitat has a major role both economically and ecologically for life in coastal areas. So the availability of shallow marine water habitat information is very important as an effort to manage coastal and marine resources. The use of remote sensing technology with the help of satellite imagery is an effective way to map shallow marine water habitats. This study aims to map the shallow marine water habitat on Nusa Lembongan Island, Bali using SPOT-7 satellite imagery and test its accuracy. The method used is the true-color composite algorithm and the Depth Invariant Index (DII) transformation and using the maximum likelihood classification. The classification scheme used is 6 classes. The results of the classification of true-color composite images show that the habitat of rubble and seagrass dominates. In the classification results of DII transformation, it shows that dead coral and seagrass habitat dominates. The mapping accuracy test results show that the overall accuracy of the DII transformation classification results is greater than the results of the classification of true-color composite images, which reaches 75.43%, while the results of the classification of true-color composite images get an overall accuracy of 66.86%.

Keywords: Shallow marine water habitat, Nusa Lembongan, SPOT-7, Depth invariant index, accuracy

Accumulation Heavy Metals of Pb and Cd on Seagrass *Thalassia hemprichii* and *Halophila ovalis* in Serangan and Tanjung Benoa, Bali

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Abstract. Seagrass ecosystem is part of a marine ecosystem that has a fairly important ecological role, Serangan and Tanjung Benoa have seagrass ecosystems including *Thalassia hemprichii* and *Halophila ovalis*, pollutants such as heavy metals in the Benoa bay area are thought to be carried out of the bay because tidal currents occur and it is estimated that the farther away from the bay, the concentration of heavy metal will be smaller. *Thalassia hemprichii* and *Halophila ovalis* are types of seagrass which are able to absorb and accumulate heavy metals. This research was conducted in January-May 2019 on Serangan and Tanjung Benoa, to see the concentration of heavy metals in water, sediments, seagrass leaves, seagrass roots, determining the heavy metal bioaccumulation and translocation character. The method used is purposive sampling, determined by 8 research points, 4 points at Serangan and 4 points at Tanjung Benoa. Heavy metal concentrations on leaves of *T.hemprichii* was range from 22,00-67,75 ppm for Pb and 5,81-13,66 ppm for Cd, the metal concentrations of the root was range from 20,31-55,65 ppm for Pb and 2,93-13,66 ppm for Cd. The concentrations on leaves of *H.ovalis* was range from 20,09-31,79 ppm for Pb and 7,49-12,98 ppm for Cd, the metal concentration of the root was range from 10,50-23,50 ppm for Pb and 6,26-11,18 ppm for Cd. The value of Pb and Cd translocation factors in both seagrasses is more than 1, that means the seagrass absorbs pollutants through the roots and it is stored on leaves. Bioaccumulation value of *T. hemprichii* is more than 1, that

means the seagrass is able to absorb heavy metal pollutants. The bioaccumulation value of *H.ovalis* seagrass for Cd is more than 1, but the bioaccumulation value of Pb is less than 1. It means it is able to absorb Cd metal but it is not good in absorbing heavy metals Pb.

Keywords: Thalassia hemprichii, Halophila ovalis, heavy metal, bioaccumulation, translocation.

Population Dynamic Of Big Eye Scad (*Selar crumenophthalmus* Bloch, 1793) In Kwandang Waters-Sulawesi Sea

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Abstract. Big eye scad (*Selar crumenophthalmus* Bloch, 1793) was one of important small pelagic fishes exploited in Kwandang waters-Sulawesi Sea. The exploitation of this species was increasing every year. This research was carried out to study the growth, mortality and exploitation of bigeye scad in the Kwandang waters during January-November 2016. The von Bertalanffy growth equation was derived as $L_t = 25.95(1 - e^{-1.01(t+0.16374)})$. The size at first capture (L_c) was estimated as 18.69 cm. The total, natural and fishing mortality rates were 4.28, 1.90 and 2.38 year⁻¹, respectively. The estimated exploitation ratio (0.56) was very close to the optimum value of 0.5. Hence, the stock can be considered as optimally exploited in Kwandang waters.

Keywords: Population dynamis, exploitation rate, big eye scad, Kwandang

Coast Line Changes Analysis Using Landsat Satellite Image Using *Digital Shoreline Analysis System (DSAS)* Method In Tonduk Island, Sumenep, East Java-Indonesia

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Abstract. Coastal zone is a dynamic region that experiences change at different rate. Monitoring the coastline is needed to determine changes that have occurred at coastline, hydrooceanography influence, and predictions of future changes. Coastal changes cause damage at coastline which can manifest as reduce usability of the land which eventually causes economic lost for the local people. This study is an important step to understand the dynamics of the coastal territory of Tonduk island which is aimed to reduce coastline damage and possible neconomic lost. We use *Digital Shoreline Analysis System (DSAS)* with method of calculation of *Net Shoreline Movement (NSM)* and *End Point Rate (EPR)* at Tonduk Island, East Java, Indonesia to monitor coastline changes. Observations of coastline changes were done with a span of 40 years using multitemporal Landsat Data from year 1978, 1989, 1997, 2008, and 2018. The landsat image is corrected radiometrically and geometrically prior to analysis. Delineation of coastline for every Landsat with *Modified Normalized Difference Water Index (MNDWI)* method for the analysis of coastline change. Erosion and accretion were detected on multitemporal satellite images of the area throughout the year of 1978-2018. The result showed that there were accretion and erosion, but overall the dominant region experienced abrasion. The region of tonduk island that

experienced the highest accretion was on southern part with an average accretion distance of 562.65 meters and rate of an average of 14.03 meters/year. On the other hand highest abrasion value of northern part has an average distance of -1042.24 meters and abrasion rate of an average of -26.44 meters/year.

Keywords: Shoreline Change, DSAS, Tonduk Island

The Analysis of Java North Coastal Vulnerability by Using Coastal Vulnerability Index

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Abstract. The sea level rise (SLR) caused by world climate change such as global warming and sea activities like the waves movement and tides have caused damages in several coastal areas. This condition also happens along the Java north coastal. The purpose of the study is to identify and map the level of vulnerability on java north coastal which is the function of physical vulnerability. Coastal vulnerability is analysed by using coastal vulnerability index (CVI) method by giving a score to each of the variables used in accordance with the categories set by United States Geological Survey (USGS). CVI is obtained by calculating 6 (six) variables that affect the vulnerability of the coast in the Java north coastal namely: (1)geomorphology, (2)coastal line change, (3)coastal slope, (4)relative sea level change, (5)average wave height, and (6) average tidal range. The vulnerability level is divided into 5 classes namely: (1) very vulnerable, (2)vulnerable, (3)rather vulnerable, (4) safe and (5) very safe.The result of this study shows that the coastal vulnerability of Java north coastal is very low to the high level and dominated by high vulnerability class.

Keywords: Java North Coastal, Sea Level Rise, Coastal Vulnerability Index

Estimating Potential Fishing Zones For Skipjack Tuna (*Katsuwonus pelamis*) Abundance In Southern Makassar Strait

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Abstract. This study aims to estimate potential fishing zones by estimating the abundance of Skipjack Tuna in Makassar Strait Using satellite data and Geographic Information System (GIS) techniques. The data used consisted of catching coordinates, skipjack catches, oceanographic data from satellite images with high-resolution satellite data of Spectra-Resolution Imaging Spectroradiometer (MODIS) Aqua (sea surface temperature, chlorophyll-a), Etopo1 for depth, and Aviso for current velocity. Prediction of the abundance of skipjack Tuna is calculated by Generalized Additive Model (GAM) predict function in r language then mapped with geographic information systems techniques. The results showed that the most potential fishing ground for skipjack tuna in the Makassar strait was in April 2018 with the estimate abundance of more than 39.000 fish km⁻². We suggest that efforts to catch Skipjack Tuna are directed to this area for more profitable catches.

Keywords: Skipjack tuna, Potential Fishing Zone, Abundance, GAM, Makassar Strait

Blue Carbon Assessment Of Mangrove Vegetation In Segara Anakan Lagoon, Cilacap

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Abstract. Potential of Blue carbon became one of the prioritized conditions in the 22th United Nations Climate Change Conference to minimize the impacts of global warming. With its world's second longest coastal line, Indonesia should have been able to improve its blue carbon potencies mainly from mangrove and seagrass ecosystem. However due to serious mismanagement the ecosystems, especially in Java, has been destructed. This status is evidenced by the decline of nearly 3000 ton Carbon in the carbon sequestration results from mangroves in Segara Anakan Lagoon, where the carbon stock in 2017 amounted to 138,696.08 ton Carbon decreased to 135,828.16 ton Carbon in 2018. The assessment was conducted using purposive sampling method and remote sensing technique was applied to observe land area changes occurring in mangrove forest. The results hopefully will be used as an important data base to maintain mangrove ecosystems and optimize sustainable blue carbon potencies.

Keywords: mangrove, blue carbon, estimation, Segara Anakan Lagoon Cilacap

Analyzing Coastal Topographic Changes using Low Cost UAS Techniques

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Abstract. The mechanism of coastal topography change is an important issue for coastal conservation, especially the effects of global warming increasing. A low cost UAS aerial photogrammetry technique can be conducted to perform efficiently and accurately topographic mapping in the coastal area. Almost one year of monthly topographic results for the Yanliao beach area in the Northeastern corner of Taiwan derived using a DJI Phantom III Drone system since May 28, 2018. The difference and profile analysis for the multi-temporal Digital Elevation Models (DEMs) are proposed to estimate the erosion or siltation situation in the study area. The results for eight profiles of S1-S8 indicate that a sandbank formation occurred in the southeast part of the beach during the observation period from 2018/11/7 to 2019/03/27. The average monthly change rate for S5 and S7 profile are 2.58 and 4.27 meters per month. The variation of the 0m line in this period at Yancheng Beach ranges between -24.82 and 24.49 meters, and the weekly change rate is -3.05 and 1.29 m.

Keywords: Optical, Polarimetric, Synthetic Aperture Radar, Geohazard

Design of Automatic Eggs Hatchery as Preservation of Turtle In Coastal of East Java

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Abstract. Among the 7 types of sea turtles in the world, 6 are in Indonesia. Unfortunately, The existence of sea turtles is currently experiencing a very drastic decline because of global warming and other factors. This research is one of the conservation efforts to increase the number of sea turtles in several conservation areas in East Java. In the process of turtle breeding, every 1 female needs 6 males, whereas what is happening now is far more females than males. From the experimental results, the temperature factor is the most influential on the results of hatching with male sex. The development of egg incubator technology in this study has been able to produce hatching results with the number of male sex dominant than female. To produce male eggs the temperature in the hatching media is between 25°C to 30°C, while the optimal temperature for hatching female eggs is the temperature of the hatchery more than 30°C. Artificial turtle egg incubator technology is designed in such a way that the conditions in the hatching chamber are close to the hatching conditions in nature with a temperature that can be set with an incandescent lamp equipped with a temperature sensor, when the high temperature the temperature sensor will work and the incandescent lamp automatically turns off. The optimal moisture condition of about 70% of the water content can be regulated by the humidity sensor, when humidity is reduced, the tool can automatically spray water.

Keywords: Turtle, Incubator, Sex, Automatic

Sea Urchin *Tripneustes gratilla*, Linnaeus, 1758 (Echinodermata): contemporary recods on Timor Island, Indonesia

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Abstract. This study was conducted to determine the distribution of Sea Urchin *Tripneustes gratilla* in several locations on the island of Timor, Indonesia in April to May 2018 using a random sampling method and description based on habitat and distribution. The results showed the presence of *T. gratilla* was found more in coastal areas with sandy mud substrate, overgrown with seagrass beds and salinity in the range of 27-35 ppt. Samples were found to have an average diameter of 6-8 cm, height 5-6 cm and a weight of 5-7gram.

Keywords: Avertebrata, distribution, Sea Urchin, Timor Island

Economic Value Total of Agricultural Land on The Critical Land

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Abstract. The management and utilization of land functions was often considered from the short-term benefits, without considering the lost benefits or losses occurred due to the reducing or the loss of the land functions. Therefore, this study aims to calculate the lost economic value as a result of the loss of the multifunction of the agricultural land due to the critical land. The total economic value has been obtained from a use value (the direct and indirect use values) and non-use value. The results showed that the majority of the farmers experienced a decline in production by 39.2%. The amount of the direct use value obtained was Rp. 9,733,794,694, the indirect use value of Rp. 44,448,176, while the non-use value was of Rp. 16,291,888. The lost estimation of total economic value due to the critical land was Rp. 9,794,534,759. This loss value will be accumulative in the following years and will increase along with the increase of the lost area of agricultural land due to the critical land.

Keywords: Mitigation, dry land agriculture, contingent valuation method, agroeconomiec, border area

Importance Performance Analysis For Pharmaceutical Services At The Outpatient Pharmacy Installation Of Rsud Dr. M. Yunus Bengkulu Province

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Abstract. Health and wellness is one of basic human needs. The individual living standard in this modern era is now increasing and is proportional to the individual needs for health care services. Elements generally used for the assessment of service quality in health care business, including public health services and hospitals, involve consumer - or in this case patient -satisfaction. It consequently triggers health care providers to improve service quality regarding to providing satisfaction to the patients. Patients satisfaction is an essential indicator for service quality. It has an impact on the implementation of health service efforts to be more efficient in meeting patient needs. The primary aim of this study was to determine the level of patient satisfaction and to find out the views of patients on pharmaceutical services at the Outpatient Pharmacy Installation of RSUD dr. M. Yunus Bengkulu Province based on the Importance Performance Analysis (IPA). The design of this study was a descriptive-analytic non-experimental research design with a cross sectional approach. Data retrieval was conducted by purposive sampling through primary data based on the results of the questionnaire. The study involved 500 patients as respondents. Level analysis of patient satisfaction in the Servqual 5-dimensional attributes used Importance Performance Analysis (IPA) Analysis. The results of the study confirmed that the Importance Performance Analysis of the level of patient satisfaction with pharmacy services at the Outpatient Pharmacy Installation of RSUD dr. M. Yunus in Bengkulu Province showed 2 attributes that are the priority of the hospital's main service improvement, namely the attribute "All drugs contained in the prescription are always available at hospital pharmacy

installations" and the attribute "Pharmacy officers encourage patients to recover quickly and pray for patients". Conclusion of this study confirmed that most patients were in the satisfaction level.

Forest Function Valuation Assessment based AMDAL and PS-IFC in Land Acquisition

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Abstract. AMDAL in Indonesia as a regulation in the initial capital in mapping the social, economic and environment situation at the development stage. Economic valuation in environmental is one thing shall be considering on the early development stage and controlled based on existing guidelines, because it is relatively risky beyond to the future generation. This paper aims to analyze the handling of environmental assessment within the framework of partnership to achieve the objectives arise due to economic factor, especially the forests valuation affected by development activities. The researcher finds that this elected legal instrument deals with stakeholder procedural issues regarding forest function valuation (PP 15/2012), including communities' clear information and effective communication among stakeholders. Regulation in the form of Ministerial Decree also formulation the public participation (Permen LH No. 12 Year 2012). Likewise, current legislation does not address important contextual dimensions, including the sharing of the rights and obligations bundle especially on disclosure information that really important to be share with the stakeholders, community, government, academic, NGO, and other parties who has an interest on the development activity. The results are expected to highlight the importance of adopting a comprehensive framework for a decision that places a detailed analysis of forest function valuation related public participation within the border legal of legal context. In the end it is expected that forest function valuation reflected of environmental

sustainability on the regulation in Indonesia and the role can be implemented in the development activities.

Keywords: Investment, AMDAL, ESIA, Forest Function Valuation