LITHOLOGY UNITS PENGKOL AREA AND SURROUNDING, GUNUNG KIDUL DISTRICT, YOGYAKARTA PROVINCE.

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ABSTRACT

The research area is located sub-district Nglipar,District of Gunnung Kidul,Yogyakarta Province. Accessibility to the research location by train Bandung - Yogyakarta, followed by a minibus to Nglipar District Gunung Kidul. Purpose Of this Research is to understanding geological conditions of the research area reviewed from litohologic units and its stratigraphic order. The lithostratigraphy of the research area is divided into 3 lithologic units, Breccia Unit, Sandstone Unit and Limestone Unit. namely the naming of the rock units based on observable physical characteristics, including rock type, uniformity lithology symptoms and their stratigraphic position. Geological history at the location of this study is the eruption of Mount Ngalanggran and deposited volcanic breccia units. Early Miocene deposited units sandstone. At that time there was a decrease in sea level which caused the diagenesis of the sedimentary material into limestone material. On Middle Miocene limestone deposited.

Keyword: Lithologic units, stratigraphic order, Gunung Kidul District.

INTRODUCTION

Understanding of geology is growing day by day, a lot opinion of experts about the progress of geology. In fact, geology can applied in various fields of scientific studies such as development, exploration, renewable environmentally friendly energy and education. This research is intended to reveal geological processes based on field data integrated with the analysis results in the studio and laboratory. The research area is located sub-district Nglipar,District of Gunnung Kidul,Yogyakarta Province. Accessibility to the research location by train Bandung - Yogyakarta, followed by a minibus to Nglipar District Gunung Kidul. (figure 1.)

The research location is in the physiographic area of the Southern Mountains of Java, more precisely in the Southern Mountains sub zone, namely the Wonosari Sub Zone. Area Physiographically, the Southern Mountains of Java are included in the mountain range south of Java (Bemmelen, 1949), while global tectonics are estimated in basins between arcs to volcanic arcs. Southern Mountain Region which stretches from Yogyakarta to the east, Wonosari, Wonogiri, Pacitan continuously to the southern Malang area, then to the Blambangan area. Based on located in the mountains that extend relatively west - east and types the constituent lithology which is dominated by volcanicclastic materials, the research area is included in the "Wonosari Plateau" zone. (figure 2.)

RESEARCH METHOD

The methods used in this study are fieldwork, laboratory analysis, data interpretation, and stratigraphic analysis. Activities in the field include data collection in the form of characteristics lithology and rock slope (strike and dip), and outcrop photos.

Method which used in data collection is: Field orientation method, plotting data with GPS, Compass trajectory method and measuring tape in several places. Petrographic analysis helps in observing rocks microscopically in order to know the composition of the constituents of a rock. Micropaleontological analysis helps in determining age relative of a rock unit and the depositional environment of a rock sediment.
The main purpose of doing a stratigraphic analysis is to obtain it age and grouping of rock units and proportionality to the formation that is in the literature.

RESULT AND DISCUSSION

Based on unofficial units naming there ae three (3) lithologic units were develop at research area, these are the order from oldest to youngest units; (1) Breccia Unit (figure 3) (2) sandstone unit (figure 4) and (3) limestone unit. (figure 5)

Breccia Unit, breccia unit It occupies a geomorphological unit of steep and unitary volcanic hills volcanic hills are rather steep. The lithology in this unit is dominated by

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breccias which has a monomic component of the andesitic type and the tuff matrix. Composed of igneous rock fragments Andesite, the size of its components is 3cm to 25cm, has a tuff matrix, packaged open, poor orting, hard violence to compact. Components especially composed of igneous andesite rocks which have a characteristic weathered brown color blackish and dark gray color, subhedral crystal shape, holocrystalline, faneritic granularity, inequigranular fabric, massive structure, index mesocratic colors, there are quartz, plagioclase and biotite By having a coarse tuff matrix it has a brownish white weathered color fresh white gray color has coarse tuff grain size with grain shape Spherical, boxed closed, soft hardness, structure massive rock, medium sorting.

Petrographic analysis for these units shows 30% phenocryst and 70% base mass. This rock has texture with porphyritic crystal size, degree of hypocrystalline crystallization, boxed eqiugranular, and hypidiomorphic mineral forms. Color index in rocks show mesocokratic. These rocks are composed of phenocrysts with minerals quartz, plagioclase and k-feldspar and other minerals such as pyroxene and biotite, whereas the basic mass is composed of plagioclase and quartz microlytes This rock has a texture with fine sand-very fine sand, angular grain form, and open box. This rock has a sorting well, the appearance can be seen from the relatively uniform grain size. The composition of this rock consists of 10% fragments and 90% matrices. Fragment consists of lytic fragments, plagioclase minerals, quartz, while the matrix consists of micro fractions of glass and quartz. (figure 6). In determining the deposit environment this unit uses analysis of the physical properties of the constituent lithology of the unit. This unit is composed of volcanic breccias and has an andesitic igneous component and a tuff matrix. Tuff matrix indicates volcanic material that has an avalanche or flow structure. All of these volcanic breccias are non-carbonate tuff matrix and in this breccias have poorly sorted components. It is on this basis that the authors draw conclusions that the depositional environment is deep marine. Based on lithostratigraphic characteristics which include physical characters rock, age, depositional environment and stratigraphic position then this unit can equated with the Ngalanggran Formation (Tmng) Surono 1992.

Sandstone unit, the development of this unit occupies a low-denudational sloping and low-hill geomorphological unit volcanic hills are rather steep. This unit is dominated by sandstone lithology and sandstones with siltstone and claystone as interludes. This unit is dominated by sandstones, there are also several locations found carbonate sandstone, clay and silt. This sandstone has characteristics weathered brown color and light brown fresh color, fine sand grain size, the sedimentary structure is graded beding, round grain shape, closed fabric, hard and good sorting.

Petrographic analysis shows this unit has a fine texture with grain size sand, angular-subrounded grain form, and open fabric. these rocks have good sorting, the appearance can be seen from the grain size uniform. The composition of this rock consists of 20% fragments and 80% matrix. The fragments consist of 5% quartz, 13% plagioclase, and 2% rock fragments already experiencing weathering. While the matrix consists of 80% clay minerals. The cement is clay. Based on Pettijohn's (1975) classification of this rock namely Mudstone. (figure 7). In determining the relative age based on fossil content shows that relative age of this unit is the Middle Miocene (N10). (figure 8 and 9). In determining the environment for deposition in this unit is carried out analysis on rock texture which shows grain sizes ranging from medium – fine sand, massive structure and carbonates. With the carbonate material in the unit this, indicating the environment in this unit is in shallow marine. Based on the lithostratigraphic characters which include the physical characters of rocks, age, depositional environment. Then the sandstone units can be compared with the Sambipitu Formation (Tmss) in Surono in 1992.

Limestone Unit, the development of this unit shows at geomorphological limestone, denudational limestone hills. This unit is dominated by packstone limestones. limestone as the main constituent of this unit has a weathered blackish color and its fresh color white light brown, has large calcarenite grains, good sorting, structure massive, open fabric, hard.

Based on the petrographic analysis that has been carried out on the sample, it has a brownish cream color characteristic with the analyzer brown, packed closed, sorting well, grain supported, roundness round responsibility. The composition consists of fossil fragments in the form of fossil shells planktonic foramnifera, carbonate cement and voids. 80% fossil component, cement carbonate / micrit 10% and voids by 10%. In the Dunham classification (1962) this rock is a packstone (figure 10).

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From fossils analysis for determine relative dating shows

fossils of planktonic foraminifera dominating in this unit, namely Globigerinoides Immarutus, Globigerinoides Trilobus and Sphaeroidinella Subdehiscens. From the three samples above can be drawn the conclusion that the age of this limestone unit is in the Middle Miocene - Late Miocene. (figure 11). This unit deposited at shallow marine. Based on the lithostratigraphic characters which include the physical characters of rocks, age, depositional environment. Then the sandstone units can be compared with the Sambipitu Formation (Tmss) in Surono in 1992.

Geological history at the location of this study is the eruption of Mount Ngalanggran and deposited volcanic breccia units. Early Miocene deposited units sandstone. At that time there was a decrease in sea level which caused the diagenesis of the sedimentary material into limestone material. On Middle Miocene limestone deposited.

CONCLUSION

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Figure 1. Research Location (no scale)

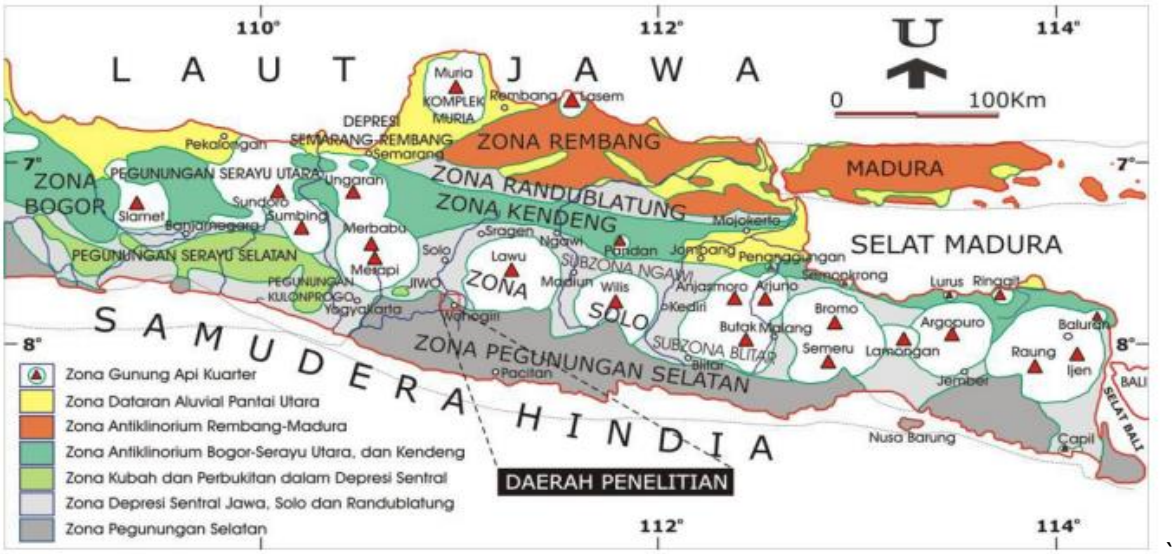

Figure 2. Regional Physiography (van Bemmelen, 1949)

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Figure 3. Breccia Outcrops

Figure 4. Sandstone Outcrops

Figure 5. Limestone Outcrops

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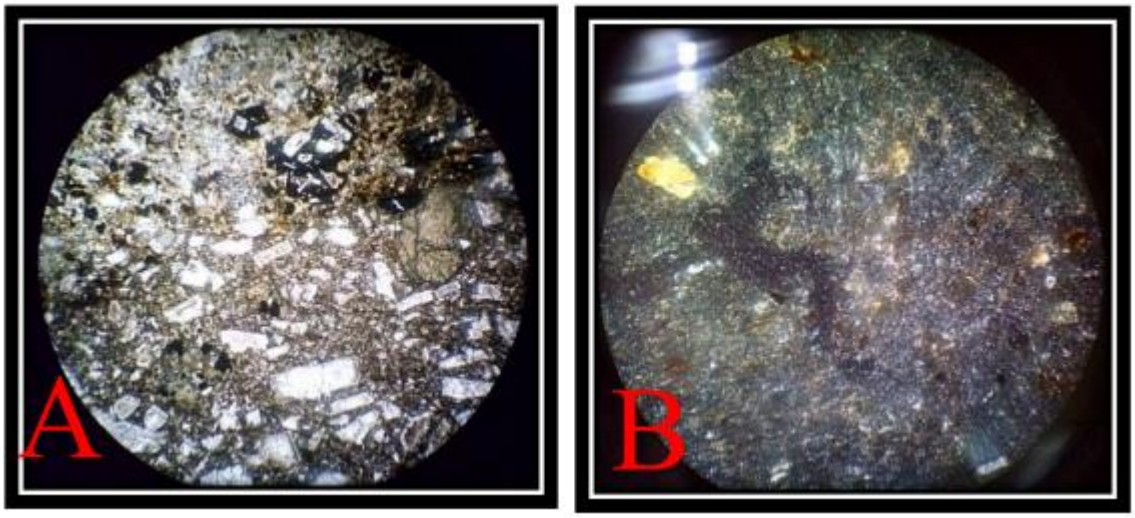

Figure 6. Petrographic Analysis of breccia unit (40x magnification)

A. Fragment B. Matrix

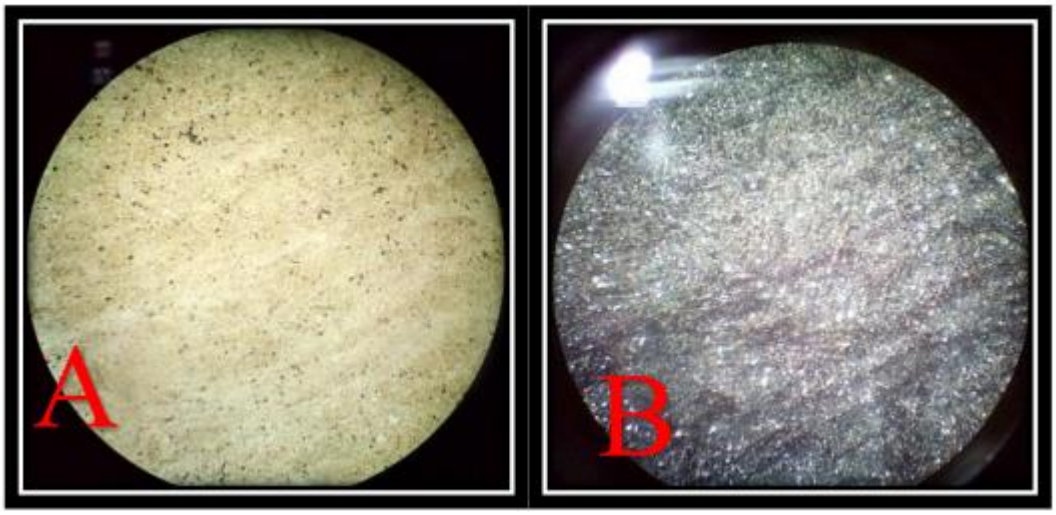

Figure 7. Petrographic analysis of Sandstone Unit (40 magnification)

A. Nicol B. X Nicol.

Stasiun 14 Batupasir Karbonatan																								
No	EPOCH AND ZONE	Oligosen			MIOCENE													PLIOCENE				QUARTERNERY	
	Species of Foraminifera				Early					Middle					Late								
		N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22	N23
1	Cassigerinella Chiploensis (CUSHMAN and PONTON)																							
2	Globigerinoides Immaturus (LEROY)																							
3	Globorotalia Siakensis (LEROY)																							
4	Sphaeroidinella Subdehiscens (BLOW)																							
5	Globigerina Praebulloides (BLOW)																							
6	Globogerinoides Subquadratus (LE ROY)																							

Figure 8. Fossils Analysis Sandstone Unit

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Stasiun 76 Batupasir Karbonatan																								
No	EPOCH AND ZONE	Oligosen			MIOCENE														PLIOCENE				QUARTERNERY	
	Species of Foraminifera				Early					Middle						Late								
		N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22	N23
1	Globigerina praebulloides (BLOW)																							
2	Sphaeroidinella Subdehiscens (BLOW)																							
3	Globorotalia Obesa (D'ORBIGNY)																							
4	Globogerinoides Subquadratus (LE ROY)																							
5	Globigerinoides Trilobus (REUSS)																							
6	Globorotalia Siakensis (LE ROY)																							

Figure 9. Fossils Analysis Sandstone Unit

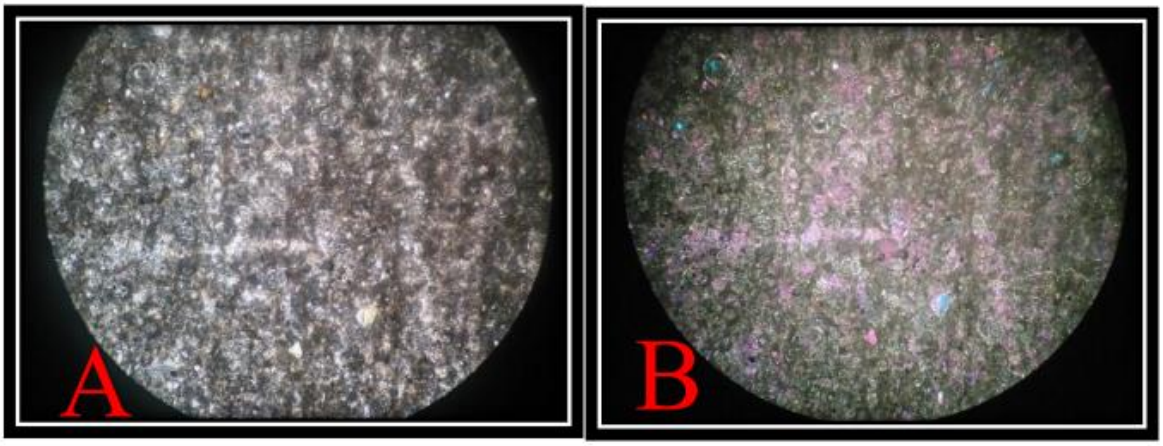

Figure 10. Petrographic Analysis of limestone unit.

A. Nicol B. X Nicol

Stasiun 22 Batugamping																								
No	EPOCH AND ZONE	Oligosen			MIOCENE														PLIOCENE				QUARTERNERY	
	Species of Foraminifera				Early					Middle						Late								
		N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22	N23
1	Globorotalia Obesa (BOLLI)																							
2	Sphaeroidinella Subdehiscens (BLOW)																							
3	Globorotalia Obesa (BOLLI)																							
4	Orbulina Universe (LEROY)																							
5	Globorotalia Mayeri (CUSHMAN AND ELLISOR)																							
6	Globigerinoides Trilobus (REUSS)																							

Figure 11. Fossils Analysis Limestone Unit

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