

Distribution of Geothermal Manifestation in Parakan Salak, West Java

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ABSTRACT

Many Geothermal Energy Source in Indonesia Country's, it's because Indonesia location consist of 3 part tectonic plates. The Exploration and development study of geothermal as part to find alternative resources energy. It may happen something like decrease carrying capacity of environmental.

Manifestations of Geothermal are indication on the earth surface what we call have an activity thermal inside into the earth. Its process happen, because of holes inside dee into the earth it may geothermal fluid like stea or geyser let out to the surface on the earth. Characteristic of manifestations consist of Chlor (Cl), SO₄, HCO₃, pH, and temperature.

The Result from Surveying in the Parakan Salak site founded four kinds of geothermal manifestations there are geyser, hot water reservoir, mudpool, and mudpool with geyser. The result shows have differences elevation and nearest with location of geothermal sources.

1. INTRODUCTION

The exploration and development of Geothermal search for alternative energy that's prove there are have natural resources of geothermal. The result from the research from exploration is exploitation of the natural resources possibility become degradation of sustainability for environmental. That condition can impact for the human immaterial or material especially for the human life on close area from exploitation the natural resources for the example geothermal exploitation. Many Geothermal Energy Source in Indonesia Country, it's because Indonesia location consist of 3 part tectonic plates. The Exploration and development study of geothermal as part to find alternative resources energy. It may happen something like decrease carrying capacity of environmental.

For minimize impact from exploitation the natural resources, we are need to anticipation. Act for those anticipation, we can study for existing condition from many factor geothermal condition before and after exploitation. Geothermal manifestation is one of indicator for volcanic activity for exploration field. The study for know that condition by routine can anticipate not normally condition system of geothermal. For the end the natural condition can protecting for along time.

Many places of Geothermal Production around Indonesia for example Sibayak in Sumatera Island, Gunung Salak, Kamojang, Wayang Windu, Darajat and Dieng in Java Island dan Lahendong in Sulawesi Island. One location big production is Gunung Salak at West Java, that production maybe impact condition of environmental at Parakan Salak.

The Question for the study is what kinds of Geothermal manifestation at Parakan Salak, West Java? How the condition of Geothermal manifestation at know?

2. DATA AND METHOD

2.1. Data

Kind of Data :

- Image from Landsat 7 ETM year 2001 and from Landsat TM year 1991
- Topographic Map year 2001 from BAKOSURTANAL
- Map of Geology year 1971 from DGTL
- Value of Water Chemical parameter (pH, Cl, SO₄, HCO₃) from surveying
- Value of Soil Chemical Parameter (pH) from surveying

Primary data from survey at sample location like value of pH (soil and water), and Temperature and about existing condition from geothermal manifestation.

(1) Find Location of Geothermal Manifestation from Topographic Map and Geology Map. (2) Interpretation Image for find the specific location of Geothermal Manifestation (Indication) (3) Korelation Map and Image and then fix the sample location. (4) Survey to location of Geothermal manifestation and Note what kind of type the Geothermal Manifestation (5) Note the temperature and pH for each sample location. (6) Take of pictures for existing condition (7) Bring fluida for analysis at laboratorium (8) Report the result.

3. RESULT DISCUSSION

3.1. Interpretation of Map

The geology Map used for identification where is location of geothermal manifestation from DGTL year 1971. Base on this map location of Geothermal Manifestation is indicated with point called hot spring. Distribution of hot spring there is 10 locations. Each point of geothermal manifestations are not same, there are 2 or 5 point and 1 point. That's location found at Young Mountain Lava Stone of Mountain Endut Perbakti, West Java. (Map's of Geology).

Base on Map of Geology with radius 1 km, area of study about 6 – 12 km from Central Mount Salak (Kawah Ratu).

3.2. Interpretation of Image

Identify of Geothermal Manifestation with interpretation technique band composition. The RGB 321 are composition with band 3, band 2 and band 1, as well as RGB 621 are composition band 6, band 3 and band 1. The technique based on each band specification:

- *Band 1 (0.45-0.52 μm ; blue) : for differencing water and differencing between soil and vegetation*
- *Band 2 (0.52-0.60 μm ; green) :for detecting vegetation*
- *Band 3 (0.63-0.69 μm ; red) : for differencing type of vegetation*
- *Band 6 (10.4-12.5 μm ; thermal IR) : for identifying located Geothermal Manifestation, measure level of vegetation stress, fire and soil moisture*

Image use for identification of Geothermal Manifestation are Landsat ETM year 2001 and Landsat TM year 1991. Result for these interpretation is Map Image Landsat ETM RGB 321 and Landsat TM RGB 321, and

Map Image Landsat ETM RGB 621 and Landsat TM RGB 621. Base on Interpretation of Landsat with RGB 621 and RGB321 prediction of Identification location Geothermal Manifestation is area without vegetation cover and there is about 10 location can identify. There's so many identified on nearest Mount Awibengkok and Batu Hill.

3.3. Field Survey

Base on Map and Image interpretation then created sample area for field survey. The Result from Surveying in the Parakan Salak site founded four kinds of geothermal manifestations there are geyser, hot water reservoir, mudpool, and mudpool with geyser.

Result from different time field survey in Parakan Salak, indicated the change of fluidal temperature (Water and Mud). This condition explain there is differentiation high level and near central Mountain indicated temperature more heat between temperature in low level and long distance with central Mountain. For example temperature in Kawah Anjing (near Central Mountain) about 60 - 70°C hotter than temperature in Kawah Citaman (50 - 70°C) and temeparture in Air Panas (30-40°C) . Also pH indication on high level and near central Mountain pH meter indicated 4 – 2 (Kawah Anjing , Kawah Citaman (pH 4 – 2) and Kolam Air Panas (pH 7).

This result can indicated to dynamic of temperature and pH in the same area. Sample 1 (9 Feb) indicated temperature change from 657°C became 50°C (20 March). Sample 2 indicated temperature change from 74°C became 55°C. Sample 3 indicated temperature change from 60°C become 73°C and pH indicated change from 3 become 4. Sample 4 indicated temperature change from 70°C became 64°C and pH indicated change 5 become 3. Sample 5 indicated temperature change from 78°C became 54°C. The last, sample 6 indicated temperature change from 42°C became 38°C. This dynamic condition because on March 20, because this is rainy.

Table 3 . Result of Field Survei and Laboratorium

Points	Coordinat	Location	Fluida, March, 20, 2008		Fluida, February, 9, 2008	
	Geography	Of Sample	pH	Temp (°C)	pH	Temp (°C)
1	06°45'29,6" S	Kawah Anjing 1	2	50	2	65
	106°41'02,1" E	1.215 m msl	Mud Pool		Mud Pool	
2	06°45'30,3" S	Kawah Anjing 2	3	55	3	74
	106°41'02,2" E	1.210 m msl	Geyser		Geyser	
3		Kawah Anjing 3	4	73	3	60
		1.205 m msl	Mud Pool with Geyser		Mud Pool with Geyser	
4	06°45'49,1" S	Citaman 1	3	64	5	70
	106°40'52,4" E	1.109 m msl	Mud Pool		Mud Pool	
5		Citaman 2	2	54	2	78
		1.112 m msl	Mud Pool with Geyser		Mud Pool with Geyser	
6	06°46'25,9" S	Kolam Air Panas	7	42	7	38
	106°41'19,1" E	917 m msl	Hot Water Reservoir		Hot Water Reservoir	

Source: Field Survey and Laboratory

IV. CONCLUSION

The Result from Surveying in the Parakan Salak site founded four kinds of geothermal manifestations there are geyser, hot water reservoir, mudpool, and mudpool with geyser. The result shows have differences elevation and nearest with location of geothermal sources.

V. REFERENCES

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