

GEOTOURISM POTENTIAL IN PEKON NEGERI KILUAN, TANGGAMUS, LAMPUNG

Bagus Sapto Mulyatno, I Gede Boy Darmawan, Ordas Dewanto*

*Teknik Geofisika Universitas Lampung

ABSTRACT

Kiluan Bay is one of the tourist destinations in the province of Lampung, precisely in the KiluanNegeri Village, Kelumbayan sub-district, Tanggamus. Leading attractions are currently being developed in the Kiluan Bay is dolphin which located in its natural habitat. Dolphin habitat utilization excessively can cause disturbances in the environment and habitat of dolphins themselves, so it is necessary to develop other potential tourist areas that can support tourist locations Kiluan Bay while enhancing the potential tourists who come to Kiluan Bay. Geological conditions in the Kiluan Bay can be one of the alternative development of tourism related to natural tourism potential (Geotourism). Based on observations in the field, gained five area of tourist location in Kiluan Bay which can be integrated into a package of Geotourism destination. These five areas represent the three characteristics of tourism that is dolphin in the sea, precisely in the habitable zone of dolphins, natural tourism by geological processes (Geotourism) include Kiluan Island, Laguna and Candi stone, as well as cultural tourism which can be developed of culture embraced by communities around the KiluanBay that is Bali and Lampung culture. Geological processes that formed the bay and the Islands inKiluanBay reflected in the appearance of shear fault obeliquestructuredue to regional tectonic force that formed Sumatra fault system. The lithology of the rocks in this area is dominated by basaltic andesite lava, andesite with xenocryst, coral limestone and shale sediments are gray and black.

Key Words : Kiluan, Dolphins, Geotourism, Bali and Lampung Culture

A. Introduction

Kiluan Bay is one of the tourist destinations in the province of Lampung, precisely located in Kiluan Negeri village, District of Kelumbayan Tanggamus. This area is one of the geological resources that have been exploited as a tourist area nuanced nature with its main icons are dolphins. Habitat dolphins are naturally located not far from the location of the Kiluan bay which has given life to the tourism potentials in this area. These dolphins that live in their natural habitat is composed of two types of Dolphins, first is Nose bottle that had big posture and are shy, whereas another kind of dolphins is Long Nose Dolphins that have a smaller body but more delighted to jump, thus further adding beauty during trip to see the dolphins are.

Famous site in Kiluan bay with dolphins did not discourage tourism potential such as natural tourism in Kiluan Island and the beach. There are several tourist sites which have been developed by the local community with regard to geological processes in its formation, the unique myth that can be one story idea during a trip to the Kiluan bay, and there is the potential for the development of cultural tourism (tourist village) related to the existence of some communities who live around the bay, one of which is a tribal society of Bali.



Figure 1. Sign Gate in Kiluan Bay Area

Development of Geotourism area can help increase the diversity of types of tourism in the Kiluan bay. By doing research on the processes of formation of landforms and unique outcrops and attractive tourist sites is expected to provide additional scientific nuances in a tour in the Kiluan bay.

B. Results of Site Visit

Based on observations in the field, there are at least five areas of tourist sites which can be integrated into one package so that a more diverse tourist destination. The fifth area can be seen in the following figure.

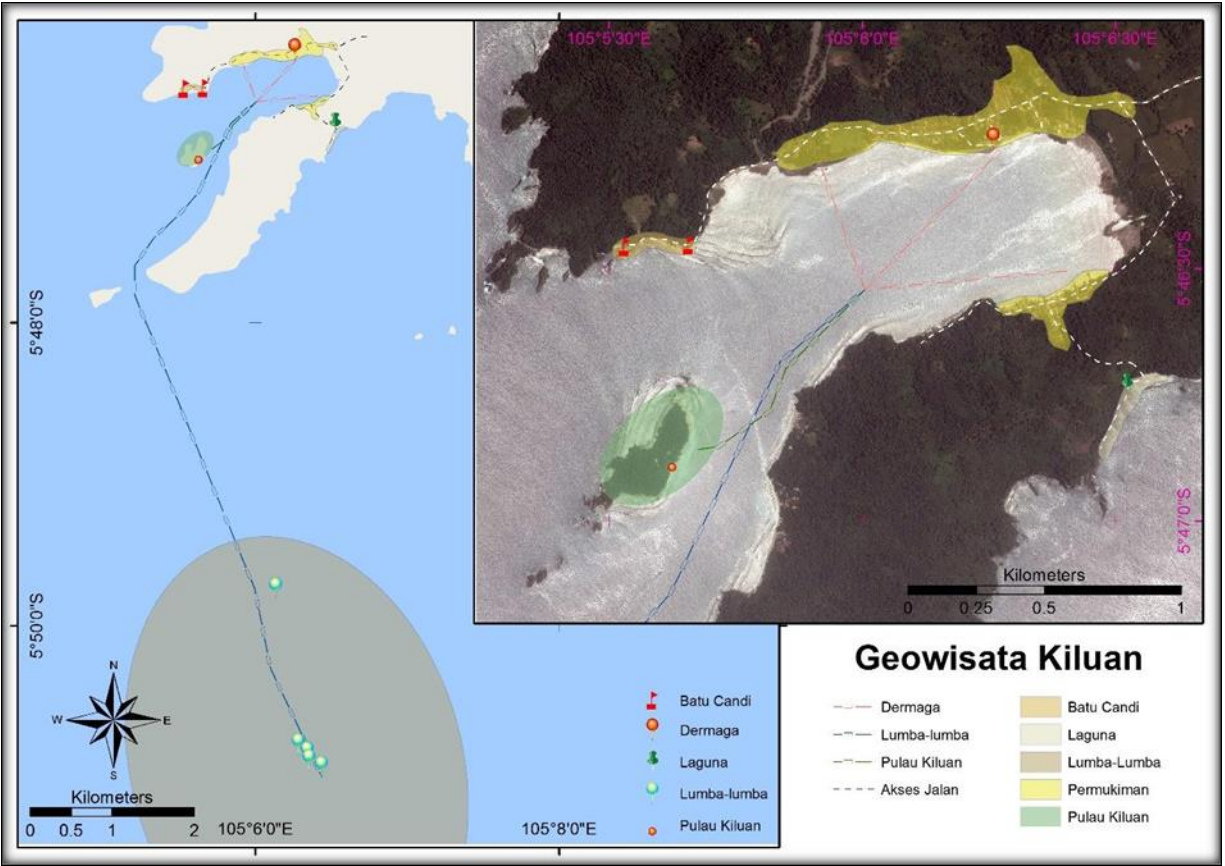


Figure 2. Tourism Map in Kiluan Bay

These fifth tourist areas represent the three characteristics of travel that is dolphin in the high seas precisely in the habitable zone of dolphins, natural tourism was formed by geological processes (Geotourism) includes Kiluan Island which located in the middle of the bay, lagoon which located in the south of the bay and the Stone Temple in the northwest of the bay. Community and cultural tourism which can be developed from the culture embraced by communities around the Kiluan bay.

B.1. Dolphin Location

The first area visited was location of dolphin habitat located in the south of the bay is about ± 10 km from the pier, which is taken for ± 30 minutes by boat catamarans / outrigger. Along the way to the location of the dolphins There are natural landscapes formed from interesting geological processes. A stretch of land jutting into the sea and islands located in the middle of the bay seems to be the gateway to the sea. Based on regional geological condition in the Kiluan

bay areas can be interpreted that the process of the formation of headlands and bays is caused by the movement of the crust are affected by the Sumatra fault system. Kiluan bay is an extension region that appears influenced by the changing direction of the resultant force of magmatic arc due subduction in the Sunda arc to Banda arc.



Figure 3. Tuntungkalik bay and Kiluan Island that seemed as gateway

Sunda arc that stretches from the northern tip of Sumatra Island has a relative direction southwest - northeast begun to change rotation around the southern Strait of Sunda due to a force to the southeast – northwest from the movement of the plate on the southern island of Java and the influence of the Australian continental plate collisions. This rotation resulted in the extension zone large enough and estimated to be the process of forming of Semangkan bay and Lampung bay and other nearby structures. Similarities coastline that looks on the map is also an indication that the tectonic processes are very strong role in the formation of headlands and bays in this area.

After traveling about 30 minutes started to look a few other boats that are looking for the location of the dolphins that will appear on the surface of the sea. A few moments later appeared a group of dolphins that appear on the surface within a few minutes.

Distribution of dolphin habitat estimated to be very spacious and the area around Kiluan bay is expected as dolphins area to look for their food.



Figure 4. Dolphins in Kiluan bay

The beauty of dolphins tourism in Kiluan Bay that attracts tourists almost every day towards the sea where their habitat giving a classic problems due to human activity that is garbage. If considered, there will be plastic waste floating in the ocean which causes disruption preservation and cleanliness of the sea which can be long-term repercussions on the habitat of the dolphins themselves. Some people expressed the opinion that the trash originated from Tanggamus city washed downstream, but it seems it has not been proven so far.



Figure 5. Garbage in the dolphin habitat area caused by human activities

After witnessing the emergence of the dolphins several times, the next trip back to the mainland because of the condition of the boat also began filling with water and a fuel capacity of the engine into consideration. Interesting scenery is also offered in all the way back, which appear beautiful hills and the mountains that are expected as a source of volcanic rocks in the Kiluan bay area.

B.2 Kiluan Island

Kiluan Island is a tourist island located in the middle of the bay which has a close distance from the boat pier and the beach in the Kiluan bay. The composition of rocks constituent dominated by Tertiary andesite lava and has been deformed strongly which is characterized by there are many shear joint in outcrop. The process of plate tectonics that drives fault shear obelique to form a gap bay when observed from above, coastline along the headlands and islands in the bay are very similar.



Figure 6. Reconstruction of fault shear obelique in the Kiluan bay.

The process of that fault is expected as a result of establishment of mechanism Kiluan Island based on the observation of surface appearance and site visit. Outcrop of lava rock andesite that is obsolete and fractured can be observed on the southeast coast of the island. Outcrop colored gray-brown on the upper layer of apparent rate of weathering is more intense than the bottom layer is colored gray-green.

The appearance of lava andesite which has basaltic composition is estimated deposited in a shallow marine environment which is then lifted due to the process of shifting from an existing fault. Outcrop looks like the structure of the pillow and there are remnants of the life of shallow marine organisms on the surface of the rock outcrop.



Figure 7. Andesite outcrop and residual activity of marine organisms on top of rocks.

The existence of coral limestone which is also exposed at the surface increasingly clear instructions regarding the geological processes that occur on the Kiluan Island. Limit contact clearly visible in the southern part of the island showing the contact between carbonate rocks (limestone coral) with andesite lava.



Figure 8. Outcrop of conglomerate carbonate rocks in the Kiluan Island

Carbonate rocks with andesite fragments formed conglomerate carbonate rocks with lava andesite as fragments / matrix sized gravel until lumps and carbonate rocks as cement. These rocks are white reddish in carbonate rocks while andesite brownish gray. Andesite outcrops oriented stance directed $N 05^{\circ} E$ and dip 60° . The process of abrasion by the sea waves quite intensively in the southwestern part of this island so that andesite outcrop becomes steep and rugged and also strong fractured and form coral islands that are difficult to access. But in the western part of the island there are still several interesting areas to visit and related in the geological processes on their establishment.

Outcrops of andesite rock made the hallway than can be found on the west of Kiluan Island. It formed a unique and interesting outcrops as Geotourism location. Rock color gray-brown and has a structure such as a pillow and shear joints. These outcrops also have veins of quartz that had started decaying and shape azimuth angle direction of the fault that exists (following the pattern of the fault). One of the quartz veins are exposed at the surface which contain sulphide minerals has shiny black color that we know as galena (PbS).

The availability of mineralization in quartz veins indicate events rock movement caused by shear fault structure that has been in contact with the hydrothermal solution. This mineralization events can be an instructions which associated with mapping of mineralization potential around the Kiluan bay. However the beauty of the beach in Kiluan island still not over, that expanse of clean white sand beaches and clear water as well as the partial remains of coral reefs into a strong appeal in completing Geotourism in Kiluan bay.



Figure 9. The Beach in Kiluan Island and Snorkeling equipment rental

B.3. Lagoon

Lagoon is referred to in this article is a pool formed by andesite which has a gap wide enough to separate the sea water in the gap with the high seas so it seems looks like a lagoon. Unlike the commonly encountered lagoons, lagoon in Kiluan bay is a gap formed by the ruins of rock that is fractured strongly by joint directed N 20 ° W, which then slowly destroyed by abrasion of ocean waves so that a large chunk of andesite rock fell into the sea and piled.



Figure 10. The ruins of andesite formed a gap in the rocks that make up the lagoon

The result of this the ruins caused cracks that can be bypassed by sea water and pose a puddle on a crack in it. The ruins of andesite rock formed a volcanic breccia rock cemented, It formed volcanic breccia rock consolidated so that a dividing wall between the high seas and the beach.



Figure 11. Mini lagoon in Geotourism area, Kiluan bay

The gap between the wall andesite with this sea become a pool which looks like a mini lagoon that can accommodate sea-water carried by currents and waves so that this area becomes one of the interesting and unique area to be visited. Many tourist who comes to lagoon to enjoy the beauty of swimming in the pool was formed by geological process although the journey that must be taken quite tiring. This is because the location of the lagoon is across the bay and had to climb the hill to arrive at that location.

Besides the many gap in the bedrock causing this area is rather dangerous and to reach this area should be guided by a guide who knew the area well. Gaps that exist as a result of unconsolidated rock cause a rise in sea water from the gap and become one interesting show in the location of the lagoon. The sea water that break through the gap will rise to the top with a very strong radiating upward like a fountain show that happens naturally.

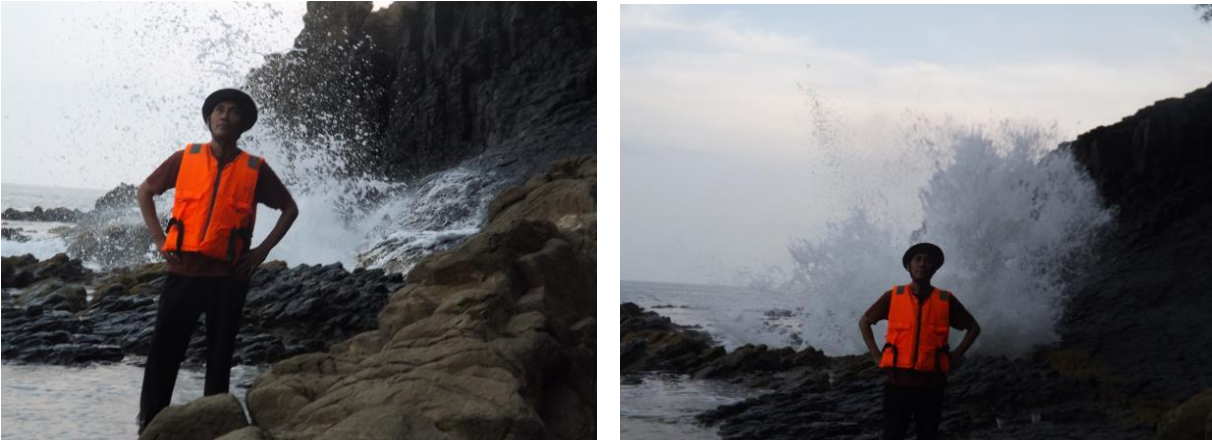


Figure 12. Sea water break through the rock that radiates to the top

Andesite outcrops in the area of the lagoon is estimated parts of basaltic andesite lava units are exposed at Kiluan Island. However, to further strengthen this interpretation required further research involving microscopic observation through an incision petrography and to know the characteristics of magma that make up this rock is necessary to XRD and XRF analysis.

B.4. Stone Temple

Last Geotourism area is the area of Stone Temple located in the northern Kiluan Island. The path has taken to reach this area is through of the beach along the northern part of the bay. The trip can be done on foot or using motorcycle. There are two geological outcrops to be observed at this location. There are outcrops of andesite stone which is unique geologically on the way to the temple.

These rocks outcrop if observed andesite outcrops appear as usual, but if we look more closely, it would appear that the unique geological process appears from these rocks. The process is the presence of xenoliths on the rock. The xenoliths is estimated to be fragments of the source rock are older than this andesite. The fragment ingested / mixed in the magma and transported in it as it freezes.



Figure 13. Outcrops of andesite lava containing xenolith

Beautiful and exotic Xenolith are usually derived from the mantle, but xenolith on an outcrop indicates comes from the older bedrock. The edge of xenolith can be identified easily and fairly rounded shape. Xenolith are small and formed by the crystals mineral usually called xenocryst and different from the constituent of andesite mineral called phenocryst.

The next area is a sedimentary rock outcrop in the sea that has been consolidated with a very strong and eroded by abrasion of sea waves and form structures such as temples known by the public as the Stone Temple. Outcrop shale composed of mineral grains sized clay which has consolidated to the surface indicate the presence of tectonic processes that cause the layers of sedimentary rock is lifted to the surface. These rocks outcrop composed by layering shale that has a different color is gray-green and dark black. This difference is caused by time difference and the deposition of sediment supply is gradually so that the characteristics of the sediment supply that comes causes a different color.

The color of shale is gray to black indicate that these rocks contain organic material inside with a content ranging between 1-2% only. Besides it, the color almost always indicates that the depositional environment of these rocks are in environments that lack of oxygen / deep sea.



Figure 14. Outcrop sedimentary rock at the site of Stone Temple

Shale rock types are brightly colored like reddish and yellowish or brownish formed in an environment that has a lot of oxygen and often contains tiny particles of iron oxide or iron hydroxide such as hematite, goethite or limonite. The presence of hematite can produce red shale and limonite or goethite presence can produce yellow or brown flakes.

The process of abrasion by the waves cause the rocks eroded and form structures such as temples because the level of violence sedimentary rock is lower than igneous rock.



Figure 15. The beauty of Geotourism area, Stone Temple

However, this process will accelerate the ruins of rocks that exposed and damage the structure which has been formed. Even at the bottom of the rocks are awash appear eroded by sea water so the structure that appear strong has lost its power. Therefore it is necessary to be careful in conducting tourism activities in this area and need to be accompanied by a local guide.

B.5. Indigenous Peoples / Cultures

Tourist sites were able to complete the tourism activities in Kiluan bay is the presence of indigenous peoples which is if guided as well will be able to donate the beauty of their culture in the tourist area of Kiluan Bay. One of these communities are indigenous Bali which is thick with their culture. Based on observations and interviews with one of the local people in Kiluan bay obtained information that indigenous peoples are ready and able to contribute in culture field for increased tourism in Kiluan bay.

But to go in that direction needed accompaniment to direct how this potential can be managed properly and professionally. Need the support of all parties and also government in the development of tourist areas Kiluan Bay. Therefore, not only the exploitation of dolphin tours are the focus of tourism development, but also the role of the community as well as Geotourism potential managed to integrate into one of the main programs in the tourist village of Lampung province.