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Abstract. Tuff which located in Batanghari, South Sumatra, especially in the research area, interpreted comes from 2 different formation, which are Qhv (Quarter Holocene volcanic) and Kasai, mostly, the Tuff is dominated by Qhv which is the younger volcanic rock unit while tuff from Kasai deposited while orogeny at the Pliocene-Pleistocene, located in the northern part of research area. There are 2 kinds of method, which are field observation that consist of geological mapping, the surface observation and sample picking and we also did laboratory analysis which consist of remote sensing and petrography analysis. The field observation shows there is a different in the characteristic, Qhv tuff shows the rocks which is very weathered consist of feldspar, quartz and hornblende while Kasai tuff shows much resistant rocks with fresh colour of grey till choco brown, consist of feldspar, quartz and a bit of biotite. Petrography analysis shows that there is embayment texture on Qhv tuff it shows by the change of crystal shape meaning that erosion process is very high there also the appearance of included old crystal by the younger crystal meaning that this type of tuff is belong to crystal tuff (Schmid, 1981), while on the Kasai shows the appearance of glass which recrystallized meaning that the rock is having low to mid devitrification, Schmid, 1981 classified this rocks into type of Vitric Tuff.

1. Introduction
Research area is located at Batanghari Village, Ogan Komering Ulu District, South Sumatran, geographically it is located at 103° 54’ 33” EL – 103° 58’ 19” EL dan 04° 00’ 38,3” SL – 04° 04’ 24.3” SL (Figure 1). The research area can be reached by car for 6 hours from Palembang City.
Figure 1. The red box shows the research location

Based on geological map of Baturaja with the serial number of 40-1011 by Gafoer, S et al (2013) the research area is located at the Qhv Formation which consists of volcanic rocks which are volcanic breccia, lava and tuff intercalated with basaltic andesit, and then the Baturaja FM with the lithology of crystalline limestone, Gumai FM with the lithology of sandstone and shalestone and also the Air Benakat FM which consist only sandstone, the whole mentioned lithology above is by the result of geological mapping (Figure 2). The research area also dominated by Qhv with the distribution of deposit comes from NW – SE of map and belongs to deposition type of flow, it is proven by the appearance of bad sortation with the irregular thickness for example get thinner in the height also doesn’t has bedding structure / massive.

Figure 2. Geological map of research area
This research aim to identify specially about the difference of characteristic between tuff Qhv and tuff Kasai by concerning on the appearance of special texture on thin section, the change of crystal orientation of tuff and knowing the litho type which divided into three kinds such as tuff vitric, tuff crystal and tuff lithic. Schmid (1981) stated that tuff vitric is the rocks with the main composition of it is glass, the tuff crystal is a tuff with the main composition of crystal and fractions of crystal, and then the tuff lithic which the tuff rocks with the main composition of rocks fragment. The author hoping that the result of this research can be use objectively and can be the reference for any parties which aiming to study about tuff characteristics.

2. Methods
In making this paper, the author focus on the two main methods which are field observation and laboratory analysis. Field observation including the observation of surface outcrop and sample picking while the laboratory analysis including the remote sensing and also petrography analysis.

Field Observation
The field observation itself done at the research area with the width of 7 km2. This method including the geological mapping to obtain the geological map area based on trajectory map, and the outcrop observation which also sample picking that will be carry on to be analysed by using petrography method.

Laboratory Analysis
Laboratory analysis is done with the remote sensing to obtain the Digital Elevation Model (DEM) Map and also analysing the petrography of some rock sample, the DEM map which obtain from SRTM data can be used by using the Global Mapper and ArcGis Software, it is used to observing the elevation level at the research area, so it is can be interpreting the flow pattern of tuff rocks and then the petrography analysis which done by thin section with the thickness of 0,03 mm which pick up randomly, it is done to observing and describing the mineral composition and also the special texture under the microscope.

3. Result & Discussion
From the field observation with the total of 35 observation and 8 total sample, can be interpreted that there are 2 kinds of tuff characteristics in the research area, it is the tuff crystal and tuff vitric. Schmid (1981) divided that tuff into the composing material which dominating them which are the tuff crystal, tuf glass and tuff lithic. The research area is consist of tuff crystal and tuff glass with each of their characteristics physically and on thin section petrography.

3.1. Qhv Formation
The crystal tuff (Qhv Formation) of research area physically has a high level of weathering, with the fresh colour of light – dark brown and the grain size dominated with the ash sizing from 0 – 2 mm and not compact. From their physical looks with their not fresh looks it is very difficult to find the appearance of sedimentary structure on the outcrop. The outcrop with the thickness of around 2 meters is distributed alongside the Suban River (Figure 3.a) and the the outcrop with the thickness of around 4 meters alongside the Air Tubuhan River (Figure 3.b)
From the petrography analysis, this tuff crystal has some of the mineral composition which are biotite, hornblende, quartz and plagioclase. Biotite with the tabular shape appears as the fenocryst and distributed unevenly. Hornblende appear has experiencing the change and reshaping the crystal boundary that having high number of erosion process. Plagioclase comes as the fenocryst and there is a few of plagioclase microlit with the kalsbad & albit twin. Quartz comes unevenly with the size from ash – lapilli and the microlit which is distributed unevenly on the thin section. The lithic on the thin section is a pumice fragment which consists of glass and ash. There is a few appearance which showing the pumice that we know pumice is a fragment with high vesicular and the minerals which altered that is the clay mineral which interpreted as siderite and the pumice appearance which has undergone crystallization (figure 4).
The crystal consists of quartz, feldspar, biotite and pyroxene. The quartz with the grain size of lapilli – ash is having embayment texture with the color order of I, distributed unevenly of the thin section. The edge of crystal is having a tapered shape which means it is undergone a great enough process of erosion. The feldspar with the plagioclase and the Carlsbad twinning with tabular shape. Biotite with the size of ash comes unevenly all over the section and there is a few of appearance that it has undergone the change to become clay mineral. The pyroxene comes excluding the lithic (rock fragment) which interpreted as the andesite. Pyroxene has the golden yellow color with the cleavage of two directions. Lithic is consist of rock fragment which are andesite and pumice. The tuff with the glass composition also comes on the thin section with having on the boundary part of lithic which has undergone the erosion by having the embayment texture (figure 5). It is the tuff with the clastic texture and not yet undergone the change and intense devitrification process. The erosion and sedimentary process which dominantly appear in this rocks. Mcphie, S, et al (1993) stated that there also a special texture on this rocks which is axiolitic texture which the indicator of devitrification process but still weak.

3.2. Kasai Formation
Vitric tuff (Kasai Formation) on the research area has the physical appearance of compact, good resistant, and the size of ash with the fresh color is grey but on some of the observation location the color is grey – light chocolate (figure 6). There is structure in the outcrop which are bedding and erosion on the outcrop but not significant.
The appearance of petrography has a few mineral composition which are feldspar, quartz and biotite. Quartz undergone the crystallization and spread evenly on the thin section with the size of ash. There is a cavity like a vein on the section and it is filled with the clay mineral. Feldspar which consists of plagioclase with a bit of albit twinning. Biotite on the section has undergone a few changes and it is not distributed evenly on the section. The lithic of pumice fragmen and tuff with the size of ash, some of the pumice appearance has undergone recrystallization but not in massive size. The vesicular cavities also can be found in the section. Minor gas pipe on the section forming lenticular but not so much on the section (Figure 7). On a few appearance shows that pumice has undergone the changes on the texture which is the recrystallization indicating the devitrification process is happening but in a weak phase. It is can also be seen on the edges of pumice which there is a growth of other crystal.

The other appearance of tuff section basically dominated by the glass shards with the shape of cuspate & platy spread all over the section. There is a crystal with the size of lapilli which are feldspar and quartz as the fenocryst (5 above right). The plagioclase with the albit twinning and the quartz also the microlit quartz which spreading unevenly on the section. Pumice fragmen is also located in this section (5 below right). There is a special texture which is axiolitic texture, Mcphie S, et al (1993) stated.
that overall the tuff has not yet undergone the change & devitrification process, it is can be seen on the tuff appearance which has some change in the pumice texture (figure 8).

![Micrography of LP 28](image)

**Figure 8. Micrography of LP 28**

4. Conclusion
Based on the result of research above, Batanghari area, Ogan Komering Ulu District, South Sumatera, especially in the research area has two types of different tuff which are crystal tuff of Qhv and vitric tuff of Kasai formation. Tuff of Qhv has light chocolate – dark chocolate with bad level of resistant also include into the type of flow deposit which is shows by the crystal composition which dominant, has bad sortation and the bedding thickness is not even. This tuff also has embayment texture where there is an excluded of younger crystal and the changes of orientation or the original shape of crystal which indicate the high level of erosion, while the tuff of Kasai formation has grey – light chocolate color with a good level of resistant. This tuff also undergone the devitrification process but in weak – medium phase where the glass as the main composition undergone the crystallization.

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