E-ISSN : 2541-5794
P-ISSN : 2503-216X

Journal of Geoscience,
Engineering, Environment, and Technology
Vol 01 No 01 2017

Control Structure of Garba Formation Through Petrography Analysis in Tanjung Beringin, South OKU Regency, South Sumatra

Ridho Widyantama Putra[1,*], Frillia Nasution[1], Nurlita Putri[1], Rahmat Alfath[1]
[1] University of Sriwijaya, South Sumatra.

* Corresponding author: widyantamaridho@gmail.com
Telp :+62822-9852-0185
Received: Oct 1, 2016. Revised : Nov 15, 2016, Accepted: Nov 20, 2016, Published: 1 Dec 2016
DOI : 10.24273/jgeet.2016.11.4

Abstract

The study area is the village of Tanjung Beringin carefully situations, South OKU Regency, which is included within the Subpalembang Basin with the dominant lithology is granite. Granite in this area has a diversity of grain size and mineral composition, in the southern part of the study area the size of the mineral feldspar is greater than the granite in the northern part, where the granite in this section contains plagioclase and quartz dominant, and it was bigger than the other minerals, Granite on the area carefully situations are the result of the appointment that occurs due to the compression phase at the end of the Late Jurassic until Late Cretaceous. Fracture growing on granite have a general direction Northeast equivalent to tectonic compression Miocene - Now, the presence of other directional sharpness is secondary sharpness formed by the collision between the rocks. Fractures that develops is the path where the discharge of magma to the formation of granite with different characteristics. In petrographic analysis porphyritic texture is thriving and there are indications of alteration process in the presence of alteration minerals such as chlorite and quartz vein.

Keywords: Granite, Structure,Basement, Fracture, Petrography.

1. Introduction

South Ogan Komering Ulu regency geographically located between 103^0 2 - $104^0$21 longitude East and 04^0 14 04^0 55 latitude South. It has 549.394 Ha width area. Geologically, the location research arranged by three formation namely; Garba Formation, Baturaja Formation and Talang Akar Formation. The vast majority of location area arranged by Garba Formation and lithology granite.

Granite is acid rock which formed by coagulation process of magma. Particularly mineral component on granite is quartz, feldspar, plagioclase, and biotite .

The aim of this research is studying petrography of granite rock in Muara Dua Region, South Oku in order to find out megascopic and microscopic granite rock.

2. Regional Tectonic

According to Suparman (1991), Palembang Basin is the southeastern part of South Sumatera Basin, located west and south of Palembang. Tectonic order in the research area which in the South Sumatera Basin has had northwest-southeast tending linements that parallel to the strike slip fault Sumatera Island's trend.

According to De Coster (1974), it has been estimated that 3 episode of orogenic which formed framework structure in region of South Sumatera cavity that is orogenic Mesozoic Center, tectonic last lime– first Tertiary and orogenic Plio – Plistocene.

First episode, precipitates Paleozoic and metamorphosed Mesozoic, foldaway and broken into chunks structure and intrusion by granite batolith also has formed the basic pattern of cavity structure. In accordance with Pulunggono (1992), this phase forming fault has an aim of NWE such as move faults.

Second episode on the last lime such as phase exstention which producing tencional moves which formed graben and horst in general has an aim of north – south. Combined with the result of orogenic Mesozoic and rock weathering – rock Pra – Teriary, tenssional moves that forming old structure which controlling the formation forming of Pra – Talang Akar.

Third episode such as phase compression on Plio – Plistocene that causing sedimentation pattern changing into regression and have a role in forming foldaway structure fault thus forming geologi configuration now. On this tectonic period also occur elevation of Bukit Barisan Mountain which produce Semangko Fault level off that amend along Bukit Barisan Mountain. Horizontal

movement which occurred started from first Plistocene until now influence South Sumatera Cavity condition and the center until the new faults formed on this region has development almost a line with Semangko Fault. Caused by this horizontal movement, orogenic which occurred on Plio – Plistocene produce foldaway which have an aim to North West – South East however fault which has formed have an aim to North East – South West and North West – South East. The Kinds of fault which exist on this cavity is ascend fault, level off fault and normal fault.

The dominant visible structure is structure which have an aim to north west – south east as a result of orogenesa Plio – Plistocene. Consequently structure pattern which occurred can be differentiated as old pattern which have an aim to North – South and North West – South East along with young pattern which have an aim to North West – South East which is a line with Sumatera Island.

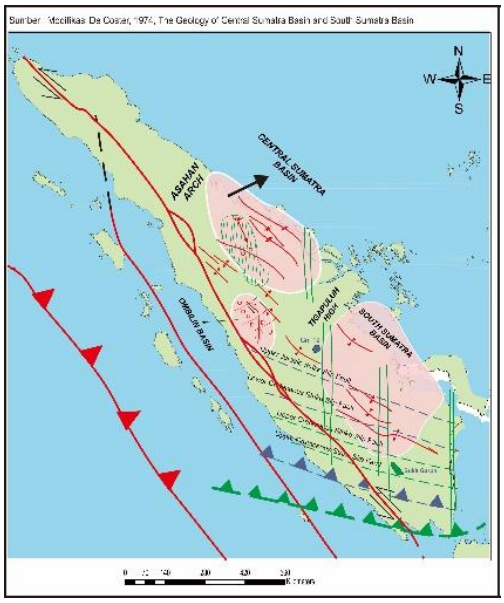

Fig. 1. South Sumatera tectonic, Pulonggono (1992).

3. Regioal Stratigraphy

Regional Stratigraphy South Sumatera cavity particularly known as megacycle which consist of phase transgression and following regression phase. Formation group that precipitated in transgression phase constitute Telisa's Group (Talang Akar Formation, Baturaja and Gumai) whereas the precipitated one on regression phase constitute Palembang group (Air Benakat formation, Gumai and Kasai) whereas Lemat Formation and Older Lemat precipitated before the main transgression phase. And sort of formation by old to young on South Sumatera cavity according to De Coster,1974 is group of Pra-Tertiary, Kikim Formation and Older Lemat Formation, Young Lemat Formation, Talang Akar Formation, Baturaja Formation, Telisa Formation, Gumai Formation, Lower Palembang Formation, Middle Palembang Formation and Upper Palembang Formation.

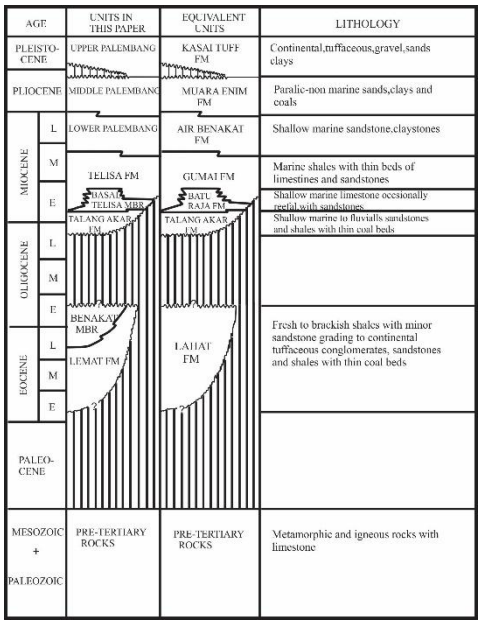

Fig. 2 Stratigraphy chart of the South Sumatera Basin, Adiwidjaja and De Coster (1973).

4. Research method

The method that used on this research is :

1. Data collection field by obtaining sample data granite rock.
2. Carry out petrography laboratory analysis that take place at Laboratorium Dinamik and Petrologi, Department Geological Engineering, Sriwijaya University, Palembang.

5. Result and Discuss

5.1 Physical Characteristic

Granite existence in the research area is dominant compare to other lithology. Physical characteristic of granite on research area in general, it has moldy dark brown color, fresh cream till white color, crystallinity holocrystaline texture, granularity phaneritic, composition of mineral is quartz, feldspar, plagioclase, and biotite (Fig 1). On the physical evident is found mineral measurement which different with granite in the one location to another, this case is showing that the bigger than other mineral measurement so the more closer to the source and if the mineral measurement more smaller so the granite is getting far away from the source. Granite on the research location constitute as product of intrusion on Garba Formation, beside that on the granite are exist squat tenssion and shear joint which formed by the cause of energy which struck the granite. The granite that controlled by many squat is showing that its granite is closer to tectonic activity and the other way if on the granite is less of the squat so the granite far from tectonic

activity. And in some locations has squat which is contained by quartz mineral (quartz tendon).

Fig. 3. The exposure of granite outcrop in Komering River.

Fig. 4. Quartz Vein on Granite.

5.2 Petrography Analysis

There exist 5 sample which reputed represent the granite that exist in the research location, in Muara Dua Territory in order to analyzing petrography. The sample code is differentiate base on number that is; 1.L1, 1.L3,1L5,1.L6 and 1.L7.

Result analysis of petrography with using IUGS classification, showing that mineral component which identification from granite sample has Quartz percentage (20%-45%), Plagioclase (10%-30%), Feldspar (10-20%), Biotite (5-25%), Opaque mineral (2%-5%) and Clay mineral (5%-20%) with exist mineral difference that is chlorite (28%).

Table 1. Percentage of mineral components on granite.

Mineral Component	Sample Code				
	1.L1	1.L3	1.L5	1.L6	1.L7
Quartz	40%	30%	40%	42%	45%
Plagioclase	15%	10%	10%	20%	30%
Alkali Feldsfar	15%	20%	-	-	10%
Biotite	5%	10%	25%	15%	5%
Opaque Mineral	6%	2%	5%	5%	5%
Clay Mineral	9%	-	20%	18%	5%
Chlorite	-	28%	-	-	-

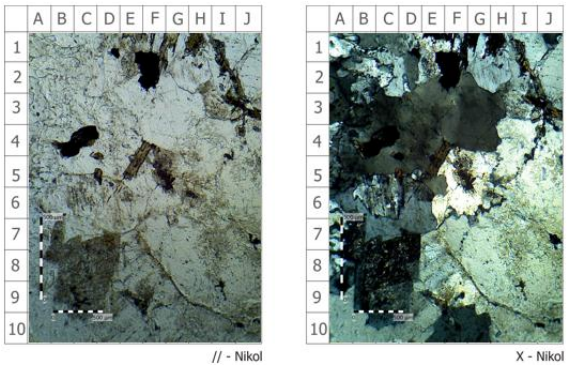

Fig. 5. Granite existence in a petrography analyze on the example of Slices 1.L1. Captured by Polarization Microscope magnification 40x.

Thin sectiom of igenous rock, silica mineral (Alkali Feldspar, Quartz, and Plagioclase) first formed at >400^0 C temperature, then accumulated alkali mineral (biotite), be found mineral difference on the thin section indicate that there is alteration process.

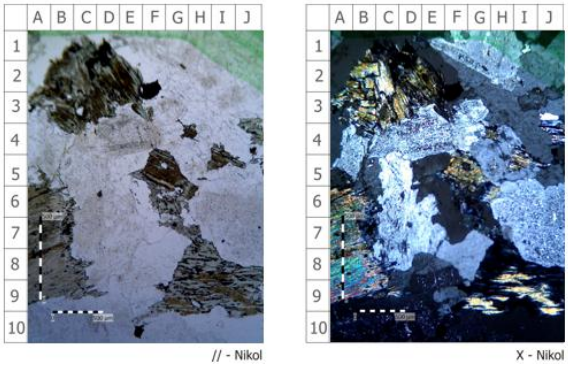

Fig. 6. Granite existence in a petrography on the example of Slices 1.L3. Captured by Polarization Microscope magnification 40x.

Thin section granite rocks, silica mineral (Alkali feldspar, Quartz, and Plagioclase) first formed at >400^0 C temperature, then accumulated by alkali mineral (Biotite), be found mineral difference chlorite, indicated of alteration process propilitik (Corbett and Leach, 1996).

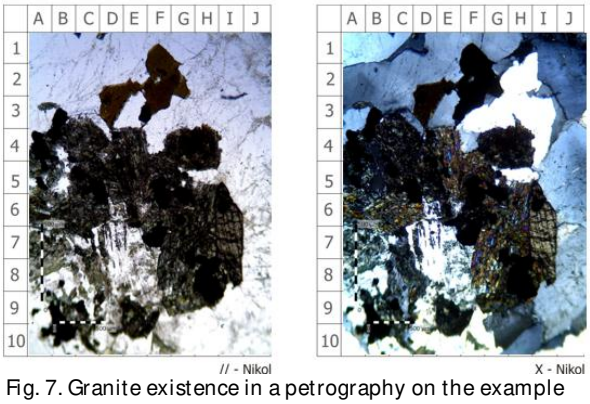

Fig. 7. Granite existence in a petrography on the example of Slices 1.L5. Captured by microscope polasisari magnification 40x.

Thin section of granite rocks, silica mineral (Quartz, and Plagioclase) first formed at >400^0 C

temperature, then accumulated alkali mineral (biotite), be found mineral difference chlorite, indicated of alteration process propilitik (Corbett and Leach, 1996)

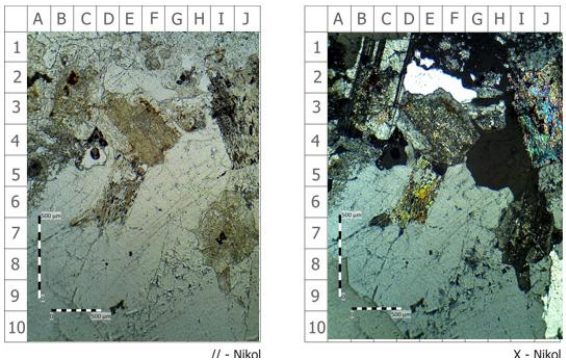

Fig. 8. Granite existence in a petrography manner on the example of Slices 1.L6. Captured by microscope polasisari magnification 40x.

Thin section of igneous rock intrusion, silica mineral (Quartz, and Plagioclase) at first formed at >400^0 C temperature, then accumulated alkali mineral (biotite), in petrology description be found green clay mineral, mineral the clay result of difference mineral alkali feldspar and quartz.

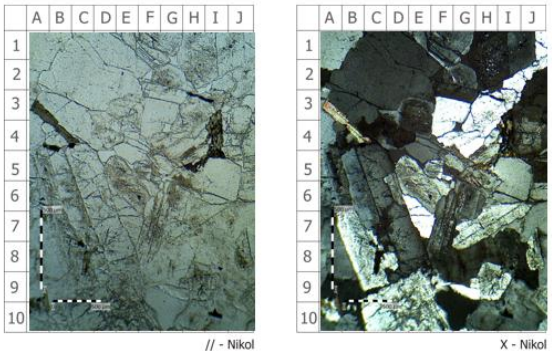

Fig. 9. Granite existence in a petrography manner on the example of Slices 1.L7. Captured by polarization microscope magnification 40x.

Thin section of granite rock silica mineral (Alkali Feldspar, Quartz, and Plagioclase) at first formed at >400^0 C temperature, then accumulated alkali mineral (biotite), be found clay mineral, as a result of difference from Quartz mineral, granitic structure.

5.3 Local Structure Analysis

By the result of the range observation and doing the measurement toward the amend of fault ih granite. The data itself then being analyzed by using georose application in order to found out the particular direction of the fault which has amend so far. Base on the fault analysis which has found main affirmation directionon north west- south east. Therefore it's showed tectonic movement direction on north east – south west.

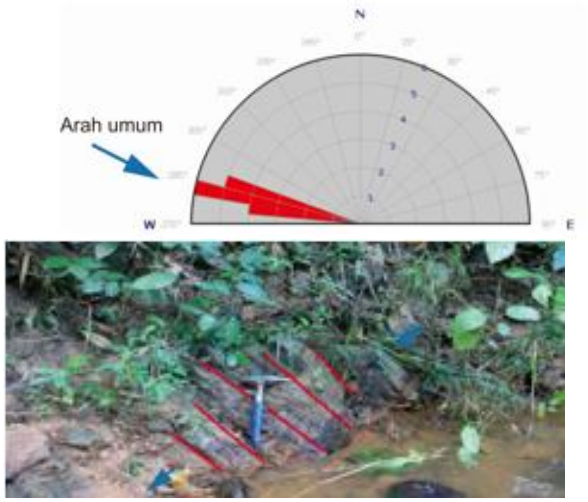

Fig. 10. Granite outcrop which has done measurement fault.

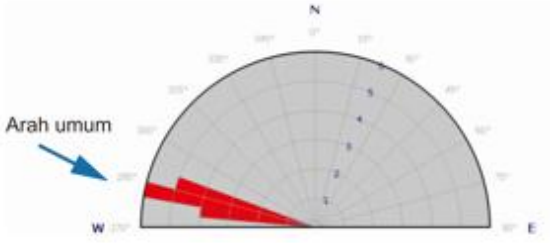

Fig. 11. The result of fault analysis by using rose diagram .

Fig.12. Fault measurement on Granite outcrop

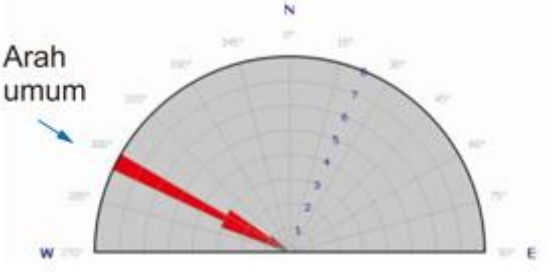

Fig. 13. The result of fault analysis by using rose diagram

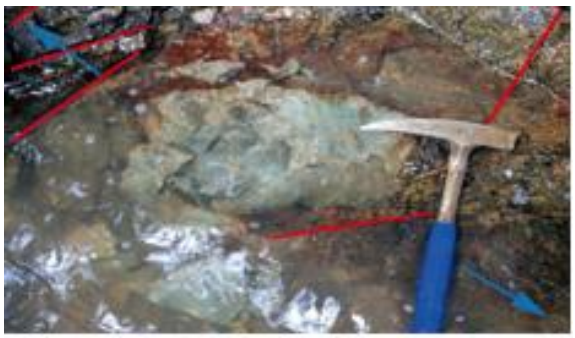

Fig. 14. Fault measurement on Granite outcrop.

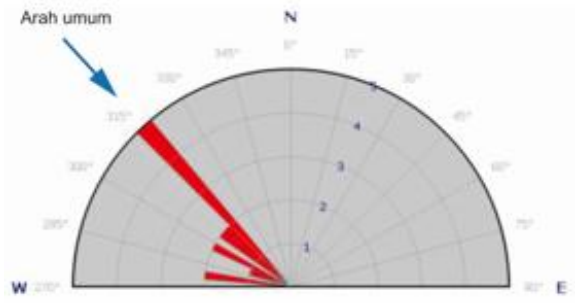

Fig. 15. The result of fault analysis from rose diagram.

Fig. 16. Fault measurement on Granite outcrop.

6. Conclusion

Granite megascopic appearance that is consist of Plagioclase, Quartz, Feldspar and biotite mineral. There is a fault that working on it.s outcrop.the granite microscopic appearance is consist of Quartz, Plagioclase, Feldspar, Biotite, Opaque mineral and Clay mineral along with mineral change that is Chlorite. The granite on this location is coat type that is the direct formed granite by the result of earth's coat coagulation. Beside that its indicated from the size of Granite Fomation that is Late Cretaceous.

On the four observation range which is obtained, base on gash fracture, it's obtained the main direction ehich has dine on south west – south east with affirmation style origin from north east-south west, this case is showing that the origin tectonic which has done well-off on the thirds Plio-Pleistocene edge.

References

[1] A. Pulonggono, A.Haryo, C.G.Kosuma. (1992). Pre-Tertiary And Tertiary Faults Systems As A Framework Of The South Sumatera Basin; A Study OfSar-Maps.

[2] De Coster. 1974. The Geology Of The Central And South Sumatera Basins.

[3] P.Adiwidjaja, De Coster. 1973. Pre-Tertiary Paleotopography And Related Sedimentation In South Sumatera.

[4] Suparman. A., Asseggaf. A. 1991. Post Convention Field Trip-Garba MTN Area South Sumatera.