

# Spatial Analysis of Territorial Sea Area of Sipadan Island and Ligitan Island

Kharismaji Kalasmoro<sup>1</sup>, Sobar Sutisna<sup>1</sup>, Syachrul Arief<sup>1,2</sup>

<sup>1</sup>Republic Indonesia Defence University

<sup>2</sup>Geospatial Information Authority, Indonesia

## I. INTRODUCTION

The Unitary State of the Republic of Indonesia has declared the national sea area as an inseparable unit from the land area that forms the archipelago. This is also written in the journal Law of the Sea Review of the Territory of the Unitary State based on the International Law of the Sea Convention or the Law of the Sea Treaty, 1982.

With the form of the Indonesian state which is a maritime country, namely a country consisting of a group of islands. The form of an archipelagic state makes Indonesia have several geographical boundaries, one of which is the maritime boundary. The division of maritime boundaries in Indonesian waters is divided into three different areas, including the following:

### 1. The territorial sea

The government has issued law number 1 of 1973 whose content is related to the division of sea zones in Indonesia. The law states that the territory of Indonesia is located between two continental shelves, namely the continents of Australia and Asia which are referred to as the territorial sea.

The territorial sea is the territorial waters of a country drawn from the outermost coastline or outermost islands as far as 12 nautical miles towards the open ocean.

It can be said that the waters along 12 nautical miles obtained from the baselines of the Indonesian archipelago have full sovereignty over the sea, seabed, subsoil and air areas, including all natural resources in the area. In this territorial sea zone, Indonesia has an obligation to guarantee the right of innocent passage, either through archipelagic or traditional routes for international shipping activities.

### 2. Exclusive Economic Zone

Indonesia also has an Exclusive Economic Zone or EEZ which was announced on March 21, 1980. Within this zone, Indonesia has the right to take, exploit and utilize all available potential natural resources. As a country that has territorial boundaries or exclusive economic zones, Indonesia has the right to an EEZ which consists of:

- Indonesia has the right to protect, research and preserve the sea

- Indonesia has the right to explore, conserve, manage and exploit natural resources. Both in the form of biological and non-biological contained in the waters, subsoil, seabed, construction of marine buildings, marine scientific research, to protect the marine environment.

- Indonesia has the right to allow international shipping activities through this area and to install various types of sea transportation facilities.

However, it should be noted that these EEZ waters have a free status, as well as the status of the air above them, so that all international shipping and flight activities remain free to carry out.

### 3. Continental Shelf

The next boundary is the continental shelf boundary or territorial boundary announced in the Djoeanda declaration, December 13, 1957. This continental shelf boundary has a depth of less than 200 meters. If translated, the boundary of the continental shelf is the bottom boundary of the final part of the sea and is still connected to the continent. However, the country concerned must provide innocent passage shipping lanes, both above and below sea level.

This seabed area includes the subsoil section which is a natural continuation of the island land area in Indonesia. If the natural continuation is gentle, then the outer boundary of the continental shelf is marked by a continental rise or continental slope.

However, if the natural continuation is steep and not far from the location of the archipelagic baselines, then the outer boundary of the continental shelf is squeezed by the outer boundary of the exclusive economic zone (EEZ).

The Boundary of the Indonesian Sea

If calculated carefully, Indonesia's territorial sea boundaries in the north are bordered by several neighboring countries, such as Thailand (continental shelf), India (continental shelf), Malaysia (continental shelf and territorial sea boundaries), Singapore (territorial sea limits), the Philippines (EEZ), Vietnam (continental shelf), Papua New Guinea (continental shelf and EEZ), Palau (continental shelf and EEZ), Australia (continental shelf and EEZ), and Timor Leste (territorial sea boundaries, EEZ and continental shelf).

Sipadan Island and Ligitan Island are still nature conservation islands. However, in the future it is not impossible that the islands of Sipadan and Ligitan Island can be converted into military bases for neighboring countries. In addition to the potential threats that arise against the National Archipelago's IKN, the boundaries of the sea area on the islands of Sipadan and Ligitan Island themselves are still unclear because there are still differences in interpretation between the two countries Indonesia and Malaysia as well as unilateral claims in determining boundaries between countries

after the decision of the International Court of Justice. 2002 on Sipadan Island and Ligitan Island.

## II. METHOD

In this study, data processing techniques used spatial analysis. Spatial analysis is a collection of techniques that can be used to perform GIS data processing. The results of spatial data analysis are very dependent on the location or place of the object being analyzed. In addition, spatial analysis can also be interpreted as a technique that can be used to research and also explore from a spatial perspective. All techniques or approaches to mathematical calculations related to spatial or spatial data are carried out using the spatial analysis function.

Spatial analysis is a technique or process that involves several or several functions of calculating and evaluating mathematical logic that can be performed on spatial data, in order to obtain added value, extraction and new information with spatial aspects.

Changed area measurement on the map before and after the results of the 2002 International Court of Justice decisions on Sipadan Island and Ligitan Island

This area measurement uses spatial data processing software in the form of ArcGIS. Where the data used is the ZEE 15 map data of 1999 and the 2017 Indonesian sea boundary line data.

## III. RESULT

The measurement of changes in area uses data obtained from Bakosurtanal/BIG & Pushidros for the EEZ 15 map in 1999 while for the NKRI sea boundary line in 2017 obtained from BIG. This data is data on the maritime boundaries of the Unitary State of the Republic of Indonesia in the Sulawesi sea area. This map is a map from 1999 and 2017 so the time span of these two data is 18 years. These maps and maritime boundaries are then processed using the ArcGIS 10.4 spatial data processing software.

The measurement of the change in the area of the territorial sea boundary is a simulation of the change in the size of the area caused by the decision of the International Court of Justice number 102 on the rights of the islands of Sipadan and Ligitan Island in 2002.

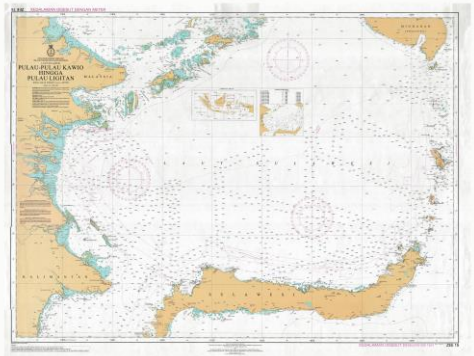


Figure 1. ZEE Map 15, 1999

From the map image, information is obtained that before the decision of the International Court of Justice, the territorial sea boundaries of Indonesia and Malaysia were still a straight

line, without looking at Sipadan Island and Ligitan Island which were included in the State of Malaysia.

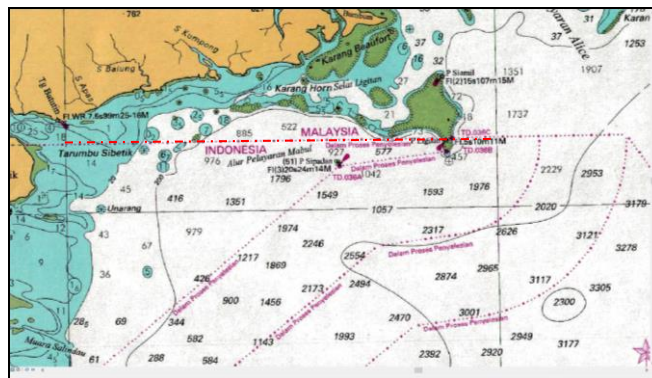


Figure 2. Red line inset ZEE Map 15, 1999

Then we make a simulation based on the rules in the regulations for determining territorial sea boundaries, then the straight line as shown in Figure 2 changes to a curved line as shown in Figure 3 below:

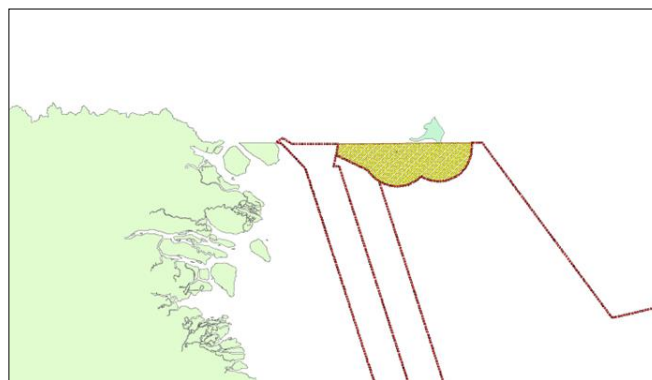


Figure 3. The result of a simulation of the territorial sea boundary that has the potential to disappear.

Based on spatial analysis using ArcGIS 10.4 software with map data for 1999 and 2017, especially in the circular shaded zone of Sipadan Island and Ligitan Island, the results as table below,

TABLE 1. Calculations from the territorial limit spatial analysis simulation,

Line	Area	Perimeter
The area of the territorial sea boundaries of Sipadan Island and Ligitan Island cut by the straight line border in 1999 (Shading Area)	1934,53 km <sup>2</sup>	212,193 km

By knowing this area, at least one can estimate the economic potential that has also changed starting from tourism with the richness of coral reef biodiversity, then marine products from the fishermen around it, and of course the issue of defense and security, if the area was previously part of the patrol area, then the patrol area will reduced.

## IV. DISCUSSION

Sipadan Island and Ligitan Island are islands that were previously disputed by the States of Indonesia and Malaysia. This dispute was later decided by the International Court of

Justice number 102 to become the right of the State of Malaysia in 2002. Sipadan Island is an island that is now in the state of Sabah, Malaysia. The location of this island is not far from the island of Borneo. The location of Sipadan Island is at coordinates 4.114967° North Latitude, 118.628667° East Longitude.

Pulau Ligitan Island is an island in the state of Sabah, Malaysia. The location of this island is not far from the island of Kalimantan. The location of the island of Ligitan Island is at coordinates 4.165447° North Latitude, 118.881568° East Longitude. The determination of sea boundaries has not yet been completed. Here the researchers simulated the territorial sea boundaries of Sipadan Island and Ligitan Island.

The territorial sea boundaries as defined by the United Nations Convention on the Law of the Sea (UNCLOS) are sea areas where sovereign states have special rights regarding the exploration and use of marine resources, including the production of energy from water and wind. The EEZ extends from the outer limit of the territorial sea (12 nautical miles from the baselines) to 200 nautical miles from the coast of the country concerned. It is also referred to as the maritime continental margin and in everyday usage can include the continental shelf. The term does not include the territorial sea or continental shelf beyond 200 nautical miles.

Based on map data in 1999 and 2017, the total area of the territorial sea changed after the 2002 International Court of Justice decision. The simulation results obtained a value of 1934.53 km<sup>2</sup> as the total area of the territorial sea which later became the right of the Malaysian state.

## V. CONCLUSION

Based on the 1999 map data simulation and the 2017 Indonesian sea boundary lines for the locations of Sipadan Island and Ligitan Island, it was found that the Malaysian state has experienced an increase in territory according to UNCLOS

where it can be claimed starting with a size of 12 nautical miles from the outer islands, it is known that the area of Malaysia's territorial sea has increased of 1,934.53 km<sup>2</sup>.

## REFERENCES

- [1] Gumilar, Nugraha. (2015). Ilmu Pertahanan dan Pendidikan Bela Negara Dalam Pembangunan Wilayah Perbatasan. WIRA: Kementerian Pertahanan.
- [2] Hartono. (2009). Geografi 3, Jelajah Bumi dan Alam Semesta. BSE: Departemen Pendidikan Nasional
- [3] Muslim, Much Aziz, Dkk. (2019). Data Mining Algoritma C4.5: Disertai Contoh Kasus dan Penerapannya dengan Program Komputer.
- [4] Faisal, M. Reza, Dkk. (2021). Teks Mining untuk Pemula: Konsep dan Implementasi Teks Mining. Belajar Data Science: Scripta Cendekia
- [5] Le, Minh Hang. (2022). Assesment of Land Cover Changes on Subi Reef in Truong Sa Islands, Vietnam Using Multi-Temporal Landsat Images. Journal of Science and Technique.
- [6] Kapiarsa, Asa Bintang. (2020) Penanganan Potensi Ancaman Terorisme di Ibu Kota Baru Indonesia Studi Kasus: Kabupaten Kutai Kartanegara dan Penajam Paser Utara. Jurnal Manajemen Pertahanan
- [7] M.S. Wicaksono & S. Darmawan. (2002). Pemetaan dan Pemantauan Lahan Terbangun Perkotaan dengan Data Landsat Multitemporal Menggunakan Google Earth Engine (Studi Kasus: Kota Bandung, Jawa Barat dan Kota Semarang, Jawa Tengah). Seminar Nasional dan Diseminasi Tugas Akhir: Institut Teknologi Nasional Bandung
- [8] Prasongko, Diarika Puspasari. Dkk. Putusan Mahkamah Pengadilan Internasional Nomor 102 Tahun 2002 Tentang Sengketa Pulau Sipadan dan Pulau Ligitan Serta Implikasinya pada Hukum Nasional Indonesia
- [9] Lestari, Tri Ditaharmi & Arifin, Ridwan. (2019). Sengketa Batas Laut Indonesia Malaysia (Studi Atas Kasus Sipadan Pulau Ligitan: Perspektif Indonesia). Jurnal Panorama Hukum
- [10] <https://ikn.go.id/> diakses tanggal 26 Januari 2023
- [11] [https://id.wikipedia.org/wiki/Angkatan\\_Udara\\_Kerajaan\\_Malaysia](https://id.wikipedia.org/wiki/Angkatan_Udara_Kerajaan_Malaysia) diakses tanggal 26 Januari 2023
- [12] [https://id.wikipedia.org/wiki/Angkatan\\_Laut\\_Kerajaan\\_Malaysia](https://id.wikipedia.org/wiki/Angkatan_Laut_Kerajaan_Malaysia) diakses tanggal 26 Januari 2023
- [13] <https://rimbakita.com/pembagian-wilayah-laut-indonesia/> diakses tanggal 30 januari 2023
- [14] <https://regional.kompas.com/read/2022/08/02/223153978/3-batas-laut-indonesia-laut-teritorial-batas-landas-kontinen-dan-zona?page=all#:~:text=1.,yang%20ditarik%20dari%20garis%20dasar.>