

Artikel Seminar Jepang

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Tanggal: Sabtu, 14 Oktober 2017 18.40 WIB

Selamat malam Pak Dicky...

Terlampir draf artikel seminar Jepang dari Bu Amara dan saya...

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Quantitative Geomorphology of Landform At Samigaluh and Surrounding Area, West Progo, Java

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Abstract— Samigaluh and its surrounding area, Kulon Progo is part of a Kulon Progo Hills physiographic zones that have steep denudational hilly morphology. Field geomorphological survey has been conducted in this area to know the landscape characteristics quantitatively. Quantitative geomorphology study was conducted on the dimension / morphometry landscape at some location samples of hills and streams surrounding them. Morphometry aspects that have been analyzed include elevation (h) and slope (α) of regions / hills as well as some variable responses of stream morphology that include valley floor-height ratio (Vf), valley cross section (Vr), river gradient index (SL) and drainage density (Dd). The results showed that the response variables of morphology in Samigaluh and surrounding areas have varying value, with an average value h of 415 m, a slope of 42.2%, Vf 1.04, Vr 0.68, SL 180.7 and Dd 0.38 / km². Analysis of the relationship between several variables of morphometry showed the low - very low correlation value, with the highest correlation value is 21.29% only shown by the relationship elevation (h) to valley floor-height ratio (Vr).

Keyword s- *Quantitative geomorphology, morphometry, response variable*

I. INTRODUCTION

Samigaluh landscape and surrounding area in general is steep to very steep hills. There is gentle enough morphology only in a few places surrounding of big stream. Morphogenesis of landscape of this area in general is dominated by denudational process, where the weathering and erosion processes have been quite intensive.

The research area is located at topographic map of Sendangagung Quadrangle, scale 1:25.000 made of Bakosurtanal (2000), included in West Progo Regency (Figure 1). This area includes in Dome & Ridges of Central Depression of Java physiographic zone after Van Bemmelen (1949).

Landscape is a reflection of the geology of an area that we need to learn, both qualitatively and quantitatively. The approach of the quantitative assessment can be done to understand the dimensions of the landscape through the magnitude of the values of the various aspects of morphometry.

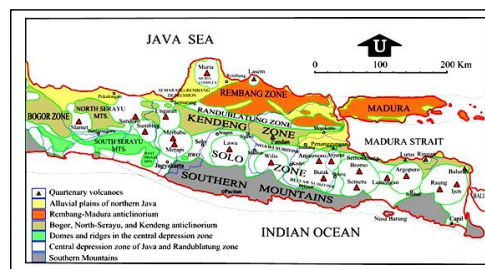


Figure 1. Research area in physiographic map after Van Bemmelen (1949).

Landform of earth surface is the final result of combination both of geology and denudational processes. Lithosphere's surface relief is controlled by rock, geological structure, and geomorphological processes successional in spatial and time frame (Davis, 1942, in Yudowiyono, 1995). In this concept, rock and geological structure have important influences to geomorphological analysis, where the past processes occurred through them, then followed by constructional and destructional processes.

Denudation is that group of processes which, if continued far enough, would reduce all surface inequalities of the globe to a uniform base level, usually sea level. In this context, the main process is degradation. This process involve the disintegration of rock (weathering) and the stripping of loose, weathered material from the earth surface by various processes of erosion and mass wasting (Van Zuidam, 1983).

Knowing geomorphology is important for some application, i.e. in stratigraphy, geological structure, engineering geology and etc. For understanding geomorphology quantitatively, there are some response variables can be analyzed. Here, geomorphological characteristics of Samigaluh area can be understood by analyzing of some response variables or geomorphology indexes.

This research wants to know about geomorphological characteristics of landscape such as hills and stream in several sample locations. Relation between them also analyzed to understand their correlation.

II. GEOMORPHOLOGY OF RESEARCH AREA

The research area includes in the Central Depression Zone of Java physiography, especially in West Progo Mountains or Dome according to Van Bemmelen (1949). It also includes in Progo drainage area, especially at the middle and western part of it.

Budiadi dan Listyani (2007) have analyzed Quaternary morphotectonic of Yogyakarta Graben and showed that there are some varieties on geomorphic variable responses. Based on some morphometric indexes it showed that Quaternary tectonic more controlled at upward to middle part of Progo drainage area. Development of Progo drainage area morphology is influenced by Quaternary tectonic (neo tectonic). This active tectonic is shown by river lineament, narrow V valley and deepening of valley.

The western part of research area show hilly to mountaineous topography of West Progo Dome (Fig. 2). Topography of West Progo Dome has steep slope and high dissected morphology.



Figure 2. Morphology of research area showed from Landsat image band 321 in 1995 (Budiadi, 2008).

III. METHODOLOGY

Field geomorphological survey has been done at Samigaluh and surrounding area, especially the areas which include in West Progo Dome. Some location samples have been taken to represent the 2 x 2 km² width of area grid approximately. Several morphometric variables associated with spatial can be analyzed using a simple grid method to simplify the calculation process (Sukiyah et al, 2007 in Sukiyah et al, 2012).

To know about morphological characteristics of the area, some response variables of morphometry have been analyzed, include :

- Elevation (h)
- Slope (α).
- Valley floor – height ratio (Vf).
- Valley cross section (Vratio or Vr).
- River gradient index (SL).
- Drainage density (Dd).

These variable responses have been collected from field directly as long as geomorphological mapping. The principle understanding of them can be noticed at Table 1.

Table 1. Some of geomorphological indexes (Wells et al, 1988).

Index	Definition	Formula	Measurement	Source
Vf	Valley floor height ratio	$\frac{V_{fw}}{[(E_{fd} - E_{fc}) + (E_{fd} - E_{fc})] \cdot z}$		Wells et al, 1988
Vratio or Vr	Valley cross section	A_v/A_c		
SL	Valley cross section	$(\Delta H/\Delta L) \times L$		
Dd	Drainage Density	$\sum L/A$		Van Zuidam, 1983

IV. RESULT AND DISCUSSION GEOMORPHOLOGY OF RESEARCH AREA

A. Landform Characteristic

The observation locations have been chosen as samples of representative landform. Usually, landform at the research area showed hilly, steep morphology. Some gently areas usually found at surrounding of big channel. (Figure 3). Forty two locations have been chosen for analyzing the morphometry of research area as shown in Table 2 and Figure 4.

Geomorphology of research area formed by many types of rocks, such as igneous rocks of lava or intrusion as old as Dukuh Formation (formerly famous as Old Andesite Formation) and sedimentary rocks of Nanggulan, Dukuh, Sentolo and Jonggrangan Formations. The landform of course, influenced by these physic condition of rocks as well as many processes in the area.

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(a)



(b)

Figure 3. Landform of research area, photograph taken from Gleoran / west of Loc 19/ (a) and at Kedunggrong / Loc. 1 (b).

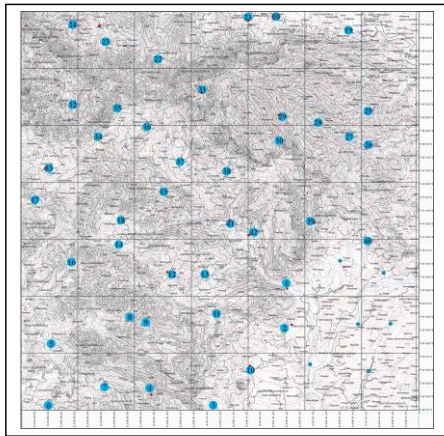


Figure 4. Location sample in topographic map of research area.

TABLE I. VARIABLES RESPONSES DATA OF RESEARCH AREA

Loc	Ares	h (m)	slope (%)	Vf	Vr	S _L	Dd
1	Kedunggrong	150	46	3.13	2.09	110	0.43
2	Banjararum	139	25	2.21	1.6	78.13	0.37
3	Pendoworejo	191	36	5.4	4.13	40.18	0.58
4	Dadapan	521	51	3.93	2.45	281.3	0.58
5	Rangkokan	763	25	1.12	0.71	111.1	0.58
6	Kiskendo, Jatimulyo	723	30	0.57	0.34	200.9	0.58
7	Gendu	664	46	2.55	1.55	250	0.58
8	Gondang	536	53	0.38	0.28	125	0.5
9	Gedong 2, Kalimasan	486	52	0.89	0.62	122.7	0.5
10	Kalisonggo	136	32	3.03	2.42	64.29	0.58
11	Ngrumpil	437	36	0.32	0.27	479.4	0.37
12	Pakelan	555	43	0.7	0.42	250	0.37
13	Balong V	425	34	2.31	1.49	333.3	0.37
14	Waru	654	40	1.69	0.75	281.3	0.37
15	Ketaon, Kaligandu	325	63	0.74	0.59	328.1	0.37
16	Karang, Jaratan	574	61	1.63	0.87	481.5	0.5
17	Kragan	533	56	0.99	0.38	247	0.17
18	Palem	646	27	1.06	0.77	175	0.37
19	Kaliduran, Wonorejo	350	100	1.07	0.82	27.5	0.5
20	Kiyudan, Majak Singi	550	64	0.27	0.14	95	0.5
21	Kamal	600	60	0.33	0.25	358.3	0.5
22	Kemiriombo Kulon, Giripurno	512	30	0.27	0.2	363.6	0.27
23	Sumbersari	600	56	1.09	0.37	138.1	0.25
24	Tegalombo, Paripurno	800	80	0.27	0.2	321.4	0.25
25	Diinseng	350	30	0.59	0.42	235	0.7
26	Promasan	300	40	0.83	0.64	64.29	0.71
27	Semagung, Banjaroyo	390	100	0.5	0.23	50	0.71
28	Tanjung	460	60	0.24	0.17	410	0.71
29	Madigondo	488	60	0.19	0.13	187.5	0.43
30	Munggang lor	475	60	0.5	0.38	133.3	0.43
31	Keceme	850	100	0.22	0.17	429.4	0.37
32	Widosari	800	77	0.44	0.34	450	0.3
33	Plono Barat	650	56	1.11	0.85	50.78	0.17
34	Tegalsari	600	22	0.67	0.51	320	0.37

TABLE I (CONTINUED)

Loc	Ares	h (m)	slope (%)	Vf	Vr	SL	Dd
35	Trayu	500	28	1.67	0.56	37.5	0.37
36	Pakelan	530	30	0.53	0.72	135.7	0.37
37	Tlogo	700	28	0.67	0.57	470	0.37
38	Karang	332	80	1.67	1.43	325.4	0.45
39	Tlegung River, Banjarsari	250	36	3.33	1.72	44	0.43
40	Tirio	200	40	0.33	0.29	128.6	0.71
41	Pucung	300	36	0.75	0.17	50	0.37
42	Plarangan	300	40	0.9	0.43	68.75	0.37
	Average	415	42.2	1.04	0.68	180.7	0.38

B. Variables Responses of Morphometry

The research area is located at an elevation of 136 to 850 m measured at several sampled locations, with a slope of 22 to 100%. The average elevation is 415 m, while the regional average slopes measured at observation sites by 42%. This suggests that the study area is a hilly morphology with moderate elevation above sea level. Slope area is quite steep to very steep, with a fairly high dissected morphology.

Valley floor - height ratio (Vf) of research areas range from 0.19 to 5.4, with an average value of 1.04. The average value of this Vf indicates that the width of the river valley is almost equal to the valley height. It shows that both the horizontal and vertical erosions are equally dominant in the study area.

Valley cross section (Vratio or Vr) ranges from 0.13 until 4.13 with an average of 0.68. This value indicates that the cross section of the river valley studied had a fairly wide cross-section, with quite large concavity. This Vr characteristics supported by some factors such as fairly strong erosion, so that the cross-sectional of the river valley became V to almost U shape, with the cross-sectional area Av is more than half of the area of Ac. Usually horizontal erosion looks balanced with vertical erosion in the research area. V shape valley found was generally sharp formed, according to Van Zuidam (1983), it marks the type of strong vertical erosion which may occur in recently uplifted areas. Rock and climate conditions in this area must, however, also be considered. Meanwhile, the shape of the valley U indicates pause after a period of strong vertical erosion, or river has followed a gapping fracture, or has stopped when reached hard rock (for example old volcanic breccia or lava in the research area), reducing the rate of vertical erosion. Usually the U-shaped valley is partly in filled with sediment, especially in downstream part of sub watershed.

Valley cross section (SL) indicates the river gradient value in total length of river channels. SL value obtained in the study area ranged from 27.5 to 481.5, with an average of 180.7 m. This value indicates that the river gradient is quite large, which means the elevation difference between upstream and downstream parts of piece of the river is large enough. This

fact is supported by the local strong dissected, coarse relief morphology of research area.

The research area is generally included in Progo Drainage Area, with several sub-watersheds. They are include Kedungan, Sindon, Pugoh, Srandu, Tlegung, Tinalah, Nungkep, Kamal, Tangsi, Sileng and Turusan sub watersheds. Their drainage density ranged from 0.17 to 0.71 / km, with an average of 0.38. In practice, according to Van Zuidam (1983), many factors influence the drainage density, i.e.: rock type, fracturing, soil type, relief, vegetation, rainfall and also evapotranspiration. Coarse grained intrusive rocks usually show low drainage densities, while fine-grained clastic sedimentary rocks reveal relatively high drainage density. Dd value as much as 0.38 show moderate drainage density, controlled by variable rocks in research area, include coarse grained intrusive rocks and fine-grained clastic sedimentary rocks.

C. Relation Between Variable Responses of Region/Hill and Stream

The relationship between the response variables of area / hill to river under study showed a low - very low value. Relations of area elevation (h) to Vf, Vr, SL and Dd have correlation coefficient value successionaly of 18.6; 21.29; 18.52 and 10.95%. These values indicate that the elevation of an area does not relate to the characteristics of the stream valley morphometry. The highest value obtained from the relationship only by 21.29% in relation h to the Vr (Figure 5) shows that the elevation does not affect the cross-sectional shape of the valley.

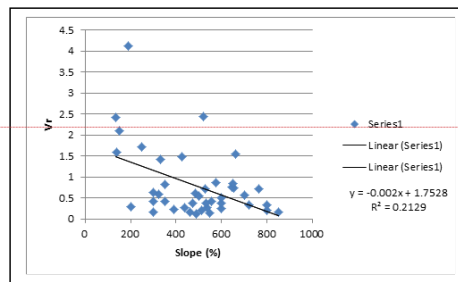


Figure 5. Relation between slope of area and Vr.

An analysis of the relationship of the variable response of slope to river valley showed a correlation value between slope to Vf, Vr, SL and Dd respectively for 6.05; 5.01; 2.02 and 0.0002% or very low. This means that the slope of an area does not also affect to the form or stream valley. The shape and size of the river valley is more likely to be influenced by the type of rock and the process that occurs.

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V. CONCLUSION

The landscape at Samigaluh and its surrounding area have coarse relief, strong dissected hilly morphology. From some sample locations selected known that the study area elevation ranges from 136 - 850 m or an average of 415 m with a slope of 22 - 100% or an average of 42%. From the calculation, the average response variable indexes of river morphometry (Vf, Vr, SL and Dd) are respectively 1.04; 0.68; 180.7; and 0.38. The response variable values are affected by the condition of the research areas that include rock type and geomorphological processes. In general, erosion horizontal balanced by vertical erosion, characterized by Vf at 1.04 and stream valleys shape of V to U type. The relationship between the response variable morphology of the area / hill showed no correlation with the response variable indexes on the river. The highest value of the relationship just gained at 21.29% on the relationship between slope and Vr.

ACKNOWLEDGMENT

The author wants to give highest award on Higher Education Grant and for Dr. Ev. Budiadi, M.S. who has helped research. Our thank you also provides to all assistant students include Abdi, Novi and Hadi who have collected data in the field as well as studio, also Danu and Hendi for preparing of this paper.

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Re: Artikel Seminar Jepang

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Tanggal: Rabu, 18 Oktober 2017 16.02 WIB

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Cheers,

DM

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2017-10-14 20:40 GMT+09:00 theo listyani <listyani_theo@yahoo.co.id>:

Selamat malam Pak Dicky...

Terlampir draf artikel seminar Jepang dari Bu Amara dan saya...

Mohon untuk dapat segera dikirimkan LoA bagi kami supaya kami bisa mengurus dana di STTNAS.

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QUANTITATIVE GEOMORPHOLOGY OF LANDFORM AT SAMIGALUH AND SURROUNDING AREA, WEST PROGO, CENTRAL JAVA, INDONESIA

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SUDRADJAT²

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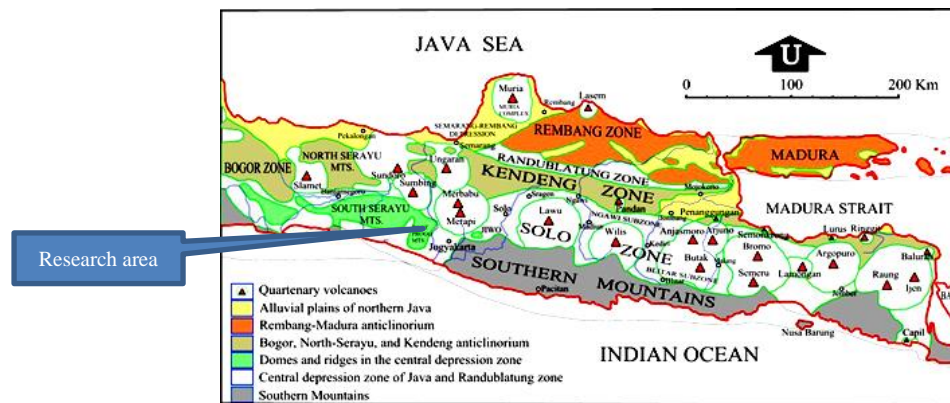


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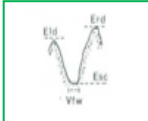

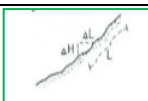
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rocks of Nanggulan, Dukuh, Sentolo and Jonggrangan Formations. The landform of course, influenced by these physic condition of rocks as well as many processes in the area.



Figure 3. Landform of research area, photograph taken from Gleoran / west of Loc 19/ (left) and at Kedunggrong /Loc. 1 (right).

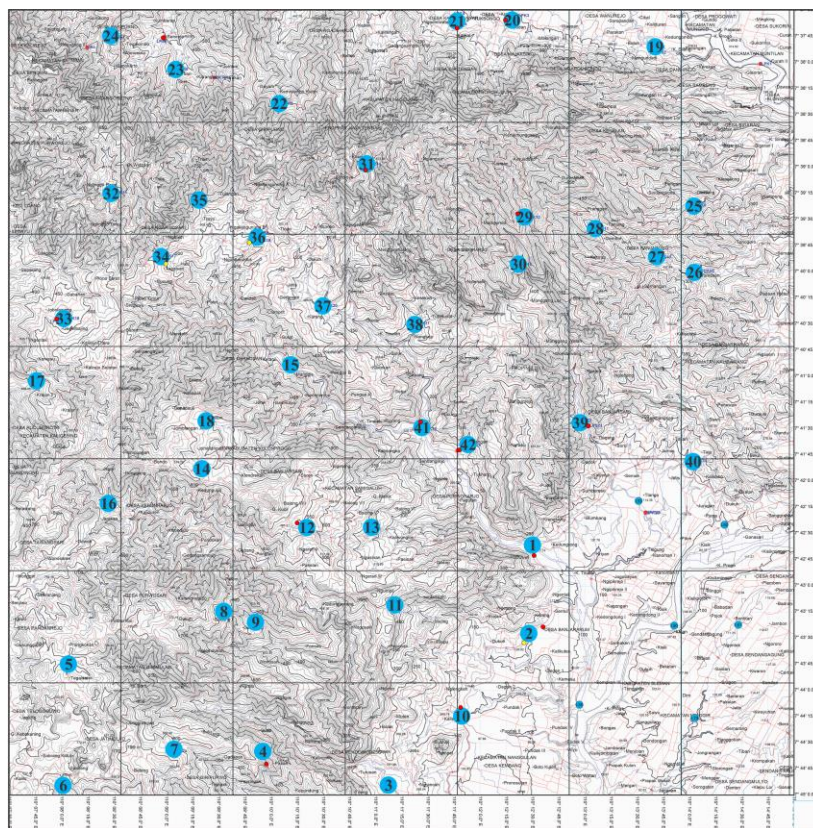


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The relationship between the response variables of area / hill to river under study showed a low - very low value. Relations of area elevation (h) to V_f , V_r , SL and Dd have correlation coefficient value respectively of 18.6; 21.29; 18.52 and 10.95%. These values indicate that the elevation of an area does not relate to the characteristics of the stream valley morphometry. The highest value obtained from the relationship only by 21.29% in relation h to the V_r (Figure 5) shows that the elevation does not affect the cross-sectional shape of the valley.

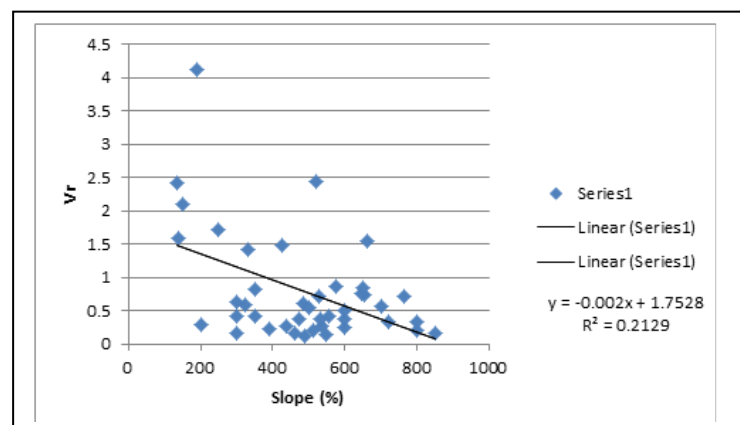


Figure 5. Relation between slope of area and V_r .

An analysis of the relationship of the variable response of slope to river valley showed a correlation value between slope to Vf, Vr, SL and Dd respectively for 6.05; 5.01; 2.02 and 0.0002% or very low. This means that the slope of an area does not also affect to the form or stream valley. The shape and size of the river valley is more likely to be influenced by the type of rock and the process that occurs.

5. CONCLUSION

The landscape at Samigaluh and its surrounding area have coarse relief, strong dissected hilly morphology. From some sample locations selected known that the study area elevation ranges from 136 - 850 m or an average of 415 m with a slope of 22 - 100% or an average of 42%. From the calculation, the average response variable indexes of river morphometry (Vf, Vr, SL and Dd) are respectively 1.04; 0.68; 180.7; and 0.38. The response variable values are affected by the condition of the research areas that include rock type and geomorphological processes, especially erosion. In general, erosion horizontal balanced by vertical erosion, characterized by Vf at 1.04 and stream valleys shape of V to U type. The relationship between the response variable morphology of the area / hill showed no correlation with the response variable indexes on the river. The highest value of the relationship just gained at 21.29% on the relationship between slope and Vr.

ACKNOWLEDGEMENT

The author wants to give highest award on Higher Education Grant and for Dr. Ir. Ev. Budiadi, M.S. who has helped research. Our thank you also provides to all assistant students include Abdi, Novi and Hadi who have collected data in the field as well as studio, also Danu and Hendi for preparing of this paper.

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QUANTITATIVE GEOMORPHOLOGY OF LANDFORM AT SAMIGALUH AND SURROUNDING AREA, WEST PROGO, CENTRAL JAVA, INDONESIA

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Abstract

Samigaluh and its surrounding area in West Progo Regency is a part of West Progo Hills physiographic zone that has steep denudational hilly morphology. Field geomorphological survey has been conducted in this area to reveal the landscape characteristics quantitatively. Quantitative geomorphology study was conducted on the dimension or morphometric of landscape at some location of hills and streams. Morphometric aspects that have been analyzed include elevation (h) and slope (α) of regions or hills as well as some response variables of stream morphology that include valley floor-height ratio (Vf), valley cross section (Vr), river gradient index (SL) and drainage density (Dd). The results showed that the response variables of morphology in the study area have variation in values. Average value of elevation (h) is 415 m, slope is 42.2%, Vf is 1.04, Vr is 0.68, SL is 180.7 and Dd is 0.38 / km². Analysis of the relationship between several variables of morphometry showed the low to very low correlation value, with the highest correlation value is 21.29% only shown by the relationship between elevation (h) to valley floor-height ratio (Vr).

Keywords: Quantitative geomorphology, morphometry, response variable, West Progo

1. INTRODUCTION

Samigaluh landscape and surrounding area in general is steep to very steep hills. There is gentle enough morphology only in a few places surrounding of big stream. Morphogenesis of landscape of this area in general is dominated by denudational process, where the weathering and erosion processes have been quite intensive. The research area is located at topographic map of Sendangagung Quadrangle, scale 1:25.000 made of Bakosurtanal (2000), included in West Progo Regency (Figure 1). This area includes in Dome & Ridges of Central Depression of Java physiographic zone after Van Bemmelen (1949).

Landscape is a reflection of the geology of an area that we need to learn, both qualitatively and quantitatively. The approach of the quantitative assessment can be done to understand the dimensions of the landscape through the magnitude of the values of the various aspects of morphometry. Landform of earth surface is the final result of combination both of geology and denudational processes. Lithosphere's surface relief is controlled by rock, geological structure, and geomorphological processes successionaly in spatial and time frame (Davis, 1942, in Yudowiyono, 1995). In this concept, rock and geological structure have important influences to geomorphological

analysis, where the past processes occurred through them, then followed by constructional and destructional processes.

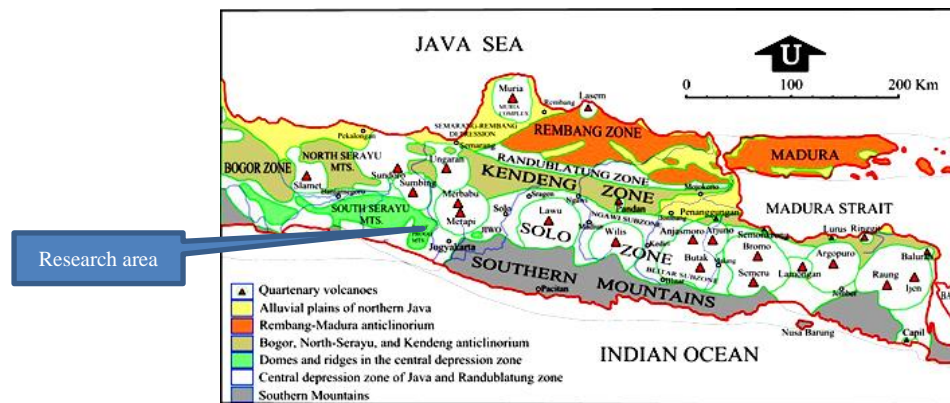


Figure 1. Research area in physiographic map after Van Bemmelen (1949).

Denudation is that group of processes which, if continued far enough, would reduce all surface inequalities of the globe to a uniform base level, usually sea level. In this context, the main process is degradation. This process involve the disintegration of rock (weathering) and the stripping of loose, weathered material from the earth surface by various processes of erosion and mass wasting (Van Zuidam, 1983).

Knowing geomorphology is important for some application, i.e. in stratigraphy, geological structure, engineering geology and etc. For understanding geomorphology quantitatively, there are some response variables can be analyzed. Here, geomorphological characteristics of Samigaluh area can be understood by analyzing of some response variables or geomorphology indexes.

This research wants to know about geomorphological characteristics of landscape such as hills and stream in several sample locations. Relation between them also analyzed to understand their correlation.

2. GEOMORPHOLOGY OF RESEARCH AREA

The research area includes in the Central Depression Zone of Java physiography, especially in West Progo Mountains or Dome according to Van Bemmelen (1949). It also includes in Progo drainage area, especially at the middle and western part of it.

Budiadi dan Listyani (2007) have analyzed Quaternary morphotectonic of Yogyakarta Graben and showed that there are some varieties on geomorphic variable responses. Based on some morphometric indexes it showed that Quaternary tectonic more controlled at upward to middle part of Progo drainage area. Development of Progo drainage area morphology is influenced by Quaternary tectonic (neo tectonic). This active tectonic is shown by river scarp lineament, narrow V valley and deepening of valley. The western part of research area show hilly to mountaineous topography of West Progo Dome (Fig. 2). Topography of West Progo Dome has steep slope and high dissected morphology.

3. METHODOLOGY

Field geomorphological survey has been done at Samigaluh and surrounding area, especially the areas which include in West Progo Dome. Some location samples have been taken to represent the 2 x 2 km² width of area grid approximately. Several morphometric variables associated with spatial can be

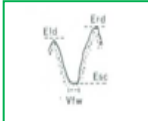

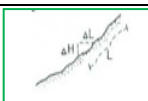
analyzed using a simple grid method to simplify the calculation process (Sukiyah *et al*, 2007 in Sukiyah *et al*, 2012).



Figure 2. Morphology of research area showed from Landsat image band 321 in 1995 (Budiadi, 2008).

To know about morphological characteristics of the area, some response variables of morphometry have been analyzed, include : (a) elevation (h); (b) slope (α); (c) valley floor – height ratio (Vf); (d) valley cross section (Vratio or Vr); (e) river gradient index (SL); and (f) drainage density (Dd). These variable responses have been collected from field directly as long as geomorphological mapping. The principle understanding of them can be noticed at Table 1.

Table 1. Some of geomorphological indexes (Wells *et al*, 1988).

Index	Definition	Formula	Measurement	Source
Vf	Valley floor – height ratio	$\frac{V_{fw}}{[(E_{ld} - E_{sc}) + E_{rd} - E_{sc}]/2}$		Wells <i>et al</i> , 1988
V _{ratio} Or Vr	Valley section cross	A_v/A_c		
SL	Stream gradient index	$(\Delta H/\Delta L) \times L$		
Dd	Drainage Density	$\Sigma L/A$		Van Zuidam, 1983

4. RESULT AND DISCUSSION

4.1. Landform Characteristic

The observation locations have been chosen as samples of representative landform. Usually, landform at the research area showed hilly, steep morphology. Some gently areas usually found at surrounding of big channel. (Figure 3). Forty two locations have been chosen for analyzing the morphometry of research area as shown in Figure 4.

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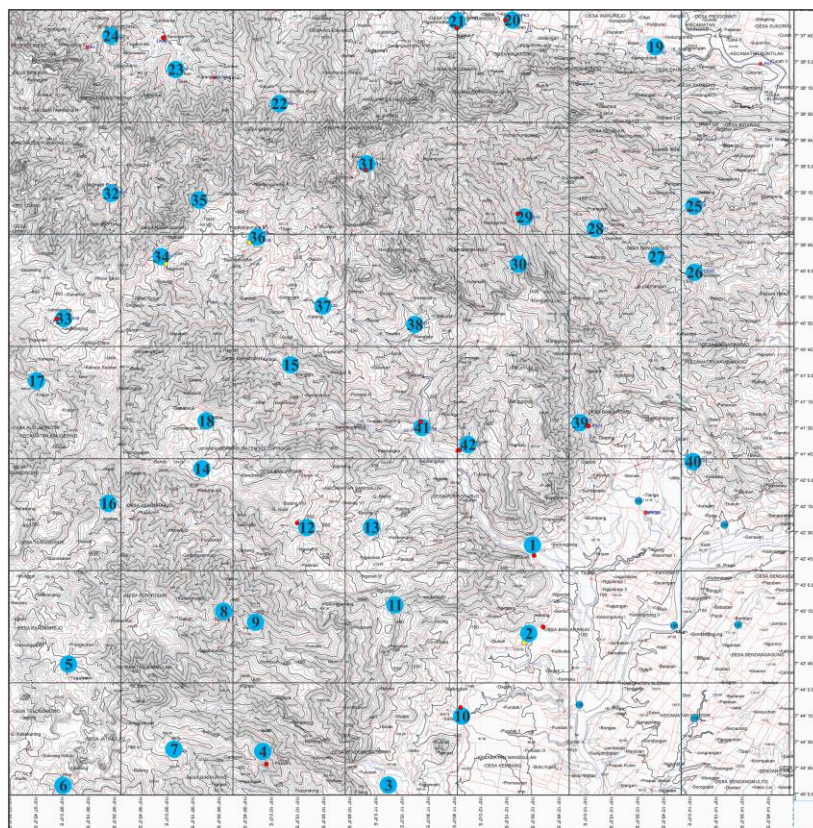


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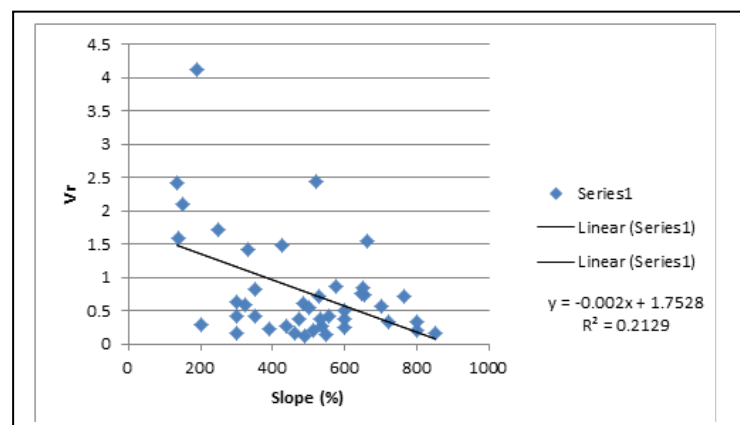


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The 2nd Joint Conference Utsunomiya University and Universitas Padjadjaran

Date 17 October 2017

To: Theophila Listyani RETNO, Nana SULAKSANA, Boy Yoseph CSSS ALAM

Acceptance of paper to the 2nd Joint Conference of UDAI and UNPAD

I am pleased to confirm that your paper has been accepted by the Committee of the 2nd Joint Conference of Utsunomiya University and Universitas Padjadjaran. Your paper will be published in the proceeding of conference.

Your active participation to this joint conference is awaited, to be held in the Yoto Campus of Utsunomiya University, Japan, on 24-25 November 2017. Your contribution to succeed this important joint conference is very much appreciated.

Title: Quantitative Geomorphology of Landform at Samigaluh and Surrounding Area, West Progo, Central Java, Indonesia

Authors: Theophila Listyani RETNO, Nana SULAKSANA, Boy Yoseph CSSS ALAM

Hoping to meet you in Utsunomiya City, Japan.

Prof. Dr. Satoshi YAMAOKA
Chairperson of Steering Committee

Abstract Amara & Lis

Dari: theo listyani (listyani_theo@yahoo.co.id)

Kepada: febrihirnawan@gmail.com

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Bcc: d.muslim@unpad.ac.id

Tanggal: Kamis, 19 Oktober 2017 17.16 WIB

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The 2nd Joint Conference of Utsunomiya University and Universitas Padjadjaran

Quantitative Geomorphology of Landform at Samigaluh and Surrounding Area, West Progo, Central Java, Indonesia

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¹Department of Geological Engineering, STTNAS Yogyakarta, INDONESIA

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Bls: Artikel Seminar Jepang

Dari: theo listyani (listyani_theo@yahoo.co.id)

Kepada: d.muslim@unpad.ac.id

Tanggal: Kamis, 19 Oktober 2017 13.04 WIB

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Cheers,

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Dr. Dicky Muslim. Ir., M.Sc.

Associate Professor,

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2017-10-14 20:40 GMT+09:00 theo listyani <listyani_theo@yahoo.co.id>:

Selamat malam Pak Dicky...

Terlampir draf artikel seminar Jepang dari Bu Amara dan saya...
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Hatur nuhun

Lis

Bls: Artikel Seminar Jepang

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Kepada: d.muslim@unpad.ac.id

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Cheers,

DM

Dr. Dicky Muslim, Jr., M.Sc.

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2017-10-14 20:40 GMT+09:00 theo listyani <listyani_theo@yahoo.co.id>:

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Mohon untuk dapat segera dikirimkan LoA bagi kami supaya kami bisa mengurus dana di STTNAS.

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Bls: Artikel Seminar Jepang

Dari: theo listyani (listyani_theo@yahoo.co.id)

Kepada: d.muslim@unpad.ac.id

Tanggal: Kamis, 19 Oktober 2017 17.22 WIB

Selamat sore....

Berikut sy lampirkan full paper sy

Hatur nuhun

Pada Kamis, 19 Oktober 2017 14:23, DICKY MUSLIM <d.muslim@unpad.ac.id> menulis:

OK Bu... saya akan atur dalam prosiding untuk menjadi T. Listyani R.A.

Semoga full paper bisa cepat selesai. Mohon Bu Deta & Pak Setyo juga.

BTW, salam untuk pak Dr. Budiadi, apa beliau akan ikut?

Dr. Dicky Muslim. Ir., M.Sc.

Associate Professor,

Postgraduate Program of Geosciences, Universitas Padjadjaran (UNPAD)

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2017-10-19 15:25 GMT+09:00 theo listyani <listyani_theo@yahoo.co.id>:

Selamat siang P Dicky

Mohon saran untuk penulisan nama

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QUANTITATIVE GEOMORPHOLOGY OF LANDFORM AT SAMIGALUH AND SURROUNDING AREA, WEST PROGO, CENTRAL JAVA, INDONESIA

T. LISTYANI R.A.^{1,2*}, Nana SULAKSANA², Boy Yoseph CSSS ALAM², Adjat
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Keywords: Quantitative geomorphology, morphometry, response variable, West Progo

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Samigaluh landscape and surrounding area in general is steep to very steep hills. There is gentle enough morphology only in a few places surrounding of big stream. Morphogenesis of landscape of this area in general is dominated by denudational process, where the weathering and erosion processes have been quite intensive. The research area is located at topographic map of Sendangagung Quadrangle, scale 1:25.000 made of Bakosurtanal (2000), included in West Progo Regency (Figure 1). This area includes in Dome & Ridges of Central Depression of Java physiographic zone after Van Bemmelen (1949).

Landscape is a reflection of the geology of an area that we need to learn, both qualitatively and quantitatively. The approach of the quantitative assessment can be done to understand the dimensions of the landscape through the magnitude of the values of the various aspects of morphometry. Landform of earth surface is the final result of combination both of geology and denudational processes. Lithosphere's surface relief is controlled by rock, geological structure, and geomorphological processes successionaly in spatial and time frame (Davis, 1942, in Yudowiyono, 1995). In this concept, rock and geological structure have important influences to geomorphological

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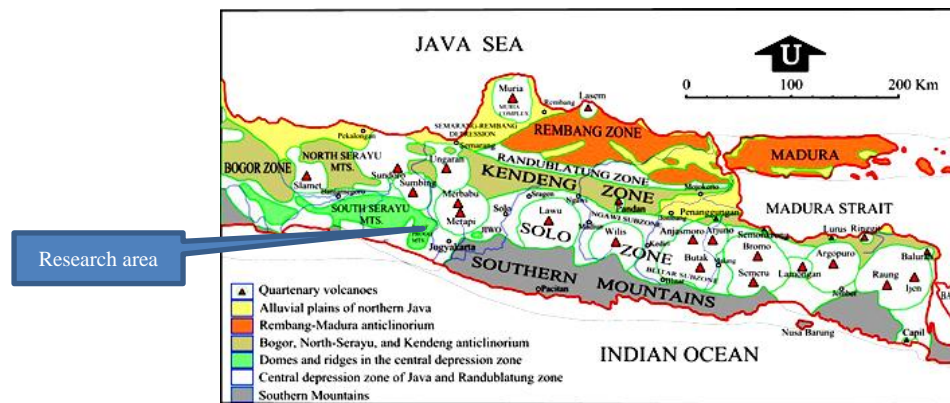


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Knowing geomorphology is important for some application, i.e. in stratigraphy, geological structure, engineering geology and etc. For understanding geomorphology quantitatively, there are some response variables can be analyzed. Here, geomorphological characteristics of Samigaluh area can be understood by analyzing of some response variables or geomorphology indexes.

This research wants to know about geomorphological characteristics of landscape such as hills and stream in several sample locations. Relation between them also analyzed to understand their correlation.

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Budiadi dan Listyani (2007) have analyzed Quaternary morphotectonic of Yogyakarta Graben and showed that there are some varieties on geomorphic variable responses. Based on some morphometric indexes it showed that Quaternary tectonic more controlled at upward to middle part of Progo drainage area. Development of Progo drainage area morphology is influenced by Quaternary tectonic (neo tectonic). This active tectonic is shown by river scarp lineament, narrow V valley and deepening of valley. The western part of research area show hilly to mountaineous topography of West Progo Dome (Fig. 2). Topography of West Progo Dome has steep slope and high dissected morphology.

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Field geomorphological survey has been done at Samigaluh and surrounding area, especially the areas which include in West Progo Dome. Some location samples have been taken to represent the 2 x 2 km² width of area grid approximately. Several morphometric variables associated with spatial can be

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To know about morphological characteristics of the area, some response variables of morphometry have been analyzed, include : (a) elevation (h); (b) slope (α); (c) valley floor – height ratio (Vf); (d) valley cross section (Vratio or Vr); (e) river gradient index (SL); and (f) drainage density (Dd). These variable responses have been collected from field directly as long as geomorphological mapping. The principle understanding of them can be noticed at Table 1.

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4. RESULT AND DISCUSSION

4.1. Landform Characteristic

The observation locations have been chosen as samples of representative landform. Usually, landform at the research area showed hilly, steep morphology. Some gently areas usually found at surrounding of big channel. (Figure 3). Forty two locations have been chosen for analyzing the morphometry of research area as shown in Figure 4.

Geomorphology of research area formed by many types of rocks, such as igneous rocks of lava or intrusion as old as Dukuh Formation (formerly famous as Old Andesite Formation) and sedimentary

rocks of Nanggulan, Dukuh, Sentolo and Jonggrangan Formations. The landform of course, influenced by these physic condition of rocks as well as many processes in the area.



Figure 3. Landform of research area, photograph taken from Gleoran / west of Loc 19/ (left) and at Kedunggrong /Loc. 1 (right).

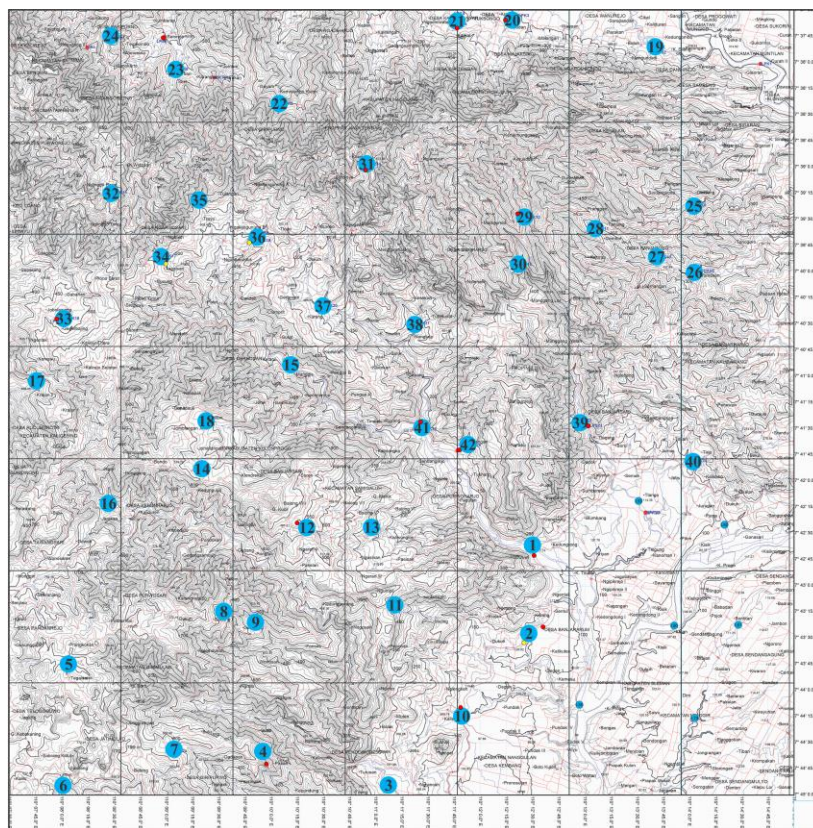


Figure 4. Location sample in topographic map of research area.

4.2. Variables Responses of Morphometry

The research area is located at an elevation of 136 to 850 m measured at several sampled locations, with a slope of 22 to 100%. The average elevation is 415 m, while the regional average slopes measured at observation sites by 42%. This suggests that the study area is a hilly morphology with moderate elevation above sea level. Slope area is quite steep to very steep, with a fairly high dissected morphology.

Valley floor - height ratio (Vf) of research areas range from 0.19 to 5.4, with an average value of 1.04. The average value of this Vf indicates that the width of the river valley is almost equal to the valley height. It shows that both the horizontal and vertical erosions are equally dominant in the study area.

Valley cross section (V_{ratio} or V_r) ranges from 0.13 until 4.13 with an average of 0.68. This value indicates that the cross section of the river valley studied had a fairly wide cross-section, with quite large concavity. This V_r characteristics are supported by some factors such as fairly strong erosion, so that the cross-sectional of the river valley became V to almost U shape, with the cross-sectional area A_v is more than half of the area of A_c . The greater the value V_r showed that the cross-section of the valley tend to widen, which means that the horizontal erosion increasingly dominant. Usually horizontal erosion looks balanced with vertical erosion in the research area. V shape valley found was generally sharp formed, according to Van Zuidam (1983), it marks the type of strong vertical erosion which may occur in recently uplifted areas. Rock and climate conditions in this area must, however, also be considered. Meanwhile, the shape of the valley U indicates pause after a period of strong vertical erosion, or river has followed a gapping fracture, or has stopped when reached hard rock (for example old volcanic breccia or lava in the research area), reducing the rate of vertical erosion. Usually the U-shaped valley is partly in filled with sediment, especially in downstream part of sub watershed.

Stream gradient index (SL) indicates the river gradient value in total length of river channels. SL value obtained in the study area ranged from 27.5 to 481.5, with an average of 180.7 m.

This value indicates that the river gradient is quite large, which means the elevation difference between upstream and downstream parts of piece of the river is large enough. This fact is supported by the local strong dissected, coarse relief morphology of research area.

The research area is generally included in Progo Drainage Area, with several sub-watersheds. They are include Kedungan, Sindon, Pugoh, Srandu, Tlegung, Tinalah, Nungkep, Kamal, Tangsi, Sileng and Turusan sub watersheds. Their drainage density ranged from 0.17 to 0.71 / km, with an average of 0.38. In practice, according to Van Zuidam (1983), many factors influence the drainage density, i.e.: rock type, fracturing, soil type, relief, vegetation, rainfall and also evapotranspiration. Coarse grained intrusive rocks usually show low drainage densities, while fine-grained clastic sedimentary rocks reveal relatively high drainage density. Dd value as much as 0.38 show moderate drainage density, controlled by variable rocks in research area, include coarse grained intrusive rocks and fine-grained clastic sedimentary rocks.

4.3. Relation Between Variable Responses of Region/Hill and Stream

The relationship between the response variables of area / hill to river under study showed a low - very low value. Relations of area elevation (h) to V_f , V_r , SL and Dd have correlation coefficient value respectively of 18.6; 21.29; 18.52 and 10.95%. These values indicate that the elevation of an area does not relate to the characteristics of the stream valley morphometry. The highest value obtained from the relationship only by 21.29% in relation h to the V_r (Figure 5) shows that the elevation does not affect the cross-sectional shape of the valley.

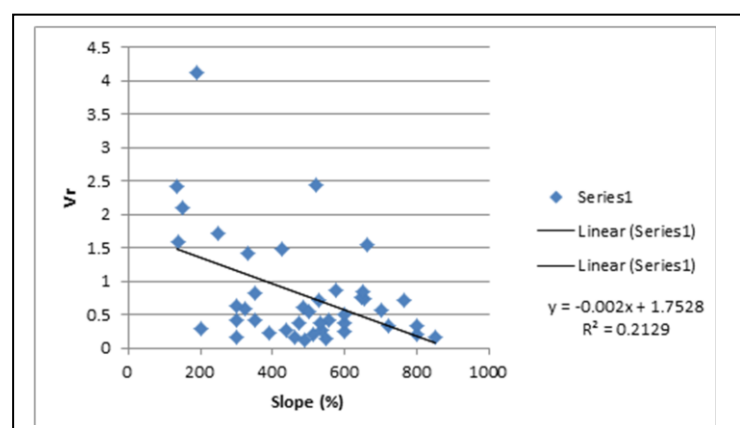


Figure 5. Relation between slope of area and V_r .

An analysis of the relationship of the variable response of slope to river valley showed a correlation value between slope to Vf, Vr, SL and Dd respectively for 6.05; 5.01; 2.02 and 0.0002% or very low. This means that the slope of an area does not also affect to the form or stream valley. The shape and size of the river valley is more likely to be influenced by the type of rock and the process that occurs.

5. CONCLUSION

The landscape at Samigaluh and its surrounding area have coarse relief, strong dissected hilly morphology. From some sample locations selected known that the study area elevation ranges from 136 - 850 m or an average of 415 m with a slope of 22 - 100% or an average of 42%. From the calculation, the average response variable indexes of river morphometry (Vf, Vr, SL and Dd) are respectively 1.04; 0.68; 180.7; and 0.38. The response variable values are affected by the condition of the research areas that include rock type and geomorphological processes, especially erosion. In general, erosion horizontal balanced by vertical erosion, characterized by Vf at 1.04 and stream valleys shape of V to U type. The relationship between the response variable morphology of the area / hill showed no correlation with the response variable indexes on the river. The highest value of the relationship just gained at 21.29% on the relationship between slope and Vr.

ACKNOWLEDGEMENT

The author wants to give highest award on Higher Education Grant and for Dr. Ir. Ev. Budiadi, M.S. who has helped research. Our thank you also provides to all assistant students include Abdi, Novi and Hadi who have collected data in the field as well as studio, also Danu and Hendi for preparing of this paper.

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Full paper revisi 1

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Cc: dickygeo86@gmail.com

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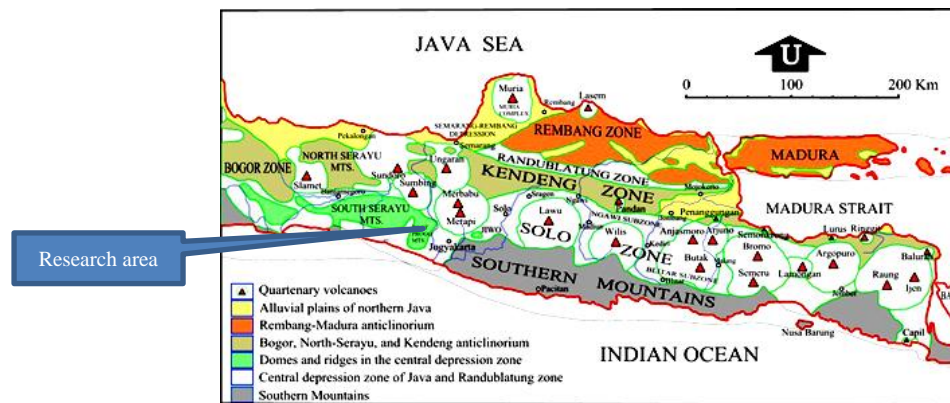


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rocks of Nanggulan, Dukuh, Sentolo and Jonggrangan Formations. The landform of course, influenced by these physic condition of rocks as well as many processes in the area.



Figure 3. Landform of research area, photograph taken from Gleoran / west of Loc 19/ (left) and at Kedunggrong /Loc. 1 (right).

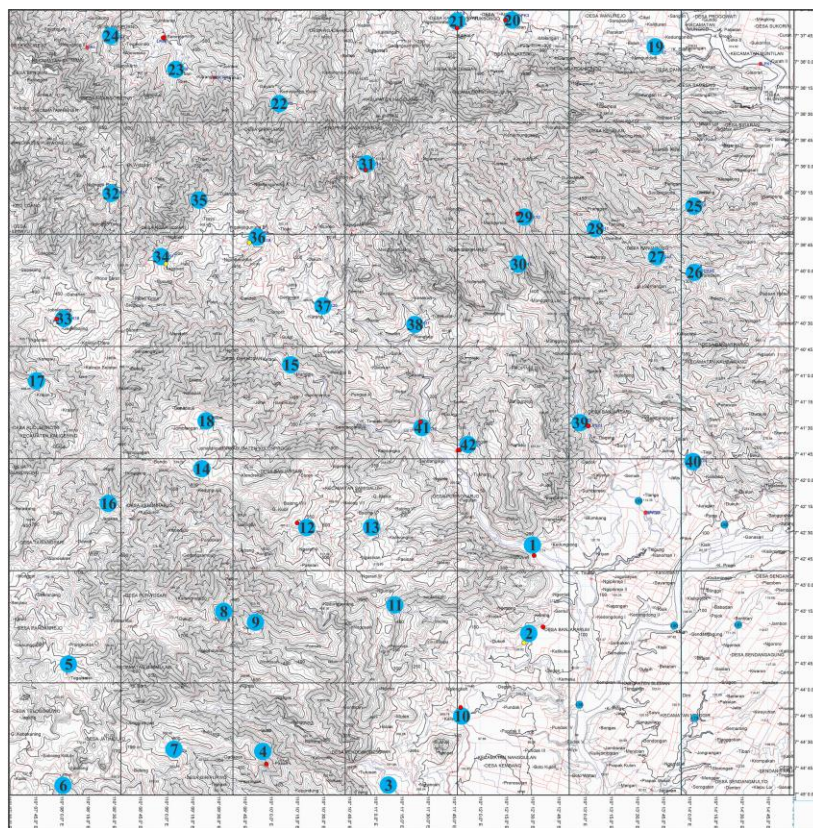


Figure 4. Location sample in topographic map of research area.

4.2. Variables Responses of Morphometry

The research area is located at an elevation of 136 to 850 m measured at several sampled locations, with a slope of 22 to 100%. The average elevation is 415 m, while the regional average slopes measured at observation sites by 42%. This suggests that the study area is a hilly morphology with moderate elevation above sea level. Slope area is quite steep to very steep, with a fairly high dissected morphology.

Valley floor - height ratio (Vf) of research areas range from 0.19 to 5.4, with an average value of 1.04. The average value of this Vf indicates that the width of the river valley is almost equal to the valley height. It shows that both the horizontal and vertical erosions are equally dominant in the study area.

Valley cross section (V_{ratio} or V_r) ranges from 0.13 until 4.13 with an average of 0.68. This value indicates that the cross section of the river valley studied had a fairly wide cross-section, with quite large concavity. This V_r characteristics are supported by some factors such as fairly strong erosion, so that the cross-sectional of the river valley became V to almost U shape, with the cross-sectional area A_v is more than half of the area of A_c . The greater the value V_r showed that the cross-section of the valley tend to widen, which means that the horizontal erosion increasingly dominant. Usually horizontal erosion looks balanced with vertical erosion in the research area. V shape valley found was generally sharp formed, according to Van Zuidam (1983), it marks the type of strong vertical erosion which may occur in recently uplifted areas. Rock and climate conditions in this area must, however, also be considered. Meanwhile, the shape of the valley U indicates pause after a period of strong vertical erosion, or river has followed a gapping fracture, or has stopped when reached hard rock (for example old volcanic breccia or lava in the research area), reducing the rate of vertical erosion. Usually the U-shaped valley is partly in filled with sediment, especially in downstream part of sub watershed.

Stream gradient index (SL) indicates the river gradient value in total length of river channels. SL value obtained in the study area ranged from 27.5 to 481.5, with an average of 180.7 m.

This value indicates that the river gradient is quite large, which means the elevation difference between upstream and downstream parts of piece of the river is large enough. This fact is supported by the local strong dissected, coarse relief morphology of research area.

The research area is generally included in Progo Drainage Area, with several sub-watersheds. They are include Kedungan, Sindon, Pugoh, Srandu, Tlegung, Tinalah, Nungkep, Kamal, Tangsi, Sileng and Turusan sub watersheds. Their drainage density ranged from 0.17 to 0.71 / km, with an average of 0.38. In practice, according to Van Zuidam (1983), many factors influence the drainage density, i.e.: rock type, fracturing, soil type, relief, vegetation, rainfall and also evapotranspiration. Coarse grained intrusive rocks usually show low drainage densities, while fine-grained clastic sedimentary rocks reveal relatively high drainage density. Dd value as much as 0.38 show moderate drainage density, controlled by variable rocks in research area, include coarse grained intrusive rocks and fine-grained clastic sedimentary rocks.

4.3. Relation Between Variable Responses of Region/Hill and Stream

The relationship between the response variables of area / hill to river under study showed a low - very low value. Relations of area elevation (h) to V_f , V_r , SL and Dd have correlation coefficient value respectively of 18.6; 21.29; 18.52 and 10.95%. These values indicate that the elevation of an area does not relate to the characteristics of the stream valley morphometry. The highest value obtained from the relationship only by 21.29% in relation h to the V_r (Figure 5) shows that the elevation does not affect the cross-sectional shape of the valley.

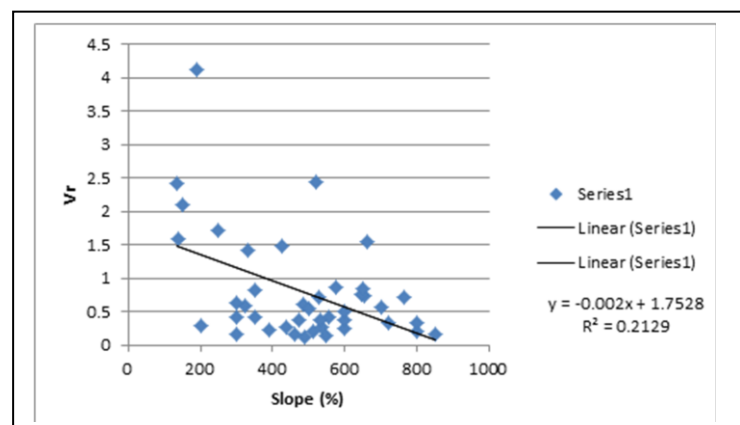


Figure 5. Relation between slope of area and V_r .

An analysis of the relationship of the variable response of slope to river valley showed a correlation value between slope to Vf, Vr, SL and Dd respectively for 6.05; 5.01; 2.02 and 0.0002% or very low. This means that the slope of an area does not also affect to the form or stream valley. The shape and size of the river valley is more likely to be influenced by the type of rock and the process that occurs.

5. CONCLUSION

The landscape at Samigaluh and its surrounding area have coarse relief, strong dissected hilly morphology. From some sample locations selected known that the study area elevation ranges from 136 - 850 m or an average of 415 m with a slope of 22 - 100% or an average of 42%. From the calculation, the average response variable indexes of river morphometry (Vf, Vr, SL and Dd) are respectively 1.04; 0.68; 180.7; and 0.38. The response variable values are affected by the condition of the research areas that include rock type and geomorphological processes, especially erosion. In general, erosion horizontal balanced by vertical erosion, characterized by Vf at 1.04 and stream valleys shape of V to U type. The relationship between the response variable morphology of the area / hill showed no correlation with the response variable indexes on the river. The highest value of the relationship just gained at 21.29% on the relationship between slope and Vr.

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OK BU, noted!

Thank you

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Selamat pagi P Dicky...

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