



Structure Control of Iron Ore Education on Sebuku Island

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ABSTRACTS

Sebuku is occupied by serpentinized ultramafic (peridotite) rocks, gabbro, and chert which are ophiolite series formed in the oceanic crust, in the middle occupied by tuff and claystones. The purpose of this study was to determine the distribution pattern of iron ore deposits. The research area illustrates that the distribution of Fe elements with high levels of >48% is concentrated in the northeast-southwest part, while Fe elements with levels of <48% are concentrated in the southwest-northwest part of the west. Based on the topographic classification of the research area. The pattern of mineralization follows the structural pattern that occurs, where the lateralization of the source rock is intensive in the crushing zone around the structure that forms the main structure and minor structure. This destruction zone serves as an effective water infiltration medium to accelerate the washing process which forms supergene enrichment zones. The pattern of distribution of mineralization is relatively Northeast-Southwest which in some places is characterized by the straightness of the ridge or morphology with more contrasting and prominent zones on the lidar mosaic map.

ARTICLE INFO

Article History:

Received 12 April 2022

Revised 13 April 2022

Accepted 27 June 2022

Available 30 June 2022

Keyword:

Iron Ore; Scatter Pattern; Structure; Sebuku

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INTRODUCTION

The existence of Ore in the Mining Authority area is essential to know with certainty its potential. It will later aim to support national steel projects that are used to meet national and international steel needs (Thamsi, Bakri, et al., 2021; Thamsi, Jafar, et al., 2021). Mineralization in Sebuku Island is formed by the lateralization process, which is closely related to weathering, oxidation, and leaching processes under normal pressure and temperature conditions. The state of rock that is destroyed by tectonic processes plays an active role in the rapid weathering process because it facilitates the infiltration of surface water so that the leaching process runs perfectly in the enrichment zone (supergene enrichment zone) (H. Bakri et al., 2021; Thamsi, Aswadi, et al., 2021). This process of iron mineralization has prompted further research. (Pambudi, 2013). Kalimantan is one of the areas that have a wide distribution of Ore. Especially in South Kalimantan; iron ore deposits are pretty abundant in the southern part, where the southeastern part of South Kalimantan is generally composed of ultramafic igneous rocks; iron ore deposits have interesting, unique characteristics ranging from their formation related to weathering processes to elemental associations. - altered elements of the original rock. (Rustandi, 1995). This study aims to determine the characteristics of iron ore and the distribution pattern of laterite iron ore deposits (S. Bakri et al., 2022).

METHODS

Based on the data obtained from drilling data analysis and analysis of Fe element assay data and its associations, the distribution pattern will be known, which will be done manually and will be correlated with X-Ray results, then compared with titration or manual analysis and the data obtained will be processed using ArcGIS.

The quantitative analysis used in this study is evidentiary by combining several data, including literature review, field data, drilling data, and grade analysis data. They were studied and analyzed comprehensively to determine Fe content data's characteristics and distribution patterns. The stages in



this research include a Literature study conducted before and during the study. At this stage, the collection of sources of information related to the characteristics of iron ore and its distribution pattern is carried out.

In this stage, the data obtained is then processed to determine the spread laterally and vertically. After getting the value of Fe content from each drill point using Niton X-Ray, proceed with making the distribution of drill points at the research site using ArcGIS software. Then compare the value of Fe content from one drill point to another to determine iron ore characteristics. In the data processing process using Arcgis, it is necessary first to know what parameters need to be considered: drill point data consisting of easting, northing, elevation, depth, and lithology.

RESULTS AND DISCUSSION

Core Drilling Data Analysis (Drill Log)

The drilling results obtained samples in cores, then got five types of lateralization zone division at PT. SILO is based on the characteristics of each zone which include:

1. Brownish Soil

The brownish soil or overburden (OB) zone is generally shown in the appearance of the core with a blackish brown to reddish brown color because it consists of soil resulting from weathering, decaying leaves, iron oxide, and is commonly known as humic acid. Red soil indicates the presence of ultramafic rocks, although this is not always true.

2. Gravel

This gravel zone is a red-brown weathered soil with nickel and more iron elements. There are small rock fragments due to the weathering process of the parent rock. Gravel-sized materials are generally dark brown to black, large gravel to boulders (Wentworth scale), well rounded to moderately angled, weak to solid magnetism, and inflexible hardness; the dominant mineral of each gravel material is generally limonite, hematite, and goethite, thick zone it is an average of 3 meters.

3. Yellowish soil

The yellowish soil zone has a yellowish-brown color, visible texture, fine-grained, slightly plastic to very plastic, elastic, weak magnetism, completely weathered, and soft hardness; the dominant mineral composition in this zone is limonite. In this zone, sometimes found black manganese oxide. In general, tiny organic remains such as plant roots are located, and this zone is thin in steep areas.

4. Green soil

The greenish soil zone is yellow-green, delicate to coarse-grained, slightly plastic, inelastic, weak magnetism, moderate weathering, fresh or discolored rock is still present, and the original rock texture is still visible, the minerals forming the bedrock can still be seen. This zone is a transition from yellowish soil to Bedrock.

5. Bedrock

The bedrock zone is characterized by blackish gray and greenish gray. It consists of ultramafic igneous rock (peridotite) and serpentinite which are still compact. There are fractures filled with silica veins. Drilling sometimes does not reach the bedrock layer due to several factors, namely frequent landslides on the rock walls, and the drill bit cannot penetrate the rock, so the drilling is stopped; the drill tool used is a manual drill.

Simbol	Lithologi	Kadar Rata-Rata				
		Al ₂ O ₃ (%)	Cr ₂ O ₃ (%)	Fe (%)	MnO (%)	SiO ₂ (%)
	Brownish Soil	-	-	-	-	-
Gravel	CF	6,97	2,57	50,10	0,98	1,75
	LO	6,08	2,89	52,43	-	2,50
	OS	6,92	-	53,38	-	1,51
	Yellowish Soil	7,49	4,85	48,70	1,29	3,29
	Greenish Soil	15,20	1,60	37,00	1,11	14,30
	Bed Rock	1,09	0,96	10,40	0,25	36,10

Figure 1. Laterite Iron Deposit Profile (Pambudi, 2013)

To determine the grade value from the drill log, the rock samples obtained from core or coring drilling were prepared according to the standards used by PT Sebuk Iron Lateritic Ores (SILO). The samples were analyzed using Niton X-Ray. This analysis is carried out for models to be exported to determine elemental data and levels per drill point. The elements and levels known by the Niton X-Ray analysis are the levels of Fe from iron ore deposits, which will then be used as data for the following mining process.

Mineralization Distribution Pattern

Geological structures play an active role in destroying ultramafic (ultrabasic) rocks; this destruction process forms gaps between grains and the minerals that make up the rock. This destruction zone is a medium that plays an active role in the surface water infiltration process, which can later accelerate the weathering and washing process to form a supergene enrichment zone. From the results of studies on drilling carried out in several places, such as in the Serakaman and Belambus blocks, the variogram contour of the distribution pattern and continuity of Fe levels is relatively Northeast - Southwest.

The research area illustrates that the distribution of Fe elements with high levels of >48% accumulated in the northeast-southwest with red, yellow, and green colors. Meanwhile, Fe elements with levels < 48% were collected in the southwest - north northwest. Based on the topographic classification in the study area, Fe elements with high levels of >48% showed red, yellow, and green colors, distributed in flat and sloping topographic regions. Moreover, Fe elements with low levels of <48% are distributed in relatively steep topographic areas.

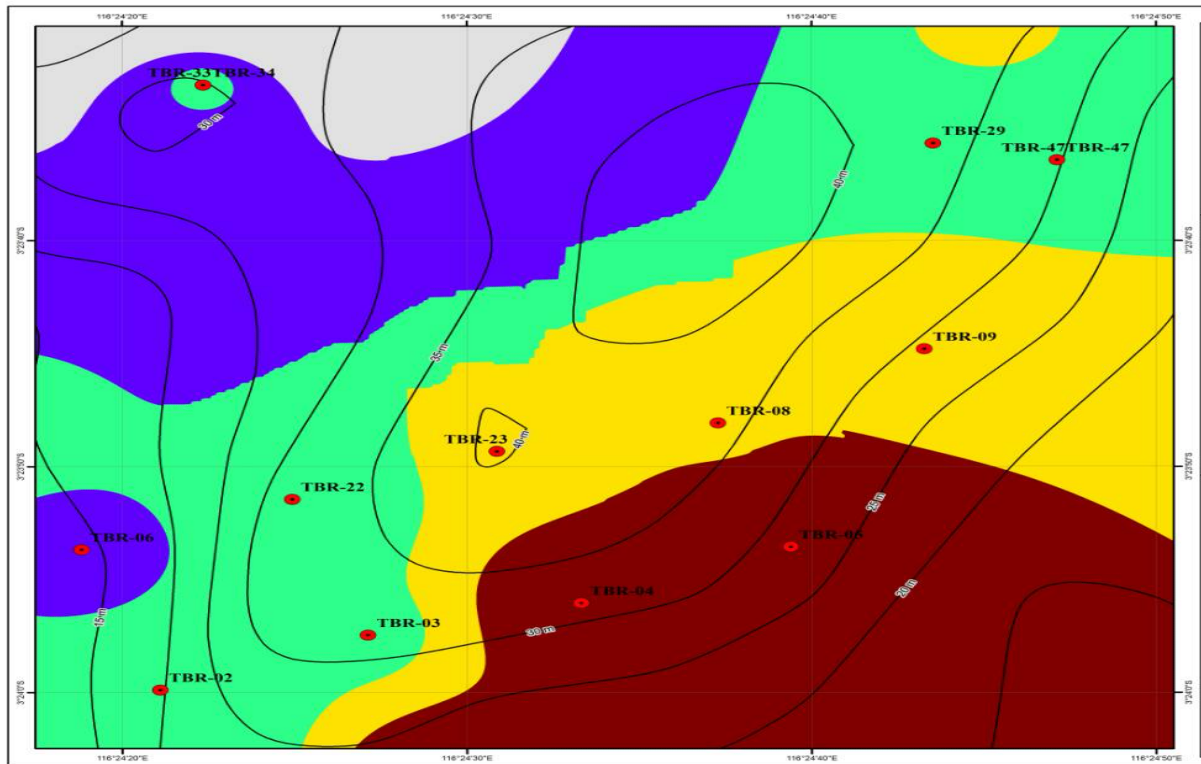


Figure 2. Fe element distribution map

Fe distribution map depicts gray color with Fe content of 11.79%-38.39%, blue color with Fe content of 38.4%-48.28%, green color with Fe content of 48.29%-51.95%, yellow color with Fe content of 51.96%-53.32%, and red color with 53.33%-57% Fe content.

From the map of the pattern of distribution of Fe levels above, it can also be seen that the zone of supergene enrichment with high grades and with a relatively broad distribution is found in the gravel and yellowish soil zones, where the limit for the ups and downs of the groundwater level is in the zone which is rich in gravel content.

CONCLUSION

From the results of the discussion in the previous chapter regarding the characteristics of iron ore, it can be concluded as follows:

1. High Fe content >48% was found in the gravel and yellowish soil zones, with a relatively broad distribution from northeast to southwest. Meanwhile, Fe elements with levels of <48% accumulated in the southwest-north-northwest, which is different in the rather steep topography.
2. The pattern of mineralization on Sebuk Island follows the structural design, where intensive parent rock lateralization in the crushed zones around the structure forms the primary and minor systems. This destruction zone is an effective water infiltration medium to accelerate the leaching process, developing supergene enrichment zones.
3. The distribution pattern of mineralization is relatively Northeast–Southwest. Some places are characterized by ridge lineaments or morphology with more contrasting and prominent zones on the lidar mosaic map. This distribution pattern can later be used as a guide for further exploration and development planning activities. This is because the continuity of the Fe content follows the straightness pattern of the morphology, like the straightness pattern in the morphology of the ridge.

ACKNOWLEDGMENT

I want to thank all leaders and employees of PT. Sebuk Iron Lateritic Ores (SILO) Site Sebuk South Kalimantan has provided opportunities, assistance, facilities, and guidance so that this research can be carried out correctly.



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