

Preface

All praises are due to Allah, God Almighty, Who made this annual event of successful. The “**3rd Annual Basic Science International Conference (BaSIC-2013)**” is an annual scientific event organized by the Faculty of Mathematics and Natural Sciences, Brawijaya University. As a basic science conference, it covered a wide range of topics on basic science: physics, biology, chemistry, mathematics and statistics. In 2013, the conference took a theme of “**Basic Science Advances in Energy, Health and Environment**” as those three aspects of life are hot issues.

The conference in 2013 was the continuation of the preceding conferences initiated in 2011 as the **International Conference on Basic Science (ICBS)**, where it was a transformation from the similar national events the faculty had organized since 2004. What also changed in year 2013 was the use of the ISSN for the conference proceedings book, instead of an ISBN used in previous proceedings books. The change was based on the fact that BaSIC is an annual event, and, therefore, the use of ISSN is more appropriate. The proceedings book was also divided into four books: Physics, Biology, Chemistry and Mathematics, each with a different ISSN. The proceedings were also published in electronic forms that can be accessed from BaSIC website. I am glad that for the first time both types of publication can be realized.

This event is aimed to promote scientific research activities by Indonesian scientists, especially those of Brawijaya University, in a hope that they may interact and build up networks and collaborations with fellow overseas counterparts who participated in the conference. This is in line with university vision as a World Class Entrepreneurial University.

I am grateful to all the members of the program committee who contributed for the success in framing the program. I also thank all the delegates who contributed to the success of this conference by accepting our invitation and submitting articles for presentation in the scientific program. I am also indebted to PT Semen Gresik and PT PLN (Persero) for their support in sponsoring this event.

I wish for all of us a grand success in our scientific life. And I do hope that the coming conferences will pick up similar success, and even better.

Malang, April 2013

Johan Noor, Ph.D.
Conference Chairperson

Foreword by the Rector of Brawijaya University

First of all I would like to congratulate the Organizing Committee for the success in organizing this amazing event. I believe all dedicated time and efforts will contribute to the advancement of our beloved university.

I would like to welcome all participants, domestic and overseas, especially the distinguished invited speakers, to Malang, to the conference. An international conference is a good means to establish and build relationships and collaborations among participants. So, I hope this conference will facilitate all of you, the academicians and scientists, to setup a network of mutual and beneficial collaboration. As a university with a vision to be “*A World Class Entrepreneurial University*”, Brawijaya University will support all efforts to realize that dream.

Finally, I do hope that the conference will run smoothly and nicely and is not the last one. I would like to thank all parties who have lent their hands in making this conference happened.

Malang, April 2013

Prof. Dr. Yogi Sugito
Rector, Brawijaya University

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Scientific Program

Time	Day One – 16 April 2013	Day Two – 17 April 2013
07.30 – 08.00	Registration	
08.00 – 08.30	Inaugural Session, Welcome Remarks and Opening Ceremony	Poster Preparation
08.30 – 09.00	Coffee Break	Poster Session (08.30-09.30) (Majapahit Hall)
09.00 – 09.45	Invited Speaker 1 Prof. Lidia Morawska, Queensland University of Technology, Australia Title: “Emissions to the Air: from Multidisciplinary Science to Applications”	
09.45 – 10.30	Invited Speaker 2 Dr. rer. nat. M. Nurhuda, Universitas Brawijaya Title: “Towards Energy Security for the Poor”	Coffee Break (09.30 – 10.00)
10.30 – 11.15	Invited Speaker 3 Prof. S.K. Lai, National Central Univ., Taiwan Title: “Cluster Dynamics by Ultra-Fast Shape Recognition Technique”	Parallel Session (start at 10.00)
11.15 – 12.00	Invited Speaker 4 Dr. Nurul Taufiqurrochman*, Indonesian Nanotech Society Title:”Nanotechnology Development Strategy for Supporting National Industry in Indonesia”	
12.00 – 13.00	Lunch Break	
13.00 – 15.00	Parallel Session	Parallel Session
15.00 – 16.30		Closing Ceremony
16.30 – 17.00		
17.00 – 19.00	Free Time	
19.00 – 22.00	Conference Gala Dinner	

Parallel Session Day One - 16 April 2013

Lontar 2 Room: Physics

Time	Paper ID	Author	Title	Moderator
13.00-13.30	Invited	Prof. Kwang-Ryeol Lee	Role of Atomic Scale Computational Research in the Nanoscale Materials Science	Mauludi A. Pamungkas
13.30-14.30	P01	Yatini, Santoso, D., Laesanpura, A	Physical Modeling Studies of the Time Domain Induced Polarization (TDIP) Response, Case : Homogen Isotropis Medium	M. Zuhdi
	P02	Sulistya Rini Pratiwi	Analysis and Identification Of Variables That Influence The Public Awareness To Reduce Air Pollution (Lead / Pb) In Tarakan City	
	P03	Arfidian Rachman, Sohif Mat, Kamaruzzaman Sopian	Potential of Desiccant Cooling System Performance in Hot and Humid Climate Country	
	P04	Shaiful Kabir, Dr. A.K.M Rezaur Rahman, Shyamal Ranjan Chakraborty, Dr. Arun Kumar Deb, Dr. Syed M. Hossain Dr. Kamrun Naher	Application of Nuclear Reactor Based Neutron Activation Analysis for Determination of Toxic Effects in Soil due to Ship Breaking Activities at Sitakunda in Chittagong, Bangladesh	
	P05	Zuraihan, Nova Purnama Lisa	The Orientation of Levels Thermal Comfort on Space Case studied: Lauser International Building In The Ground Floor	
	Discussion/Questions/Answers			
	14.30-15.30	P06	Muhammad Zuhdi, Sismanto	
P07		Imam Suyanto, Yatini	Application of Induced Polarization to Estimate Saprolite and Limonite Deposits Case Study Kolo Bawah Area, Morowali Regency, Central Sulawesi	
P08		Abd. Rahman Assyakur and Laily Mukaromah	Gross Primary Productivity in Bali Botanic Garden: a Landsat data-based estimation	

	P09	Adhi, Aryono, Wahyudi, W. Suryanto. W.	Simulation Design Of Earthquake On Fault Zone Using Stochastic Model (A Brief Review)	
	P10	Sismanto	A New Concept Water Saturation Estimation Based on Vertical Seismic Profiling Data	
	Discussion/Questions/Answers			
15.30-16.30	P11	Budi Eka Nurchaya	An application Continuous Wavelet Transform (CWT) to Analysis of Seismic Exploration Data	Yatini
	P12	Hidden and Sismanto	Mapping and Analysis of Pumice Coating Proceeds Volcano Eruption Rinjani In Lombok Based on Data Geoelectric Resistivity	
	P13	Dian Wijaya Kurniawidi	Investigation of Subsurface Structure with Integrated Geophysical Methods in Sedau Lombok Barat to determine Landslide Risk	
	P14	Erna Kusuma Wati and Wiwit Suryanto	Instrument Corrections for Broadband and Short-Period in Japan’s Earthquake September 5 th 2004	
	P15	Adi Susilo	Iron Rock Positioning Determination, Using The Geomagnetic Method, in The Mount Lawang, Aceh, Indonesia	
	Discussion/Questions/Answers			

Parallel Session Day TWO - 17 April 2013

Lontar 2 Room: Physics

Time	Paper ID	Author	Title	Moderator
10.00-11.00	P16	Muhammad Farid, Kirbani Sri Brotopuspito, Wahyudi, Sunarto, Wiwit Suryanto	Shoreline Changes and Seismic Vulnerability Index in The Earthquake Prone Areas (The Case of Coastal North Bengkulu, Bengkulu Province-Indonesia)	Saad M. Alshehri
	P17	Deassy Siska, Wiwit Suryanto	Array Technique Application to Determine Direction of Rupture of Tohoku’s Earthquake, March 11 th 2011	
	P18	Suprianto.A., Wahyud, Suryanto. W., Utama. W., Jaya. M.S., Deon. A., Grassner. A., Putrakusuma. T.M., Putriatni.D., Supoyo, and Erbas. K	Installing Surface Microseismic Monitoring in Mt. Lamongan Geothermal Field, East Java, Indonesia	
	P19	Chrystian Afiko, Sismanto and Taufik Anwar	Analysis of Petrophysics Properties Reservoir using Software Geolog 6.7 with Multimin Method and Calculate Volumetric Reserves Gas on “Sianturi” Field Reservoir G25 Kutai Basin East Kalimantan	
	P20	F. Virgo, A. Zaenudin, Suharno, W. Suryanto and Wahyudi	Magnetic Survey within Penantian Geothermal Area in Pasema Air Keruh, South Sumatra	
	Discussion/Questions/Answers			
11.00-12.00	P21	Saad M. Alshehri and Tansir Ahamad	Silver Nanoparticles (AgNP) Loaded Hydrogels and their Antimicrobial and Burn Wound Healing Properties	M. Farid
	P44	Sri Herwiningsih	Potential Benefits of Hypofractionation Scheme to Improve Radiotherapeutic Ratio for Lung Cancer Treatment	
	P46	Johan A.E. Noor	Treatment Strategy for Dynamic Organs in Radiation Oncology	

	P48	Arinto Yudi PW	The Relation of Temperature to PM _{2.5} Production from Wood Burning	
	Discussion/Questions/Answers			
12.00-13.00	Lunch Break			
13.00-14.00	P26	Sudarmaji, Budi Eka Nurcahya, and Sismanto	Application of Biot -Gassman Substitution method in Generating Synthetic of S-Wave Sonic Log for Simultaneous AVO Inversion	Dian Wijaya K.
	P27	Rian Amukti and Wiwit Suryanto	Detection of Low Velocity Zone using Receiver Function Analysis from CJ1 Station	
	P28	Haerudin N., Wahyudi, Suryanto W., and Sarkowi	Analysis of the 3D Geothermal Reservoir Model from Anomaly Magnetic Data using Mag3d Software. Case Study: Rajabasa Geothermal Field, Lampung Province, Indonesia	
	P29	Yudianto, D., Istiyanto, J.E., Broto K.S., Sismanto	Development of Information Systems to Semeru Volcano Activity using SMS: In Study	
	P30	Wiyono, Soemarno, Sukir Maryanto, Lailatin Nuriyah, and Jupriadi	Pattern Prediction of Ground Water Depth around TPA Supit Urang (Landfill) using Geoelectric Resistivity Sounding Method	
	Discussion/Questions/Answers			
14.00-15.00				
	P32	Indra surya atmaja	Correcting the Pull-Up Effect In Seismic Data using Pre Stack Depth Migration Method	
	P33	Karyanto, Wahyudi, Ari Setiawan	Interpretation of Mount Ungaran Geothermal Geomagnetic Data using Pseudogravity Transform for Determining Heat Source Rock	
	P34	Agus Santoso	Subsurface Determination of Cave And Void in Limestone Rock Area by Geoelectric Method in Tinapan Village Todanan District Blora Central Java	
	P35	Bakti Sukrisna , Kirbani S.B., Wahyudi and Wiwid S., Bambang Sunardi	Seismicity Analysis by using USGS Data 1973-2012 for Detection of Banyuwangi Earthquake that Caused Eruption Activity of M. Rinjani 1994	
	Discussion/Questions/Answers			

15.00-16.00	P36	Suharsono and Wahyu Hidayat	Study on Comparison between Wenner and Wenner-Schlumberger Configuration Case Study : Coal Layer Prediction
	P37	Adi Susilo, Arief Rachmansyah, Irwan, Fajar Rakhmanta and Yunu Sulistyono	Detection of Seepage Patterns Direction in The Bajulmati Dam, Banyuwangi, Indonesia Using Geoelectrical Method, Schlumberger and Dipole Dipole Configuration
	P51	Sunaryo	Study of Aquifer Potency at Kayu Aro Village of Gunung Talang Solok-West Sumatera by Means of Geoelectrical Resistivity Methods
	P52	Sukir Maryanto, Ahmad Nadhir, Ratri Andinisari, Arin Wildani, Muhamad Hendrasto	A Preliminary Application of Fuzzy Logic to Classify Volcanic Earthquakes and Tremors Recorded at Semeru Volcano, East Java, Indonesia
Discussion/Questions/Answers			

Parallel Session Day TWO - 17 April 2013

Majapahit 1 Room: Physics

Time	Paper ID	Author	Title	Moderator
14.00-15.00	P38	Poppy Puspitasari	Comparison of Ammonia Yield using Nanocatalyst of Mn- _{0.4} Zn _{0.6} Fe ₂ O ₄ and Mn _{0.6} Zn _{0.4} Fe ₂ O ₄ at Ambient Environment	Sri Herwiningsih
	P39	Istiroyah, T. Aizawa, I.N.G Wardana, D.H Santjojo	Nitriding Behavior of Aisi 316 L in High Density Plasma Nitriding	
	P40	D.J. Djoko H. Santjojo, Unggul P. Juswono, Yudy S. Irawan, Masruroh	Mechanical Property and Stability of ZnPc Thin Film in ZnPc/Polystyrene/Quartz Crystal Oscillator Stack for QCM Based Biosensor	
	P41	Masruroh	Influence of the Waveform and DC Offset on the Asymmetric Hysteresis Loop in Au/Pzt/Pt/ Al ₂ O ₃ / SiO ₂ /Si Thin Films Prepared by MOCVD Method	
	P42	Retno Wulandari, I Nyoman Gede Wardana, Slamet Wahyudi, Nurkholis Hamidi	Reactive Mixing in Stirred Tanks under Different Kinds of Perturbations	
	Discussion/Questions/Answers			
15.00-16.00	P43	Anisa Nur Istiqomah	The Preceptions of Students at the Department of Physics of State University of Malang about the Development of Science	Djoko Santjojo
	P45	Setyawan P. Sakti	Comparison between general purpose crystal resonator and TCXO as Reference Frequency for Frequency Counter	
	P47	Agus Naba	Power Curve Based Wind Speed Estimation in Wind Energy Conversion System	
	P49	Marsi Bani	Effect of Purification of Carbon from Coconut Shell Pyrolysis With Acid Reaction Method in HCl 1 M Solution	

	P50	Didik R. Santoso	Development of Instrumentation System for Heavy-Load Measurement Based on Piezoelectric Sensor	
	Discussion/Questions/Answers			

Scientific Papers

Invited Papers

Magnetic Survey within Penantian Geothermal Area in Pasema Air Keruh, South Sumatra

F. Virgo, Wahyudi, W. Suryanto, Suharno and A. Zaenudin

Abstract— Magnetic survey has been conducted within Penantian geothermal area of Pasema Air Keruh, Empat Lawang District, South Sumatra Province. The purpose of the survey is to determine the subsurface geological structures that act as a migration path to the surface of the geothermal fluid. Total magnetic field anomaly data obtained is transformed into a flat surface, and reduced to the pole, then carried upward continuation. The result is a regional magnetic field anomaly, which describes the existence of subsurface geological structures in the Penantian geothermal area.

Keywords— Anomaly, geothermal, magnetic, structure.

I. INTRODUCTION

The research area is located in the Penantian village, Pasema Air Keruh Subdistrict, Empat Lawang District, South Sumatra. Geothermal manifestations such as hot springs, streaming ground and hot mud. They are located at 3°53'5" to 3°53'8, 2" South Latitude and 102° 47'45" to 102°47'47" East Longitude.

In general, the formation of the study area is shown in Figure 1. Formation consists of two main groups: the group is represented by Bengkulu Basin which is product of volcanism activity Barisan Mountains, that exist in Oligocene - Miocene to the Quaternary Period. Then the rock of South Sumatra Basin is represented by Gumai Formation as the product of exposure system passive margin sediments into the Fluvial, Deltaic to shallow marine.

Stratigraphic sequence from old to young research areas are as follows: Hulusimpang andesitic-basaltic lava altered

unit, Gumai sandstone unit, andesite intrusion and Quaternary volcanic andesite lava unit [1].

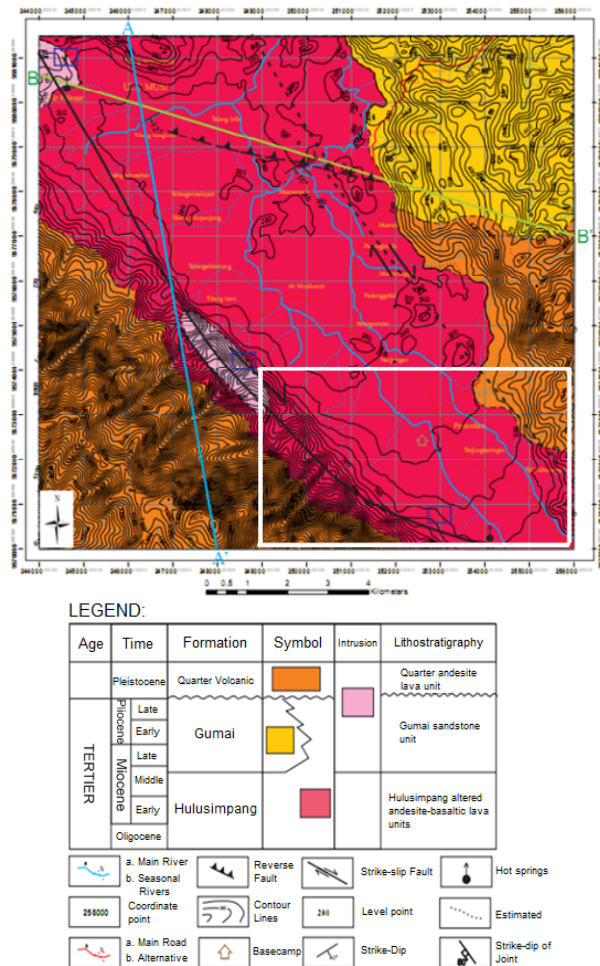


Figure 1. Pasema Air Keruh Geological Map. White box indicates magnetic survey area [1].

The geothermal manifestations are controlled by the fault as heat medium fluid flow to the surface. Area manifestation is near to Sumatra Fault System and Musi-Keruh Fault. However, whether these two major faults that control the presence of manifestations or minor faults that surround the two main fault is still not known.

One of the geophysical method that can explain the existence of faults in the subsurface is a magnetic method. This method is commonly used in geothermal exploration in determining weak zones / faults. In this zone, magnetic field anomaly value will be low, because the rocks has undergone

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demagnetization by hydrothermal alteration processes due to heat fluid from below the surface.

II. BASIC THEORY

Magnetic method in exploration of geothermal energy is used to study subsurface structures, alteration zones, the characteristics of the magnetic anomalies and the type of rock below the surface [2].

This method is basically used for the measurement of total magnetic field anomalies in the earth's surface by magnetic susceptibility contrast of rocks beneath the surface. By the contrast, it can be identified masses of igneous rocks that have a high concentration of magnetic minerals. Furthermore, the structure and rock formations below the surface can be determined. Susceptibility magnetic rocks are affected by a natural magnetic field, which is measured in nanotesla (1 gamma = 1 nT).

Susceptibility expressed as the level or degree of a magnetized object because of the influence of magnetic field, and is written as: [3]

$$k = \frac{M}{H} \quad (2.1)$$

Where k is the magnetic susceptibility, H is the earth magnetic field strength (Am^{-1}), and M is the magnetic intensity (Am^{-1}).

Magnetic anomaly is caused by the presence of local rocks that affect the earth's magnetic field. Local rock was dike, faults, folds, lava flows, massive intrusions, metamorphic rocks, and magnetite ore body. Illustration of normal earth's magnetic field and Earth's magnetic field is affected by magnetic anomalies can be seen in Figure 2 [4].

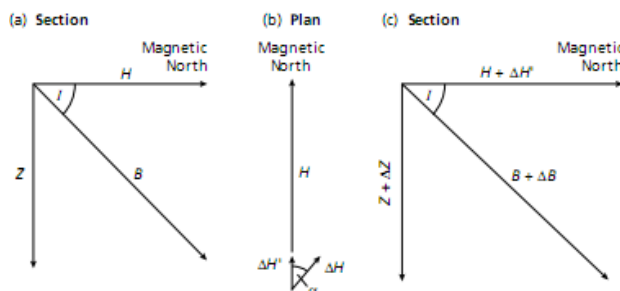


Figure 2. Vector representation of (a) normal earth's magnetic field (b) magnetic field (c) earth's magnetic field with superimposed magnetic by the anomaly [4].

The existence of magnetic anomalies caused total magnetic field vector B changes by ΔB , ΔZ changes as the vertical component and a horizontal component changes by $\Delta H'$ (ΔH projection to the horizontal component H). Normal earth's magnetic field is given by equation (2.2) and the Earth's magnetic field is affected by the anomaly is given by equation (2.3):

$$B^2 = H^2 + Z^2 \quad (2.2)$$

$$\Delta B = \Delta Z \sin I \Delta H \cos I \alpha \quad (2.3)$$

Where I is the angle of inclination of the earth's magnetic field.

III. METHODOLOGY

The first magnetic surveys carried out around the manifestation of the measurement points tighter around manifestations. The second, conducted by the pattern of spread in the Penanian village and surrounding. The area of the survey is about 6.5 km², with 165 observation stations (Figure 1).

The measurement results corrected prior to the daily variation using Excel software to get the total value of the magnetic anomaly. Then, this value is plotted using Surfer software to get the contour patterns of total magnetic anomalies (Figure 2).

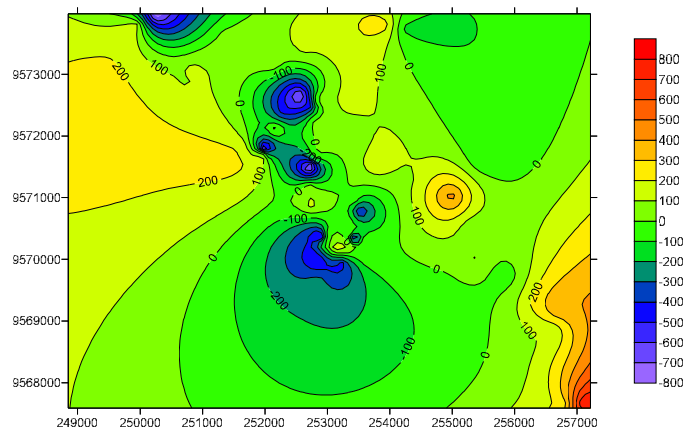


Figure 2. Total magnetic anomaly map of Penanian area.

The contour is transformed into a flat surface to eliminate the effects of topography, then reduced to the pole to eliminate the effect of a magnetic dipole. Furthermore, carried upward continuation to get regional magnetic anomalies (Figure 3).

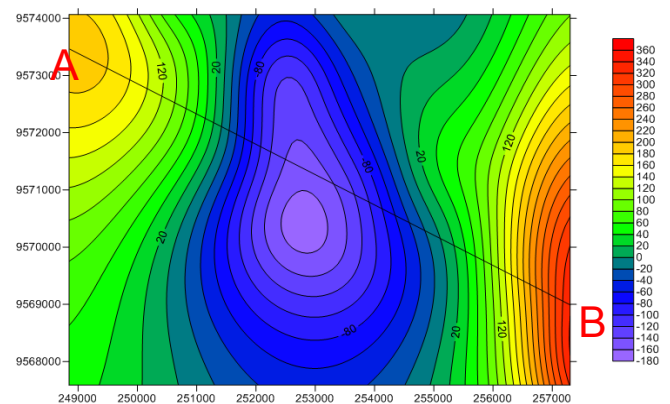


Figure 3. Regional magnetic anomaly map after carried upward continuation at an altitude of 1000 m above sea level. The line AB is the cross-section to be modeled.

Based on the contours of the regional magnetic field anomalies, can be further interpreted the presence and position of faults beneath the surface through 2-D modeling by using Mag2dc software.

IV. DISCUSSION

From 2-D modeling has been conducted (Figure 4), it can be seen that there are two faults that surround the Penantian village. Then there are two rock formations with different susceptibility values, ie $k = 0.02$ and 0.0196 .

Based on the local geology map, the value of $k = 0.02$ is a unit of andesitic lava of the Quaternary volcanic rock formations, while the value of $k = 0.0196$ is a unit of altered andesitic-basaltic lava of Hulusimpang rock formations. Meanwhile, the two faults identified above as Sumatra Fault System and Musi-Keruh Fault.

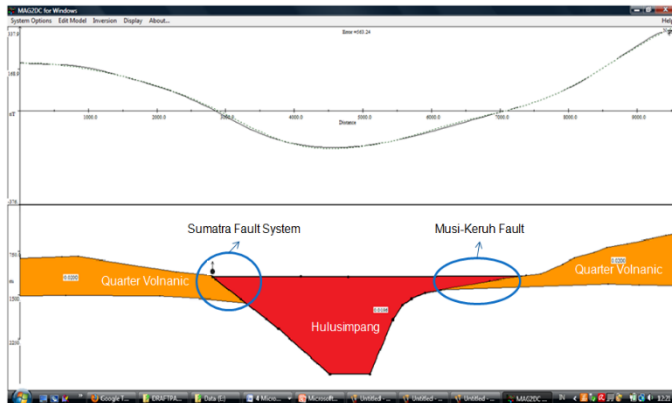


Figure 4. The result of 2-D modeling of AB section (Fig. 3). The value of $k = 0.02$ is a unit of andesitic lava of the Quaternary volcanic rock formations, while the value of $k = 0.0196$ is a unit of altered andesitic-basaltic lava of Hulusimpang rock formations.

According to the location and position of geothermal manifestations on geological maps, it can be estimated that the Sumatra Fault System is a fault that controls the existence of Penantian geothermal manifestations.

V. CONCLUSION

Sumatra Fault System is a fault that act as hot fluid migration path to the surface in the area of Penantian geothermal manifestations. Magnetic susceptibility values of Hulusimpang and Quarter Volcanic rock formations, respectively are $k = 0.0196$ and 0.02 .

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