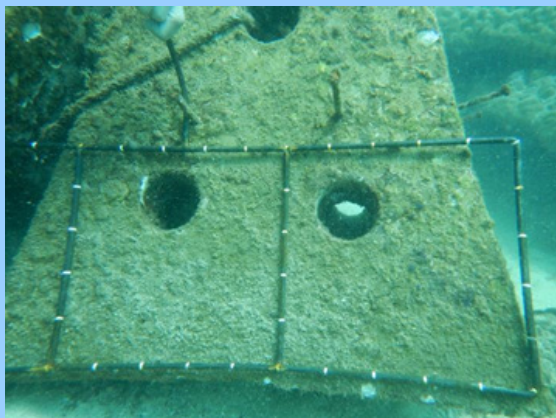


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Data retrieval techniques

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INTRODUCTION OF EDITORIAL

Jurnal Segara is scientific journal published and funded by the Marine Research Center, The Agency for Marine & Fisheries Research & Human Resources, Indonesian Ministry of Marine Affairs & Fisheries.

Jurnal Segara Volume 17, Number 1, April 2021 is the second edition of Fiscal Year 2021. The articles contained in Jurnal Segara are the results from research and conceptual studies related to the marine and fisheries issues, conducted by researchers, academics, students, and observers from Indonesia and around the world.

In this edition, the journal features six scientific research articles on: Effectivity of Normal Concrete and Clamshell as Materials of Artificial Pyramid Reef at Pasir Putih Beach, Situbondo – Indonesia; Marine-Sediment Characteristics and Thickness Over the Eroded Sayung Coast, Demak, Indonesia; Assessment of Underground Water Quality in Karimunjawa Island, Central Java – Indonesia; Coral Recruitment on Artificial Patch Reefs Deployed in The Marginal Reefs: Effect of Multilevel Substrate on Density of Coral Recruit; Identifying Priority Areas for Coastal Protection Around Java, Indonesia; Evolution of Subsurface Temperatures in West Sumatra - Southern Java Waters During 2010–2014 Indian Ocean Dipole Events; Identification of Reclamation Area in Ancol of North Jakarta Using Resistivity Method.

It is hoped that this scientific journal can contribute to the development of Indonesia marine science and technology. Finally, the Editor would like to thank the infinite participation of the researchers scientific for contributors this journal.

EDITORY



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EFFECTIVITY OF NORMAL CONCRETE AND CLAMSHELL AS MATERIALS OF ARTIFICIAL PYRAMID REEF AT PASIR PUTIH BEACH, SITUBONDO - INDONESIA

Rudhy Akhwady, Muhammad Akhyar Maududi, Dwi Chandra Dewi, & Oktiyas Muzaky Luthfi

ABSTRACT

The bivalve *anadara grandis* is one of the most abundant shells which are easy to find in Indonesian waters. The number of clams consumed is directly proportional to the amount of clamshell waste, which the most part is only disposed into waste. Coral reef has a very important purpose in supporting activities in coastal areas. Artificial reef is a structure that has aim to restore the biological purpose coral reef that have been damaged. This study aims to compare the effectiveness of the use of normal concrete (made from sand, cement dan splits only) than clamshell mixture as materials of artificial reef. A field research was conducted in Pasir Putih, Situbondo, with visual descriptive method (transect with a quadrant of 25 x 25cm) and underwater camera as an aid to facilitate the observation. During the 4-month observation of the drowning, nine types of biotas were found in attaching, with the dominant biota attached to these artificial reef were bivalves, barnacles, and bryozoan. Results show that the total number and density of calcareous biota attached on clamshell concretes are higher than those of standard concretes. So, it could be concluded that the concrete reefs made of clamshells resulted in attachment of biota slightly higher than it of normal concretes and the benefits of both materials can form the coral reef ecosystem well. In particular, the use of artificial reef with a mixture of clamshells is better than normal concrete because its more effective for algae attachment and cheaper because low budget due to the material availability of clamshell presently as damage and wastes in coastal area.

Keywords: Artificial reef, normal concrete, clamshell, ecosystem.

MARINE-SEDIMENT CHARACTERISTICS AND THICKNESS OVER THE ERODED SAYUNG COAST, DEMAK, INDONESIA

Wisnu A. Gemilang, Ulung J. Wisna, Guntur A. Rahmawan, & Koko Ondara

ABSTRACT

An over whelming erosion occurred in Sayung waters is related to sedimentary processes. That is why the deeper determination of sediment characteristics through direct survey and acoustic data retrieval is crucial. Several previous related studies had been conducted revealing the rate and model of sedimentation. This study aimed to describe the sedimentary processes according to its features and deposition. In this study, we conducted a grab-sampling, bathymetry surveys and also hydrodynamical model. Grain size analysis was employed to observe the characteristics of sediment and its deposition environment. At the same time, we applied dual-frequency bathymetry data for estimating sediment thickness which reflects the accumulation sediment over Sayung waters. We found that sediment texture varies from sand to clay, while coarse sediment fraction is dominant in the western part. Near the coastline area of Sayung waters reflecting the more potent transport mechanism in the deposition environment, proven by the less-accumulated sediment from 0-2.5 km from the coastline. In sea-ward regions, we observed the finer sediment fraction, showing that the low-transport mechanism takes place. The topographical alteration has intensively occurred at 2.5-3.2 km from the coastline. Tidal current has an essential role in inducing local transport whereby the speed varies ranging from 0-0.14 m/s, other than that, the more substantial current features have observed in Surodadi and Bedono coast moving perpendicularly toward the beach. In contrast, in the southern Sayung waters, the current profiles tend to be weak inducing higher sedimentation. Besides, the emergence of the sandbar has a role in reflecting sediment texture predomination in Sayung waters.

Keywords: Marine-sediment, sediment thickness, deposition environment, Sayung Waters.

ASSESSMENT OF UNDERGROUND WATER QUALITY IN KARIMUNJAWA ISLAND, CENTRAL JAVA – INDONESIA

Joko Prihantono, Yulius, Semeidi Husrin, Muhammad Ramdhan, & Wisnu A. Gemilang

ABSTRACT

As a small island and tourist destination, Karimunjawa municipal is need fresh water to support the tourist activity, mainly to supply drinking water. Unfortunately, freshwater on a small island is obtained from groundwater which is very limited and vulnerable to climate change and anthropogenic activities. A groundwater assessment is necessary to receive up-to-date information on groundwater quality, to assess the groundwater feasibility for drinking water, and determine the pollutant source. The assessment was conducted by collected groundwater sampling from dug wells and swamp area in Karimunjawa municipal and then analyzed the samples in the laboratory to obtain the value of Nutrient (NO_3^- , NO_2^- , $\text{NH}_3\text{-N}$); Heavy Metals (Cu, Fe, and Pb); and Salt (TDS, Cl⁻, Na⁺). These obtained parameters were compared with the quality standard of the minister of health regulation of the Republic of Indonesia about water quality standards for drinking water. In this study, 14 samples were collected and analyzed. The result shows that nutrient contaminant is low, but some groundwater sample was contaminated by ammonia. Heavy metal is undetectable, but almost all samples are contaminated by salt. Therefore, the groundwater in Karimunjawa municipal experienced seawater intrusion and not feasible to be consumed as drinking water.

Keywords: Groundwater quality, Karimunjawa municipal, groundwater pollution, seawater intrusion, small island.

CORAL RECRUITMENT ON ARTIFICIAL PATCH REEFS DEPLOYED IN THE MARGINAL REEFS: EFFECT OF MULTILEVEL SUBSTRATE ON DENSITY OF CORAL RECRUIT

Munasik, Agus Sabdono, Eunike D. Hutapea, Sugiyanto, & Denny N. Sugianto

ABSTRACT

A study of coral recruitment on Artificial Patch Reefs (APR) was performed in the marginal reef of Panjang Island, Central Java (Java Sea) to examine whether multilevel substrates of APR affect the density of coral recruits. Long-term and short-term observations were applied in yearly monitoring 2017-2019 and biweekly observations for 3 months in early 2019. Coral recruitment significantly varied among level substrates of APR ($F_{(a,b)} .05=3.08$; $p\text{-value}<0.05$) and there was a significant difference at the beginning of the year ($F_{(a,b) .05}=5.52$; $p\text{-value}<0.05$). The density of recruits on the substrates after 4 years post-deployment of APRs was 0.2 to 129.2 m^{-2} while the recruitment rate within short-term observations was 0.28-1.28 m^{-2} per month. The highest coral recruitment occurred at the middle to the top level of APR, while the lowest recruitment was found in the lowest level of APR. This is possibly due to high resuspension from the seabed. *Oulastrea* was dominant in both long- and short-term recruitment periods while *Pocillopora* was rare due to post-settlement mortality which trigger the overgrown coral-killing sponges. The results indicated that the adaptation of coral recruitment in the marginal environment is determined by the high recruitment of the small-colony coral species which possessed stress-tolerant for turbidity disturbance, such as *Oulastrea crispata*. This study suggested that the multilevel substrates, Artificial Patch Reefs (APR) are one of the reef rehabilitation methods which can be applied in the marginal environment enhancing coral recruitment.

Keywords: Density of coral recruits, coral recruitment, multilevel substrate, artificial patch reef (APR).

IDENTIFYING PRIORITY AREAS FOR COASTAL PROTECTION AROUND JAVA, INDONESIA

Jimy Kalther & Akemi Itaya

ABSTRACT

Climate change-induced sea level rise will likely increase the severity of ongoing coastal disasters in Indonesia. The selection and concentration approach should be applied to minimize the costs of conservation when budgets are limited. Prioritizing is then effective in terms of cost effectiveness. We aimed to identify priority areas for coastal protection against sea level rise around Java, Indonesia, using the Marxan model. The model uses systematic planning to select prioritized areas for coastal protection. Three scenarios were developed based on ecological, economic, and disaster elements that were exacerbated by sea level rise. A scenario is defined as a particular simulation circumstance based on assumptions about extrinsic drivers, parameters, and the structure of the model. Coastline length, mangrove coverage, low-elevation area, fishpond area, human settlement area, and the area of zones with the potential for annual rainfall increases acquired from DIVA-GIS and WorldClim were set as environmental factors. There were 60 areas facing the coast among 117 areas. For those protection, it would be fairly costly. We were able to narrow that number down from 18.8% to 62.4% from 117 areas using our method. This might become very cost effective. The most prioritized areas were located in the northern region of Java. These areas can be a focus of preferential effort and funding for conservation. The results of this study will help to make the protection strategy based on not only the magnitude of damage but also the total perspective using public data that is relatively easy to obtain.

Keywords: Aquaculture, erosion, low elevation area, mangrove, marxan.

EVOLUTION OF SUBSURFACE TEMPERATURES IN WEST SUMATRA - SOUTHERN JAVA WATERS DURING 2010–2014 INDIAN OCEAN DIPOLE EVENTS

A.R. Khairun Nisa & Ivonne M. Radjawane

ABSTRACT

The temperature anomaly formation in the West Sumatra and South Java Waters plays an important role in the formation of the Indian Ocean Dipole (IOD). There have not been many detailed studies on the evolution of temperature anomalies in the subsurface layers in the area during the IOD events. In this study, temperature data from the HYCOM were used to examine the evolution of temperature anomalies on the surface and subsurface in the event of negative IOD (nIOD) 2010 and positive IOD (pIOD) 2012). The analysis was done using a cross-section plot and a Hovmöller diagram. It has shown that in the negative IOD 2010, a positive temperature anomaly in the subsurface layer was started four months earlier than the surface layer and ended six months after the IOD event. In contrast to positive IOD 2012, a negative temperature anomaly formed in the surface layer seven months earlier, and then move to the deeper layer coincide with the onset of the positive IOD event. The negative anomaly in both layers was simultaneously over two months after the positive IOD event over. The La-Niña phase that coincides with the positive or negative IOD event, influences the process of forming temperature anomalies in the subsurface layer, which in this case supports (inhibits) the formation of positive (negative) temperature anomalies in negative (positive) IOD event. The temperature anomaly in the subsurface layer can be an alternative indicator in identifying and predicting IOD events.

Keywords: Indian Ocean Dipole (IOD), subsurface layer, la-Niña, West Sumatra waters, South Java waters.

IDENTIFICATION OF RECLAMATION AREA IN ANCOL OF NORTH JAKARTA USING RESISTIVITY METHOD

Dino Gunawan Pryambodo, Joko Prihantono, Syaiful Imam,
Abdurrahman Wafi, & Panganggit Sasmito

ABSTRACT

The coastal reclamation area is an expansion of coastal areas through technical engineering to develop new land areas. Identification of the reclamation area can be performed by detecting subsurface imaging using the resistivity method. This study used a multi-electrode (multichannel) resistivity imaging method. The resistivity imaging results show a good response of subsurface resistivity and successfully identified reclamation area with low resistivity $<27.8 \Omega\text{m}$ in almost the study area. Its depth varies from 4 meters to 30 meters. The reclamation results are composed of loose rock that has not been fully compacted, so it has not been well consolidated. As a result, it will experience land subsidence if overload.

Keywords: Reclamation, subsidence, Ancol, resistivity.