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GEOMATE2018-Acceptance of Abstract and invitation-g1

Zakaria <zakaria@bio.mie-u.ac.jp>
Kepada: listyanitheophila@gmail.com

13 Maret 2018 17.42

Dear Authors,

Thanks.

GEOMATE2018-Acceptance of Abstract and invitation-Group 1 is attached.

Best regards.

Zakaria

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162K

March 13, 2018

Paper ID Number: 8104
Ms. T. Listyani R.A. Listyani
Sekolah Tinggi Teknologi Nasional Yogyakarta
Indonesia
E-mail: listyanitheophila@gmail.com

Subject: **Acceptance of Abstract for full paper submission at the GEOMATE2018-KL, Malaysia**

Dear Ms. T. Listyani R.A. Listyani,

We are pleased to inform you that after careful review and assessment, the members of the GEOMATE2015 Technical Committee have accepted your abstract entitled "TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA" for full paper submission at the GEOMATE2018-KL, Malaysia conference. It is, therefore, with great pleasure that we extend our formal invitation to you to submit the full paper through online submission using the following link.
http://www.geomate.org/full-paper.html

Please download the paper template from the conference web page and prepare your paper according to the instructions/manuscript preparation guidelines given in the template. Your paper should look exactly like the template.

The file name of the full paper should be your paper ID number "8104". Please submit the full paper as early as possible to complete the review process smoothly. If you have any correction in title/abstract, please make the necessary correction in full paper. You do not need to resubmit abstract separately.

Should you require more information, please do not hesitate to contact us. We look forward to hearing from you soon.

Sincerely yours,

Prof. Zakaria Hossain,
GEOMATE2018 Conference Chairman
The Eighth International Conference on Geotechnique, Construction Materials and Environment,
Division of Environmental Science and Technology
Graduate School of Bioresources
Mie University, 1577 Kurima Machiya-cho,
Tsu-city, Mie 514-8507, Japan
http://www.geomate.org
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listyani theo <listyanitheophila@gmail.com> 13 Maret 2018 23.35
Kepada: Zakaria <zakaria@bio.mie-u.ac.jp>

I accept the invitation.
[Kutipan teks disembunyikan]

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GEOMATE2018 KL Malaysia Accepted Abstract-Group 1

Zakaria <zakaria@bio.mie-u.ac.jp> 13 Maret 2018 20.38
Kepada: GEOMATE <conference@geomate.org>

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GEOMATE2018 KL Malaysia Accepted Abstract-Group 1

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Zakaria <zakaria@bio.mie-u.ac.jp> 11 April 2018 15.59
Kepada: conference@geomate.org

Dear Colleagues,

I am pleased to attach the list of accepted abstracts and paper template for your kind reference. Please submit full paper using the following link.

http://geomate.org/full-paper.html

We appreciate early submission of full paper to facilitate the review process smoothly.

Best regards.

Zakaria

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8199	Mr.	Kenneth Jae	Elevado	Compressive strength modelling of concrete mixed with fly ash and waste ceramics using machine learning
8200	Dr.	Fumitake	NISHIMURA	Influence of Light on Microbial River Water Ecosystem and its Self-Purification Capacity
8201	Dr.	Lessandro Estelito	Garciano	Efficient Repair Scheduling of a Multiple-Source Lifeline Network using Constrained Spanning Forest (CSF)
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8210	Dr.	Soewignjo Agus	Nugroho	Liquefaction potential of sand on peat deposits with a various grain size with laboratory model

GEOMATE2018 KL Malaysia Accepted Abstract-Group 1 & 2

8211	Dr.	TAIZO	UCHIDA	Allelopathic effects of aqueous extracts from six hydrophytes species on activities of seed and lateral bud of Phragmites japonica Steudel as a green infrastructure plant
8212	Mr.	Aprisal	Aprisal	Soil quality index analysis under horticultural farming in sumani upper watershed
8213	Prof.	Hiroyuki	Ii	Making simulated lunar highland rocks using Japanese igneous rocks
8214	Prof.	Chi-Min	Liu	Mathematical modeling of extended Stokes problems for Newtonian and non-Newtonian fluids
8215	Prof.	Tetsuya	Ohmura	The effect of rebar in a short height concrete wall for the ultimate lateral strength
8216	Mr.	Tyron	Thomson	Sinkhole induced subsidence investigation
8217	Dr.	Elena	Sizova	Forecast of the biological effect of different-sized metal nanoparticles for the use in feed of broiler chickens
8218	Dr.	Krisada	Chaiyasarn	Change Detection in Historical Structures via a Guided Unmanned Aerial Vehicle
8219	Dr.	Endng Wiwik Dyah	Hastuti	Characteristics of organic petrography : implications on coal depositional environment of muara enim formation in tanjung enim area, south sumatra, indonesia
8220	Mr.	Wacharapon g	Nachiengmai	Defect-driven development: a new software development model for beginners
8221	Prof.	abdul	hakam	West Sumatra Coastline Change due to Beach Protection Structures
8222	Dr.	Prince	Asilevi Junior	Development of the spatial distribution of global solar radiation (gsr) over ghana using sunshine duration model
8223	Dr.	Ghazi	Hussain	Study some parameters related to aeolian rocks and soils erosion
8224	Mr.	ALVIN	QUIZON	Reliability Assessment of Wooden Trusses of a Historical School
8225	Prof.	Kunyanuth	Kularbohettong	Environmental Management Factors of Students Behaviors: The Case of Suan sunandha Rajabhat University
8226	Dr.	Ghanshyam	Singh	A Novel Grounded Inductor Based Band Pass Filter Design with Temperature Variation on Bandwidth using Single VDVTA
8227	Dr.	Satoshi	Sugimoto	Development of the deformation monitoring system with wireless sensor network and evaluation of mechanical stability for damaged stonewalls by huge earthquake in Kumamoto Castle
8228	Dr.	Prateep	Lueprasert	Effect of tunnel size and lining thickness on tunnel deformation due to adjacent pile under loading
8229	Dr.	Weerawat	Ounsaneha	Enhancing efficiency of thai sugar cane production by clean technology
8230	Prof.	Yutaka	Fukumoto	Discrete particle simulation model for slaking of geomaterials including swelling clay minerals
8231	Prof.	Jose Carlos	Solis Tito	Evaluation of shear strength parameters of gravel soils with a large scale direct shear equipment built in laboratory
8232	Dr.	Koji	WATANABE	Evaluation of Bearing Capacity on Soil-Cement Mixing Wall Using Permanent Pile
8233	Mr.	Takeshi	Yamamoto	Fundamental study of the effect of water level lowering in the groundwater drainage work utilizing siphon
8234	Mr.	Azizi	Abu Bakar	Assessment for determination of ptes contamination indicator in closed urban landfills by utilizing ICP-MS and distribution analysis using Guess Field Kriging.
8235	Prof.	Askar	Zhussupbekov	Laboratory experiments of freezing soil
8236	Mr.	Hidetake	Matsui	Experimental study on chemical grouting into calcium-containing sand
8237	Ms.	Miki	Nishimura	Experimental study for suggestion measurement method of Initial quasi-saturated volumetric water content

GEOMATE2018 KL Malaysia Accepted Abstract-Group 1 & 2

8238	Ms.	Pahala Ge Nishadi	Nayanthara	Evaluating Possible Avenues to Build Artificial Biogenic Beachrocks against Coastal Erosion in Sri Lanka
8239	Mr.	Muhammad Chaidir	Harist	Identification of landslide potential area using smorph method and the relation with vegetation density in indonesia
8240	Prof.	Askar	Zhussupbekov	Design concept for an anchored diaphragm wall in project adp astana, kazakhstan
8241	Dr.	Mitsuru	Komatsu	A study on evaluating the calibration accuracy of soil moisture using a new microchip sensor
8242	Dr.	Ahmad Hilmy	Abdul Hamid	Building mass rail transit in kuala lumpur: is it good transport economics?
8243	Mr.	Raden	Putra	Understanding Fire Distribution in The South Sumatra Peat Area during the Last Two Decades
8246	Dr.	Dewi	Susiloningtyas	SUITABILITY ANALYSIS OF SEAWEED (Eucheuma cottonii) BASED ON ENSO AND MONSOON VARIABILITY IN TARAKAN ISLAND, INDONESIA
8247	Dr.	AHMAD	RIFAI	Slope stability analysis of integrated municipal disposal site based on organic content change to optimize embankment capacity
8248	Dr.	Rohaya	Abdul Malek	Chloride ion Resistivity of Patch-Repaired Reinforced Concrete Elements
8249	Mr.	Kohei	Mishima	Experimental Study on the Effect of Rebar Corrosion on the Measurements of Various Nondestructive Tests
8250	Dr.	Kazuhito	Niwase	Basic Study of Cement Solidification Technology for Solidification of Cesium Adsorbed Zeolite Evaluation of Microscopic Structure of Cement Solidification
8251	Mr.	Rainier Lawrence	Valdez	Seismic Reliability Analysis of Lifeline: A Case Study On The Water Network System of Biñan City, Laguna
8252	Mr.	Jefri Dwi	Putra	Parting Control on Coal Seam Based on Ash Content and Total Moisture, North Musi Rawas, South Sumatra
8253	Mr.	Ahmad	Zubair	Passenger behavioral mapping and station facilities design at commuter line train station (case: tangerang station, indonesia)
8254	Mr.	Doddy	Apriansyah	Public perceptions of transit oriented development plans (case: lebak bulus mrt station, indonesia)
8255	Mr.	Hong-Son	NGUYEN	Quality inspection method of jet-grouting construction by applying acoustic tomography
8256	Ms.	Deni Okta	Lestari	Impact of 2016 Weak La Niña Modoki Event over the Indonesian Region
8257	Dr.	Seiichiro	Fukushima	Development of risk evaluation method considering aftershocks
8258	Mr.	SAJIHARJO	MARTO SURO	Stability performance of loading test for short piled raft foundation system on peat
8259	Dr.	Kazuhiro	Kaneda	Ultimate bearing capacity of footing of two layered clayey soil system by rigid plastic finite element method
8260	Mr.	Unggul	Juswono	THE EFFECTS OF TRANSFLUTHRIN AS THE ACTIVE SUBSTANCE OF ONE PUSH AEROSOL REPELLENT ON MICE ORGAN DAMAGE (Mus musculus) (CASE STUDY OF LUNG, LIVER, BLOOD, AND KIDNEY)
8261	Dr.	Kazuhito	Niwase	Basic Study of Cement Solidification Technology for Solidification of Cesium Adsorbed Zeolite ~ About Influence on Manufacturability and Strength of Cement Solidification by Chemical Admixture ~
8262	Ms.	Noor Suraya	Romali	Flood damage assessment: an analysis of residential damage data and content value
8263	Dr.	ADNAN	ZAINORABIDIN	Compressive behaviour of parit nipah peat under embankment loading
8264	Mr.	Naoya	Nishihara	A fundamental study on pneumatic tomography of unsaturated soil ground using a horizontal one-dimensional column

8265	Mr.	Muhammad	Rezky	Late Miocene – Pliosen Fold Stucture Connection With Depositinal System of Coal in West Banko Field in South Sumatra Basin
8266	Ms.	PAPIYA	DEBNATH	Modelling of aseismic ground deformation and earthquake prediction
8267	Ms.	Irene Sondang	Fitrinitia	Integration of Spatial Characteristic to Health Services: A Case Study of Children Health Improvement Compare to the Environmental Management at Depok City Scale- Indonesia
8268	Mr.	Arbain	Tata	Durability of Reinforced Concrete Beams Strengthened Using GFRP Sheet Due to Fatigue Loads
8269	Mr.	Wasif	Khan	Performance evaluation of crack localization techniques for concrete and masonry structures
8270	Dr.	Junichiro	Takeuchi	Evaluation of drainage process in porous media by invaded percolation probability
8272	Mr.	Luqman	Ali	Damage detection and localization in masonry structure using faster region convolutional networks
8273	Mr.	Takayuki	Hayashi	Temporal Change of Seismic Load by Probabilistic Seismic Hazard Analisys with Updating Process
8274	Ms.	Nurhamidah	Nurhamidah	Land subsidence in Sumatera Peatland Forest
8275	Dr.	Sabril	Haris	Experimental and Analytical Studies of Flexural Capacity of Concrete-Cold Formed Steel Composite Structures with Tension Reinforcement
8276	Dr.	Mohd Firdaus	Md Dan	Impact of Mechanical Weathering to the Durability Strength Index of Ayer Hitam
8277	Dr.	Satyajit	Patel	Comparison of bearing capacity improvement for soft clay using soil-lime and soil-cement columns
8278	Mr.	I Made Wahyu	Wijaya	Study of Anammox Process in an Anaerobic Incubation with Sludge from Decentralized Domestic Wastewater Treatment Plan in Surabaya, Indonesia and Gramido Estuary in Portugal
8279	Dr.	Aditya	Parihar	Influence of amplification on seismic response of retaining wall
8280	Mr.	Kuswantoro	.	Flood modelling in arid region case study in jeddah city, saudi arabia
8281	Dr.	JAMBUNATH AN	RAJARAMAN	The Association and Disassociation Tendencies of Environmentally Significant Minerals on Strength Properties of Sediments in Ocean Environment
8282	Mr.	Adi	Wibowo	Spatial-Temporal Urban Heat Signature in University Campus Using Remote Sensing
8283	Dr.	Sinardi	Sinardi	Characteristics cf Chitosan Membran from Green Gren Mussel Shells (Mytilus Virdis Linneaus) for Water Treatment
8284	Dr.	Fauzan	Fauzan	Effect of Soil Structure Interaction on Response of Building Structure in Padang City, Indonesia
8285	Dr.	Rokhmatulo h	Rokhmatuloh	Paddy field mapping using uav multi-spectral imagery
8286	Ms.	Heidy Octaviani	Rachman	Strengthening The Planning of CFD as Car-Free Life Initiative (Case: Sudirman-Thamrin Street, Jakarta)
8287	Dr.	Supriatna	Supriatna	Spatio-temporal analysis of rice field phenology using sentinel-1 image in karawang regency, west java, indonesia
8288	Mr.	Iqbal Putut	Ash Shidiq	Topographical mapping using uav lidar: a study case in urban forest university of indonesia
8289	Dr.	Jana	Vaskova	Loading tests of steel-fibre reinforced concrete (sfrc) slabs-on-ground
8290	Dr.	Fauzan	Fauzan	Structural evaluations of shelter building in liquifaction prone area
8291	Ms.	MHD	Susilowati	The integration of meteorological data and land sattelite for drought

8292	Ms.	MAHA	ALI	Drying Shrinkage, electrical resistivity and mechanical strength of structural mortar containing Fibers at early age
8293	Prof.	Marian	Drusa	Definition of foam concrete layer interacting with subsoil in geotechnical applications
8294	Prof.	Purnawan	Junadi	Technology Improvement for Children Health in Suburban- A Self Diagnose Health Application as An Integration Approach among Health Practitioner

Gmail

listyani theo <listyanitheophila@gmail.com>

GEOMATE2018-Acceptance of Abstract and invitation-g3

Zakaria <zakaria@bio.mie-u.ac.jp> 11 Mei 2018 13.48
Kepada: listyanitheophila@gmail.com

Dear Authors,

Thanks.

GEOMATE2018-Acceptance of Abstract and invitation-Group 3 is attached.

Best regards.

Zakaria

GEOMATE2018-Acceptance of Abstract and invitation-g3.pdf
162K

INTERNATIONAL CONFERENCE GEOMATE

May 11, 2018

Paper ID Number: 8104
Ms. T. Listyani R.A. Listyani
Sekolah Tinggi Teknologi Nasional Yogyakarta
Indonesia
E-mail: listyanitheophila@gmail.com

Subject: **Acceptance of Abstract for full paper submission at the GEOMATE2018-KL, Malaysia**

Dear Ms. T. Listyani R.A. Listyani,

We are pleased to inform you that after careful review and assessment, the members of the GEOMATE2015 Technical Committee have accepted your abstract entitled "TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA" for full paper submission at the GEOMATE2018-KL, Malaysia conference. It is, therefore, with great pleasure that we extend our formal invitation to you to submit the full paper through online submission using the following link.
http://www.geomate.org/full-paper.html

Please download the paper template from the conference web page and prepare your paper according to the instructions/manuscript preparation guidelines given in the template. Your paper should look exactly like the template.

The file name of the full paper should be your paper ID number "8104". Please submit the full paper as early as possible to complete the review process smoothly. If you have any correction in title/abstract, please make the necessary correction in full paper. You do not need to resubmit abstract separately.

Should you require more information, please do not hesitate to contact us. We look forward to hearing from you soon.

Sincerely yours,

Prof. Zakaria Hossain,
GEOMATE2018 Conference Chairman
The Eighth International Conference on Geotechnique, Construction Materials and Environment,
Division of Environmental Science and Technology
Graduate School of Bioresources
Mie University, 1577 Kurima Machiya-cho,
Tsu-city, Mie 514-8507, Japan
http://www.geomate.org
conference@geomate.org

Gmail

listyani theo <listyanitheophila@gmail.com>

8104: Ms. T. Listyani R.A. Listyani: GEOMATE-2018 Fullpaper: Auto Responder

geomate <noreply@jotform.com> 18 Mei 2018 11.19
Balas Ke: geomatejournal@gmail.com
Kepada: listyanitheophila@gmail.com

Dear Ms. T. Listyani R.A. Listyani,

Thanks for submitting full paper. We would get back to you with review results as early as possible. Please always refer your paper ID number for any communication with us.

Best regards.

conference@geomate.org

8104: Ms. T. Listyani R.A. Listyani: GEOMATE-2018 Fullpaper

Paper ID number	8104
Title/Position	Ms.
Full Name	T. Listyani R.A. Listyani
Paper Title	TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA
Presentation style	Oral
E-mail	listyanitheophila@gmail.com
Journal Publication	Geomate Journal (40% discount)
Upload Full Paper (Doc File)	8104-T. Listyani R.A.-full paper.docx
Upload Full Paper (pdf file)	8104-T. Listyani R.A.-full paper.pdf
Upload Copyright	8104-T. Listyani R.A -copyright May 2018.jpg

Gmail

listyani theo <listyanitheophila@gmail.com>

10th June 2018: Deadline for GEOMATE-KL Full Paper Submission

Zakaria <zakaria@bio.mie-u.ac.jp> 4 Juni 2018 16.11
Kepada: conference@geomate.org

Dear Authors,

Good day. This is a gentle reminder that the Deadline for full paper submission is 10th June 2018.

We appreciate online submission using the following link.

http://www.geomate.org/full-paper.html

Best regards.

Prof. Zakaria Hossain (Ph.D. Kyoto Univ. Japan)

Conference Chairman

E-mail: conference@geomate.org

Gmail

listyani theo <listyanitheophila@gmail.com>

10th June 2018: Deadline for GEOMATE-KL Full Paper Submission

listyani theo <listyanitheophila@gmail.com> 5 Juni 2018 07.25
Kepada: Zakaria <zakaria@bio.mie-u.ac.jp>

Dear editor

Actually I have sent on May 18 and you replied me for waiting of your review

Thank you
[Kutipan teks disembunyikan]

Gmail

listyani theo <listyanitheophila@gmail.com>

10th June 2018: Deadline for GEOMATE-KL Full Paper Submission

Zakaria <zakaria@bio.mie-u.ac.jp> 5 Juni 2018 09.40
Kepada: listyani theo <listyanitheophila@gmail.com>

Noted with thanks.

2018年6月5日(火) 11:00 listyani theo <listyanitheophila@gmail.com>:
[Kutipan teks disembunyikan]
--

Dr. Zakaria Hossain (Ph.D. Kyoto Univ.)
Professor, Mie University, Japan
Editor-in-Chief, Int. J. of GEOMATE
editor@geomatejournal.com
http://www.koku.bio.mie-u.ac.jp/
http://www.geomatejournal.com/

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共生環境学専攻地域保全工学講座
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ファックス：059-231-9578

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listyani theo <listyanitheophila@gmail.com>

GEOMATE2018-Full paper acceptance and invitation

Zakaria <zakaria@bio.mie-u.ac.jp> 13 Juni 2018 16.28
Kepada: listyanitheophila@gmail.com

Dear Authors,

Thanks. GEOMATE2018-Full paper acceptance and invitation is attached for your official use.

Best regards.

Zakaria

GEOMATE2018-Full paper acceptance and invitation.pdf
179K

INTERNATIONAL CONFERENCE GEOMATE

June 13, 2018

Paper ID Number: 8104
Ms. T. Listyani R.A. Listyani
E-mail: listyanitheophila@gmail.com

Subject: **Acceptance of Full Paper and Invitation to the 8th International Conference on Geotechnique, Construction Materials and Environment, 20 to 22 November 2018, Kuala Lumpur, Malaysia**

Dear Ms. T. Listyani R.A. Listyani,

We are pleased to inform you that after careful review and assessment, the members of the GEOMATE2018 Technical Committee have accepted your full paper entitled "TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA" for "Oral" presentation at the conference. It is, therefore, with great pleasure that we extend our formal invitation to you to participate and present your paper at this conference. If there are additional comments/corrections from other reviewers, then we would inform you for necessary improvement later on.

Please be informed that the acceptance of your paper is conditional on your pending registration. Please make sure you register before 31st July 2018 for your papers to be included in the proceedings and to be evaluated for GEOMAT2018 Awards. This is strictly necessary for logistics and smooth operation of the conference.

Guidelines for preparing oral or poster presentations are available on conference web page: http://www.geomate.org

Should you require more information, please do not hesitate to contact us. We look forward to hearing from you soon. Please always refer paper ID number in any communication to us.

Sincerely yours,

Dr. Zakaria Hossain, Conference Chairman
8th International Conference on Geotechnique, Construction Materials and Environment,
Professor, Graduate School of Bioresources,
Mie University 1577 Kurima Machiya-cho, Tsu-city,
Mie 514-8507 Japan,
E-mail: editor@geomate.org
Tel & Fax: +81-59-231-9578
Conference URL: http://www.geomate.org/

Gmail

listyani theo <listyanitheophila@gmail.com>

Invoice GEOMATE-KL 2018

Zakaria <zakaria@bio.mie-u.ac.jp> 14 Juni 2018 16.12
Kepada: listyanitheophila@gmail.com

Dear Valued Authors,

Good afternoon. Hope, all is well with you. Due to many requests for a proforma invoice, it is attached along with this email for your official use.

The followings are eligible to register now at early bird rate:
1. Authors/coauthors of accepted papers
2. Authors/coauthors of revised papers
3. Listeners
4. Participants/Accompanying persons
5. The manuscript is not submitted yet but planning to submit it later on.
6. Not attend but publish papers only
7. Poster presenters

Paper ID and author’s name are mandatory if pay by the bank.

Thank you for your kind understanding cooperation.

Best regards.

Conference Chairman

Invoice GEOMATE-KL 2018.pdf
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June 14, 2018

Paper ID number and Author's Name are mandatory if pay by bank

Paper ID: 8104

Ms. T. Listyani R.A. Listyani
Sekolah Tinggi Teknologi Nasional Yogyakarta
E-mail: listyanitheophila@gmail.com

INVOICE

Invoice for registration fee at the 8th International Conference on Geotechnique, Construction Materials and Environment, 20 to 22 November 2018, Kuala Lumpur, Malaysia

Registration Fees /**Person/Paper of 6 Page limit**

	Before 31st July	1st Aug - 20 Aug.	20th Aug. - 10 Sept.
Authors/Participants	USD600	USD700	USD800
Students/GEOMATE Member/Accompanying Person	USD480	USD560	USD640

***Please note that the above fee structures are for per person per paper (6 page limit per paper). Add 100USD/page or fraction thereof exceeding the page limit. Student means bonafide students enrolled in Malaysian universities and accompanying persons mean family members only. If your co-author or colleague are coming with you, please ask him/her to register separately. If you have two or more papers, please register separately. It is mandatory to register as author or student rate for the paper to appear in the proceedings. For YEN, Use current rate or 110yen/USD.*

Mode of Payment:

1. Online: http://www.geomate.org/registration.html

* Please note that the payment is payable in full without deduction of any bank charges.

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Please send a copy of money transfer by email attachment.

Sincerely yours,

Dr. Zakaria Hossain, Conference Chairman
8th International Conference on Geotechnique, Construction Materials and Environment,
Professor, Graduate School of Bioresources, Mie University 1577 Kurima Machiya-cho, Tsu-city,
Mie 514-8507 Japan, E-mail: editor@geomate.org
Tel & Fax: +81-59-231-9578 Conference URL: http://www.geomate.org/

Editor-in-Chief International Journal of GEOMATE

ISSN: 2186-2982 (Print), 2186-2990 (Online), Japan

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listyani theo <listyanitheophila@gmail.com>

Gentle Reminder for Registration: GEOMATE-2018 KL Malaysia

Zakaria <zakaria@bio.mie-u.ac.jp> 9 Juli 2018 14.44
Kepada: conference@geomate.org

Dear Colleagues,

Hope, all of you are well and preparing for GEOMATE-2018 Kuala Lumpur, Malaysia. This is a gentle reminder that the early bird registration deadline is **31st July 2018**. Please do not miss this early bird rate which is mandatory for proceedings publication and evaluation of best paper award.

http://www.geomate.org/registration.html

The followings are eligible to register now at early bird rate:

1. Authors/coauthors of accepted papers
2. Authors/coauthors of revised papers
3. Listeners
4. Participants/Accompanying persons
5. The manuscript is not submitted yet but planning to submit it later on.
6. Not attend but publish papers only
7. Poster presenters

Please see attached files for details about registration fees.

Best regards.

Conference Chairman

Professor Zakaria Hossain
Division of Environmental Science and Technology
Graduate School of Bioresources
Mie University, 1577 Kurima Machiya-cho,
Tsu-city, Mie 514-8507, Japan

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電話番号：059-231-9578 (内線：9578)
ファックス：059-231-9578
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2 lampiran

Registration includes.pdf
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1. Proceedings in USB/CD containing full paper with page number
2. Conference kit (Bag, pen, etc.)
3. Event card, Strap
4. Access to all events of the conference
5. Complimentary cocktail on 1st day
6. Complimentary tea/coffee, lunch, banquet on the 2nd day
7. Complimentary tea/coffee, lunch on the 3rd day
8. The program, Awards (best papers, keynotes, etc.)
9. Certificates (keynotes, presenters, participants etc.)
10. Journal paper publication fees 40% included (you need to pay 60% journal fee)

INTERNATIONAL CONFERENCE GEOMATE

June 14, 2018

Paper ID number and Author's Name are mandatory if pay by bank

INVOICE

Invoice for registration fee at the 8th International Conference on Geotechnique, Construction Materials and Environment, 20 to 22 November 2018, Kuala Lumpur, Malaysia

Registration Fees /**Person/Paper of 6 Page limit**

	Before 31st July	1st Aug - 20 Aug.	20th Aug. - 10 Sept.
Authors/Participants	USD600	USD700	USD800
Students/GEOMATE Member/Accompanying Person	USD480	USD560	USD640

***Please note that the above fee structures are for per person per paper (6 page limit per paper). Add 100USD/page or fraction thereof exceeding the page limit. Student means bonafide students enrolled in Malaysian universities and accompanying persons mean family members only. If your co-author or colleague are coming with you, please ask him/her to register separately. If you have two or more papers, please register separately. It is mandatory to register as author or student rate for the paper to appear in the proceedings. For YEN, Use current rate or 110yen/USD.*

Mode of Payment:

1. Online: http://www.geomate.org/registration.html

* Please note that the payment is payable in full without deduction of any bank charges.

2. Bank Transfer (Must write Paper ID on bank document)	3. 学会登録費振込情報
BANK: Hyakugo Bank SWIFT CODE: HYKGJPJT A/C No. 317163 Beneficiary: Glorious International Jigyokai Branch: Kurima Shucchou-sho Address: 1606-7 Kurimamachiya-cho, Tsu city, Mie 514-0102, Japan	振込先金融機関名　百五銀行 振込先支店名　栗真出張所 振込先口座種別 普通 振込先口座番号 0317163 振込お受取人名 グロリアス インタ-ナショナル事業会

Please send a copy of money transfer by email attachment.

Sincerely yours,

Dr. Zakaria Hossain, Conference Chairman
8th International Conference on Geotechnique, Construction Materials and Environment,
Professor, Graduate School of Bioresources, Mie University 1577 Kurima Machiya-cho, Tsu-city,
Mie 514-8507 Japan, E-mail: editor@geomate.org
Tel & Fax: +81-59-231-9578 Conference URL: http://www.geomate.org/

Editor-in-Chief International Journal of GEOMATE

ISSN: 2186-2982 (Print), 2186-2990 (Online), Japan

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Only 1 week left- GEOMATE 2018 KL Malaysia Regsitration

Zakaria <zakaria@bio.mie-u.ac.jp> 22 Juli 2018 11.35
Kepada: conference@geomate.org

Dear Colleagues,

Good day. This is a gentle reminder that only 1 week left for the early bird registration (Deadline: 31st July 2018). Registration is mandatory for the inclusion of papers in the conference proceedings and evaluation of best paper award.

We appreciate online registrationr using the following link:

http://www.geomate.org/registration.html

The followings are eligible to register now at early bird rate:

1. Authors/coauthors of submitted/revised/accepted papers
2. Authors/coauthors of papers under the review process
3. Listeners
4. Participants/Accompanying persons
5. The manuscript is not submitted yet but planning to submit it later on.
6. Not attend but publish papers only
7. Poster presenters
8. Others

Best regards.

Conference Chairman

Gmail

listyani theo <listyanitheophila@gmail.com>

Only 1 week left- GEOMATE 2018 KL Malaysia Regsitration

listyani theo <listyanitheophila@gmail.com> 23 Juli 2018 10.49
Kepada: Zakaria <zakaria@bio.mie-u.ac.jp>

Dear Sir
I have paid registration fee this morning
Let me know if you have received my payment.
Thank you

Best regard
Lis Indonesia
[Kutipan teks disembunyikan]

P_20180723_104502.jpg
2250K

Gmail **listyani theo <listyanitheophila@gmail.com>**

Review Results - GEOMATE- KL 2018

GEOMATE <conference@geomate.org> 26 Juli 2018 19.02
Kepada: listyanitheophila@gmail.com, nsulaksana@unpad.ac.id, boy.yoseph@unpad.ac.id, asudradjat@yahoo.com, agus.didit.haryanto@unpad.ac.id

Dear Author,

Thanks for your kind contribution. We have reviewers' comments on your paper (attached). Please send revised paper by maximum of 4 days. Please send response to reviewers by authors in separate file (example attached). We appreciate online submission using the following link.

http://www.geomate.org/revised-paper.html

Early bird registration is going on. We appreciate online registration using the following link:

http://www.geomate.org/registration.html

Yours sincerely,

Conference Chairman,

Prof. Dr. Zakaria Hossain (Ph.D. Kyoto University)

2 lampiran

Example-Response to reviewer by Author.pdf
19K

8104.pdf
20K

Response by Authors to Reviewer's Remarks/Comments

Scale Effects of Plate Load Tests in Unsaturated Soils

Authors: Won Taek Oh and Sai Vanapalli

The authors have summarized their replies to the Reviewers' comments in this response letter in a two column format. A revised manuscript is submitted addressing all the comments to the Journal of GEOMATE for possible publication.

	Reviewer_A's Comments	***Authors Response***
	Creeping displacement or settlement behavior of soil material is not consider to deign foundation, tunnel, retaining wall etc. It will be better if you can include the soil material creeping failure mechanism which is leading to foundation failure in your paper.	The authors appreciate the comments from the reviewer A; however, creeping displacement is beyond the scope of this paper at this time.
	Reviewer_B's Comments	***Authors Response***
1	Remove "In addition, there are different ground improvement methods to increase the bearing capacity and reduce the settlements".	The sentence is removed in the revised manuscript.
2	Remove "hereafter referred to as *SF*s".	The phrase is removed in the revised manuscript.
3	Fig. 1	Fig. 1 is modified as per the reviewer's comments.
4	This means to be well known and accepted. Why do authors need to provide this level of evidence if well understood and accepted?	The authors provided the details to justify the estimation of average matric suction and for completeness of the paper.
5	Fig. 2: not necessary	Fig. 2 and the relevant explanations are removed in the revised manuscript as per the comments.
6	From an engineering practice point of view, these curves can be considered to be unique. (remove this sentence)	This sentence is removed in the revised manuscript as per the reviewer's comment.
7	The critical state concept discussed above can be effectively used to explain the scale effects of SFs in saturated or dry sands. However, this concept may not be applicable to interpret the scale effects of plate size in unsaturated soils. The SVS behaviors in unsaturated soils are influenced both due to the footing	This paragraph is removed in the revised manuscript due to the relevance to the item '4'.

	size and matric suction. The influence of matric suction however is typically ignored in conventional engineering practice.	
8	section 4.2 initial (***<u>drained</u>***) tangent elastic modulus, E_i	The authors did not use the term, 'drained' because a study by authors showed that Eq. (4) can also be extended to estimate the variation of initial tangent elastic modulus for the in-situ plate load test results in unsaturated fine-grained soils. *Vanapalli, S.K. and Oh, W.T. 2010. A model for predicting the modulus of elasticity of unsaturated soils using the Soil-Water Characteristic Curves. International Journal of Geotechnical Engineering, 4(4): 425-433.*
9	Fig. 11 and Fig. 12 (include information about rate of loading)	Rate of loading is included in the revised figure.
10	Fig. 15(a) and (b) (include information about rate of loading)	Rates of loading are not included in the figures since the results are from bender element test.
11	Fig. 18 (Do you have measured suction values?)	The suction distribution profile in Fig. 18 is idealized behavior to explain average matric suction concept. Measured suction values were not available in the literature.

The authors appreciate the valuable comments from the Reviewers.

GEOMATE Conference Review & Evaluation

Submission Date	2018-07-24 18:09:54
Paper ID number	8104
Paper Title	Topographic Control on Groundwater Flow in Central of Hard water Area, West Progo Hills, Indonesia
i. Originality	3
ii. Quality	3
iii. Relevance	3
iv. Presentation	3
v. Recommendation	3
Total (sum of i to v)	15
Mandatory changes	Poor English. No clear justification on the problems/ objectives/ methodology/ results in the abstract/text. The figures shown are not clear.
Reviewer's E-mail (Remove before sendiing to author)	

Gmail

listyani theo <listyanitheophila@gmail.com>

8104: GEOMATE Revised paper: Auto Responder

geomate <noreply@jotform.com> 28 Juli 2018 13.43
Balas Ke: zakaria@bio.mie-u.ac.jp
Kepada: listyanitheophila@gmail.com

Dear Mrs. ,

listyanitheophila@gmail.com

Thanks. You have successfully submitted the revised paper. We would take necessary action as early as possible.

Best regards.

Prof. Dr. Zakaria Hossain

8104: GEOMATE Revised paper: Auto Responder

Paper ID number	8104
Title/Position	Mrs.
Full Name	T. Listyani R.A. Listyani
Revised Title	TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA
E-mail	listyanitheophila@gmail.com
Revised Paper	8104-T. Listyani R.A.-full paper REVISION.pdf
Response to Reviewers	8104 Response by Authors.pdf

Response to reviewers: 8104 Response by Authors.pdf

Gmail

listyani theo <listyanitheophila@gmail.com>

Review Results - GEOMATE- KL 2018

GEOMATE <conference@geomate.org> 29 Juli 2018 14.23
Kepada: listyanitheophila@gmail.com, nsulaksana@unpad.ac.id, boy.yoseph@unpad.ac.id, asudradjat@yahoo.com, agus.didit.haryanto@unpad.ac.id

Dear Author,

Thanks for your kind contribution. We have reviewers' comments on your paper (attached). Please send revised paper by maximum of 4 days. Please send response to reviewers by authors in separate file (example attached). We appreciate online submission using the following link.

http://www.geomate.org/revised-paper.html

Early bird registration is going on. We appreciate online registration using the following link:

http://www.geomate.org/registration.html

Yours sincerely,

Conference Chairman,

Prof. Dr. Zakaria Hossain (Ph.D. Kyoto University)

2 lampiran

Example-Response to reviewer by Author.pdf
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8104.pdf
22K

Gmail

listyani theo <listyanitheophila@gmail.com>

Invitation to Session Chair GEOMATE

Zakaria <zakaria@bio.mie-u.ac.jp> 2 Agustus 2018 14.12
Kepada: conference@geomate.org

Dear Colleagues,

Good afternoon.

We would like to invite you to chair a technical session for Geotechnique, Construction Materials and Environment (GEOMATE2018)-Kuala Lumpur Malaysia that will be held in Istana Hotel from Nov. 20-22, 2018. If you are interested to chair on any day of Nov. 21 or 22, please apply using the following link by August 30, 2018.

http://www.geomate.org/chair.html

We would nominate most suitable Chairs for Technical Session. Chairman's name will be shown on the program, webpage and certificate will be awarded to all Session Chairs. Welcome to join.

Best regards.

Conference Chairman

Prof. Dr. Zakaria Hossain

Gmail

listyani theo <listyanitheophila@gmail.com>

Receipt GEOMATE 2018 KL (Bank)

Zakaria <zakaria@bio.mie-u.ac.jp> 10 Agustus 2018 13.53
Kepada: listyanitheophila@gmail.com

Dear Colleagues,

Thanks. I am attaching the "Receipt GEOMATE 2018 KL (Bank)" for your official use. We will handover the printed version during the conference.

Best regards.

Receipt GEOMATE 2018 KL (Bank)-g1.pdf
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10 August 2018

OFFICIAL RECEIPT

GEOMATE 2018 Conference Registration Fees

Paper ID Number: 8104

Received from: Ms. T. Listyani R.A. Listyani

Email: listyanitheophila@gmail.com

Amount: 600 USD (Bank)

Sincerely yours,

Dr. Zakaria Hossain, Conference Chairman
8th International Conference on Geotechnique, Construction Materials and Environment,
Professor, Graduate School of Bioresources, Mie University 1577 Kurima Machiya-cho, Tsu-city, Mie 514-8507 Japan, E-mail: editor@geomate.org
Tel & Fax: +81-59-231-9578 Conference URL: http://www.geomate.org/

Editor-in-Chief International Journal of GEOMATE

ISSN: 2186-2982 (Print), 2186-2990 (Online), Japan

Gmail

listyani theo <listyanitheophila@gmail.com>

Gentle Reminder for Registration - GEOMATE 2018 KL

Geomate Editor <editor@geomate.org> 18 Agustus 2018 19.19
Kepada: Geomate Conference <conference@geomate.org>
Bcc: listyanitheophila@gmail.com

Dear Colleagues,

Good evening. Conference days are coming soon.

This is a gentle reminder that only 3 days left for registration (deadline 20th Aug. 2018). Registration is mandatory for inclusion of your paper in the proceedings and evaluation of best paper award. Please click the following link for registration.

http://www.geomate.org/registration.html

Best regards.

Conference Chairman

Gmail **listyani theo <listyanitheophila@gmail.com>**

Gentle Reminder for Registration - GEOMATE 2018 KL

listyani theo <listyanitheophila@gmail.com> 21 Agustus 2018 20.40
Kepada: editor@geomate.org

Dear chairman
I can't make registration by http://www.geomate/registration.html again because I've registered and paid registration fee last month on early birth registration.
Thank you
[Kutipan teks disembunyikan]

Gmail

listyani theo <listyanitheophila@gmail.com>

Claim or Request Form:8104:T. Listyani R.A. .

geomate <noreply@jotform.com> 11 September 2018 12.33
Balas Ke: editor@geomatejournal.com
Kepada: listyanitheophila@gmail.com

Claim or Request Form:8104:Paid by Bank T. Listyani R.A. .

Paper ID	8104
Full Name	T. Listyani R.A. .
Write details	I'm sorry Sir, actually I don't have last name. My full name is: T. Listyani R.A.
Reg. Fee	Paid by Bank
E-mail	listyanitheophila@gmail.com

Gmail **listyani theo <listyanitheophila@gmail.com>**

CONFERENCE PAPER REPRINT IN JOURNAL

Zakaria <zakaria@bio.mie-u.ac.jp>
Kepada: listyanitheophila@gmail.com
22 Oktober 2018 11.27

Dear Colleagues,

Good day. As per the request fo many authors, I am attaching the information for "CONFERENCE PAPER REPRINT IN JOURNAL".

Please see attached file for details.

Best regards.

Zakaria

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International Journal of GEOMATE

A Scientific International Journal on Geotechnique, Construction Materials and Environment

● www.geomatejournal.com ● editor@geomatejournal.com ● Tsu city, Mie, Japan

October 22, 2018

Paper ID: 8104
Ms. T. Listyani R.A. Listyani
E-mail: listyanitheophila@gmail.com

CONFERENCE PAPER REPRINT IN JOURNAL
(Deadline: 30 November 2018)

Accepted paper: TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA

Provided that you comply the following conditions:

1. First of all, please read the content of the journal template (download from journal website)

2. Please rewrite your paper according to the instructions given in journal template

3. Make sure that the paper content is checked by all authors

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http://www.geomatejournal.com/submission-guidlines

5. If you agree, then please submit journal paper using the following link
(in "Reviewers Name": Please write as "Reviewed during conference")
http://www.geomatejournal.com/paper-submission

6. Please pay reprinting fee for journal using the following link (40% discount)
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Sincerely yours,

Zakaria Hossain
Editor-in-Chief
International Journal of GEOMATE

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ISSN: 2186-2990, Japan

Gmail

listyani theo <listyanitheophila@gmail.com>

GEOMATE Conference REVISED PAPER FOR JOURNAL

Zakaria <zakaria@bio.mie-u.ac.jp>
Kepada: conference@geomate.org 23 Oktober 2018 09.33

Dear Conference Participants/Authors,

Thanks for your kind contribution. If you are interested to publish your paper in the journal, then please follow the followings. Please ignore this email if you have already submitted for the journal and paid the reprinted fee.

REVISED PAPER FOR JOURNAL

(Deadline: 30 December 2018)

---

1. First of all, please read the content of the journal template (download from journal website)

2. Please revise your paper according to the instructions given in the journal template

3. Make sure that the paper content is checked by all authors

4. Please read journal submission guidelines in the following link

http://www.geomatejournal.com/submission-guidlines

5. If you agree, then please submit journal paper using the following link (use conference ID no.)

(in "Response to Reviewers": Please use review results during the conference"),

http://www.geomatejournal.com/revised

6. Please pay reprinting fee for the journal using the following link (40% discount, 480USD only)

http://www.geomatejournal.com/payment

7. Please confirm in submission guidelines that the regular fee is 800USD for non-paid papers.

http://www.geomatejournal.com/submission-guidlines

8. Please note that there may be several rounds of corrections before final publication in the journal and your cooperation would be highly appreciated.

Sincerely yours,

Zakaria Hossain

Editor-in-Chief

International Journal of GEOMATE

Gmail

listyani theo <listyanitheophila@gmail.com>

GEOMATE 2018 KL Malaysia Program

Zakaria <zakaria@bio.mie-u.ac.jp> 23 Oktober 2018 10.04
Kepada: conference@geomate.org

Dear Colleagues,

Hope you are well. The GEOMATE 2018 KL Malaysia Program is attached.

See you in the conferences.

Best regards.

Zakaria

Program GEOMATE 2018.pdf
1421K

PROGRAM

Edited by
Zakaria Hossain
Bujang B.K.Huat
Vivi Anggraini
Jim Shiau

GEOMATE

ISBN 978-4-9905958-8-3 C3051

Welcome Participants

Welcome to the GEOMATE 2018 - The Eighth International Conference on Geotechnique, Construction Materials and Environment, from 20 to 22 November 2018, Kuala Lumpur, Malaysia organized by Monash University, Malaysia, Mie University Research Center for Environmental Load Reduction, The GEOMATE International Society, Useful Plant Spread Society, Glorious International, AOI Engineering, HOJUN, JCK, CosmoWinds and Beppu Construction, Japan.

We would like to thank you for your participation, especially the authors who have submitted interesting and important papers with most of them here to share their valuable experience with fellow participants. We appreciate the contribution of the session chairmen, the conference advisors and all those who have helped in one way or another to make this conference a success.

The Secretariat desk has been set up to service you so that you can participate actively in the deliberations. Do contact any of the secretariat staff for any assistance that you may require during these three days.

Please wear your name badge at all times during the conference and at the associated events as it will create a friendlier atmosphere where fellow participants can address you by name. This will also serve as an identification for your admission to the conference activities.

Kindly identify all materials and documentation handed to you, with your name, so that we can return to you if you have inadvertently forgotten to take them with you. Please check the NOTICE BOARD regularly for any changes in the program and also for messages.

On behalf of the organizing committee, we invite you to stay on after the conference to enjoy the sights of Kuala Lumpur and the nearby places of interest.

Yours Sincerely,

Prof. Zakaria Hossain, Prof. Bujang B.K. Huat, Dr. Vivi Anggraini, Dr. Jim Shiau
Executive Committee

20 November 2018

GEOMATE 2018 Program Summary with ID

Tuesday, 20 November 2018:

1600-1800: Registrations
1830-1930: Welcome Cocktails
2000-2100: Special dinner for keynote speakers

Wednesday, 21 November 2018:

0830-1600: Registration

0900-0910: Opening and Welcome Address

Welcome address by Professor Dr. Bujang B. K. Huat, Department of Civil Engineering, Universiti Putra Malaysia

Keynote Session (0910-1010), Room A, **Chair: Prof. Ken Kawamoto 2X30mins including Q & A**

AN APPLICATION OF SCREW DRIVING SOUNDING TEST TO A SURVEY ON LIQUEFACTION POTENTIAL
Naoaki SUEMASA

GEOTECHNICAL CHARACTERIZATION OF PEAT DEPOSIT IN JAPAN
Hirochika HAYASHI

1010-1030: Morning Refreshments

1030-1230 Oral Session 1 (Room A) 10X12mins	**1030-1230 Oral Session 2 (Room B) 10X12mins**
Chair: Dr. Fauzan	**Chair: Prof. Hiroyuki Ii**
8117, 8127, 8136, 8138, 8139, 8151, 8171, 8172, 8183, 8196	8118, 8137, 8140, 8142, 8145, 8153, 8163, 8168, 8277, 8332

1230-1330 Lunch

1330-1530 Oral Session 3 (Room A) 9X12mins	**1330-1530 Oral Session 4 (Room B) 10X12mins**
Chair: Dr. Vivi Anggraini	**Chair: Dr. Uma Shankar M.**
8101, 8111, 8112, 8115, 8116, 8120, 8121, 8122, 8212	8176, 8180, 8189, 8234, 8238, 8243, 8244, 8246, 8256, 8260

1530-1550: Afternoon Refreshments

Poster Session-1 (hang at 1300 ~ , remove at 1700)) Q&A 1530
8113, 8114, 8119, 8125, 8128, 8131, 8132, 8133, 8134, 8135, 8143

1550-1600 Group Photo
1600-1620 Discussion on Journal Publications, Room A

1620-1820 Oral Session 5 (Room A) 10X12mins	**1620-1820 Oral Session 6 (Room B) 10X12mins**
Chair: Dr. Chollada Kanjanakul	**Chair: Dr. Nik Norsyahariati Nik Daud**
8198, 8213, 8224, 8236, 8249, 8250, 8261, 8299, 8324, 8330	8123, 8124, 8129, 8130, 8141, 8147, 8148, 8149, 8150, 8154

1830-2030 Banquet & Awards Ceremony

1830 Group Photo in Banquet Hall

1930 Awards Ceremony

2030 Adjournment for the Day

GEOMATE 2018 Program Summary with ID

Thursday, 22 November 2018:

0830-1600: Registration

0830-1030 Oral Session 7 (Room A) 10X12mins	0830-1030 Oral Session 8 (Room B) 10X12mins
Chair: Prof. Abdul Hakam	**Chair: Dr. Rajaraman Jambunathan**
8155, 8156, 8158, 8159, 8161, 8164, 8170, 8178, 8181, 8263	8191, 8193, 8205, 8221, 8228, 8230, 8233, 8237, 8240, 8247

1030-1050: Morning Refreshments <u>Poster Session-2</u> (hang at 0900~ , remove at 1250) Q&A 1030
8160, 8162, 8165, 8169, 8211, 8217, 8241, 8254, 8257, 8273, 8300

1050-1250 Oral Session 9 (Room A) 10X12mins	1050-1250 Oral Session 10 (Room B) 10X12mins
Chair: Dr. Roohollah Kalatehjari	**Chair: Dr. Nabila Shah Jilani**
8320, 8323, 8325, 8345, 8349, 8104, 8179, 8187, 8190, 8201	8267, 8281, 8286, 8287, 8297, 8307, 8313, 8314, 8341, 8342

1250-1350 Lunch

1350-1630 Oral Session 11 (Room A) 12X12mins	1350-1630 Oral Session 12 (Room B) 12X12mins
Chair: A/Prof. Akhila M.	**Chair: Dr. Tatyana Krupnova**
8109, 8258, 8259, 8264, 8274, 8284, 8290, 8293, 8295, 8306, 8312, 8315, 8358	8157, 8197, 8215, 8218, 8220, 8242, 8251, 8253, 8270, 8272, 8301, 8340

1630-1650: Afternoon Refreshments <u>Poster Session-3</u> (hang at 1300~ , remove at 1700) Q&A 1630
8152, 8232, 8316, 8329

1650-1700 Discussion on Journal Publication, Closure of Conference, Room A

Friday, 23 November 2018:

1300-1700 Technical Tour

GEOMATE 2018 – PROGRAM DETAILS

Tuesday, 20 November 2018	
1600-1800	Registrations
1830-1930	Welcome Cocktails
2000-2100	Special Dinner for Keynote Speakers

Wednesday, 21 November 2018 Oral Sessions	
0830-1600	Registration
0900-0910	**Opening and Welcome Address**
0910-1010	Welcome address by Professor Dr. Bujang B. K. Huat, Department of Civil Engineering, Universiti Putra Malaysia **Keynote Session (0910-1010), Room A 2X30mins including Q & A** **Chair: Prof. Dr. Ken Kawamoto, Saitama University, Japan** AN APPLICATION OF SCREW DRIVING SOUNDING TEST TO A SURVEY ON LIQUEFACTION POTENTIAL Naoaki SUEMASA GEOTECHNICAL CHARACTERIZATION OF PEAT DEPOSIT IN JAPAN Hirochika HAYASHI
1010-1030	***Morning Refreshments***
1030-1230	**1030-1230 Oral Session 1 (Room A) Wednesday, 21 November 2018** **Chair: Dr. Fauzan 10X12mins including Q & A** **8117, 8127, 8136, 8138, 8139, 8151, 8171, 8172, 8183, 8196** ASSESSMENT OF QUALITY OF DIFFERENT AGGREGATES FOR ROAD CONSTRUCTION IN THE CENTRAL DIVISION OF FIJI Atinesh Vijay Prasad, Darga N Kumar DEVELOPMENT OF CARBON FIBER REINFORCED THERMOPLASTIC STRAND ROD Y Mochida, Y Imoto QUICK ASSESSMENT PROCEDURES FOR TWO STORIES BUILDING BASED ON NUMERICAL SIMULATION RESULTS Febrin Anas Ismail, Abdul Hakam, M Maisaquddus Hape, M Sofian Asmirza COMPRESSED EARTH BLOCKS WITH POWDERED GREEN MUSSEL SHELL AS PARTIAL BINDER AND PIG HAIR AS FIBER REINFORCEMENT Bernardo A. Lejano, Ram Julian Gabaldon, Patrick Jason Go, Carlos Gabriel Juan, and Michael Wong INVESTIGATION OF THE FLEXURAL STRENGTH OF COLD-FORMED STEEL C-SECTIONS USING COMPUTATIONAL AND EXPERIMENTAL METHOD Bernardo A. Lejano and Eyen James D. Ledesma STUDY ON STRENGTH ESTIMATION OF SOIL CEMENT USED IN THE EMBEDDED PILE METHOD BY ELECTRICAL RESISTIVITY MEASUREMENT Y Mochida, M Matsuura VOLUME CHANGE BEHAVIOR OF SEA WATER EXPOSED COAL ASH USING HYPERBOLIC MODEL Erica Elice S. Uy, Jonathan R. Dungca and Mary Ann Q. Adajar

	FINITE DIFFERENCE METHOD FOR SOLVING HEAT CONDUCTION EQUATION OF THE GRANITE Dalal Adnan Maturi COMPRESSIVE LOADING TEST OF STEEL PILE TOP FILLED WITH CONCRETE Mutsuki Sato, Toshiharu Hirose and Yoshihiro Kimura REGRESSION MODELING OF BREAKOUT STRENGTH OF AN EXPANSION ANCHOR BOLT AS INFLUENCED BY CONCRETE AGGREGATES Gilford B. Estores, Wyndell A. Almenor and Charity Hope A. Gayatin
1030-1230	**1030-1230 Oral Session 2 (Room B) Wednesday, 21 November 2018** **Chair: Prof. Hiroyuki Ii 10X12mins including Q & A** **8118, 8137, 8140, 8142, 8145, 8153, 8163, 8168, 8277, 8332** COMMUNITY EMPOWERMENT IN PLANTING VEGETATION TO REDUCE COASTAL ABRASION IN WEST SUMATRA Taufika Ophiyandri, Bambang Istijono and Abdul Hakam APPROACH TO ASSESSMENT OF SOIL AND WATER CONTAMINATION BY MINING ACTIVITIES IN MANDALAY REGION, MYANMAR Than Htike Oo, Toshiro Hata DEVELOPMENT OF THE MODIFIED EICP FOCUSED ON THE HIGH STRENGTH UNDER LOW CALCITE PRECIPITATION RATE Yusui Murata, Toshiro Hata WATER RETENTION, GAS TRANSPORT PARAMETERS, AND THERMAL PROPERTIES FOR ROADBED MATERIALS UTILIZING CONSTRUCTION DEMOLITION WASTE AND INDUSTRIAL BYPRODUCTS Mohd Redzuan MOHD SAUFI , Takeshi SAITO, Taro UCHIMURA, and Ken KAWAMOTO WATER QUALITY AND SEDIMENTATION MODELING IN SINGKARAK LAKE, WESTERN SUMATRA, INDONESIA Harman Ajiwibowo, R.H.B. Ash-Shiddiq, Munawir B. Pratama INTEGRATED LAND USE – FLOOD MANAGEMENT APPROACH IN URBAN SPRAWL OF LAFIA, NASARAWA STATE OF NIGERIA Danjuma Inarigu, Zakiah Ponrahono, Mohammad Firuz Ramli and ZulfaHanan Ashaari GEOCHEMISTRY ANALYSES OF SEA FLOOR SEDIMENTS FROM THE COASTS OF SHIKINE ISLAND IN JAPAN INDICATE AN INFLUENCE OF CO2 SEEPS TO COASTAL ENVIRONMENTS Hirosuke Hirano, Koetsu Kon, Masa-aki Yoshida, Ben Harvey, Davin H. E. Setiamarga AN ALTERNATIVE INTEGRATED OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT SYSTEM FOR SMALL AND MEDIUM-SIZED ENTERPRISES (SMEs) IN THAILAND Thepporn Jaroenroy, Chutarat Chompunth COMPARISON OF BEARING CAPACITY IMPROVEMENT FOR SOFT CLAY USING SOIL-LIME AND SOIL-CEMENT COLUMNS Satyajit Patel, Amruta Joshi and Shravan Sukumaran EFFECT OF MANUFACTURED DOLOMITIC LIMESTONE SAND AS ALTERNATIVE FINE AGGREGATES FOR SHOTCRETE WET-MIX APPLICATION Benedicto, Patrizia S., Calaywan, Juan Fidel B. , Ebueng, Rio Jocelle A., and Matba, Ylam Shalev dT.
1230-1330	***Lunch***

1330-1530	**1330-1530 Oral Session 3 (Room A) Wednesday, 21 November 2018** **Chair: Dr. Vivi Anggraini 9X12mins including Q &A** **8101, 8111, 8112, 8115, 8116, 8120, 8121, 8122, 8212** PULL-OUT RESISTANCE OF SINGLE PILES AND PARAMETRIC STUDY BASED ON NUMERICAL SIMULATION APPROACH (FDM) USING FLAC2D Alex Otieno Owino, Zakaria Hossain, Jim Shiau THE COMPARISON BETWEEN SOIL SAMPLING AND UNSATURATED SOIL HYDRAULIC DATABASE (UNSODA) Chollada Kanjanakul A NEW PRESSUREMETER FOR TESTING STIFF CLAY Prof. Radhi Alzubaidi COLLOIDAL SILICA GROUT IN SOIL IMPROVEMENT: AN EXTENSIVE REVIEW Jiji Krishnan, Shruti Shukla THE BEHAVIOR OF UNTREATED AND TREATED EXPANSIVE SOIL AS EMBANKMENT OF FLEXIBLE PAVEMENT Yulvi Zaika, Eko Andi Suryo GEOTECHNICAL ASSESSMENT OF MALAYSIAN RESIDUAL SOILS FOR UTILIZATION AS CLAY LINERS IN ENGINEERED LANDFILLS Lee Li Yong , Endene Emmanuel, Ria Purwani and Vivi Anggraini INVESTIGATING THE EFFECT OF GEOTEXTILE AS REINFORCEMENT ON THE BEARING CAPACITY OF GRANULAR SOIL John Carlo R. Samarita, and Mary Ann Q. Adajar A COMPARATIVE STUDY ON THE USE OF WOVEN GEOTEXTILE FOR SETTLEMENT REDUCTION OF SPREAD FOOTING ON GRANULAR SOIL Mary Ann Adajar, Maricris Gudes and Lillibelle Tan SOIL QUALITY INDEX ANALYSIS UNDER HORTICULTURAL FARMING IN SUMANI UPPER WATERSHED Aprisal, Bambang Istijono, Juniarti and Mimin Harianti **1330-1530 Oral Session 4 (Room B) Wednesday, 21 November 2018** **Chair: Dr. Uma Shankar M. 10X12mins including Q &A** **8176, 8180, 8189, 8234, 8238, 8243, 8244, 8246, 8256, 8260** SOME INSIGHT INTO DIRECT OBSERVATION OF HYDROLOGICAL PARAMETERS IN PEATLAND AREA OF THE SOUTH SUMATERA Muhammad Irfan, Wijaya Mardiansyah, M. Yusup Nur Khakim, Menik Ariani, Albert Sulaiman and Iskhaq Iskandar DEVELOPING REHEATED MOTORCYCLE EXHAUST FOR PM2.5 EMISSION Wardoyo, Arinto Y.P. Dharmawan, Hari A HYDROLOGICAL CHARACTERISTICS AND WATER MANAGEMENT IN THE AIR SUGIHAN SUB-RIVER BASIN, SOUTH SUMATERA, INDONESIA Wijaya Mardiansyah, M. Yusup Nur Khakim, Dedi Setiabudidaya, Satria J. Priatna and Iskhaq Iskandar DEVELOPMENT OF ASSESSMENT FOR POTENTIALLY TOXIC ELEMENT CONTAMINATION INDICATOR IN CLOSED LANDFILLS AND PROSPECTIVE GEOSTATISTICAL ANALYSIS Azizi Abu Bakar, Minoru Yoneda, Nguyen Thi Thuong and Noor Zalina Mahmood

1330-1530	EVALUATING POSSIBLE AVENUES FOR SOIL IMPROVEMENT BY BIOCEMENTATION IN SRI LANKA: A PRELIMINARY INVESTIGATION P.G.N. Nayanthara, A.B.N. Dassanayake, Kazunori Nakashima and Satoru Kawasaki UNDERSTANDING OF FIRE DISTRIBUTION IN THE SOUTH SUMATRA PEAT AREA DURING THE LAST TWO DECADES Raden Putra, Edy Sutriyono, Sabaruddin and Iskhaq Iskandar PADDY FIELD MAPPING USING UAV MULTI-SPECTRAL IMAGERY Rokhmatuloh, Supriatna, Tjiong Giok Pin, Ronni Ardhianto, Oka Setiawan, Iqbal Putut Ash Shidiq, Adi Wibowo and Riza Putera SUITABILITY ANALYSIS OF SEAWEED (Eucheuma cottonii) BASED ON ENSO VARIABILITY IN AMAL COAST, TARAKAN ISLAND, INDONESIA Dewi Susiloningtyas, Tuty Handayani and Della Ayu Lestari IMPACT OF 2016 WEAK LA NIÑA MODOKI EVENT OVER THE INDONESIAN REGION Deni Okta Lestari, Edy Sutriyono, Sabaruddin, and Iskhaq Iskandar THE EFFECTS OF TRANSFLUTHRIN AS THE ACTIVE SUBSTANCE OF ONE PUSH AEROSOL REPELLENT ON ORGANS DAMAGE OF MICE (MUS MUSCULUS) (CASE STUDY OF LUNG, LIVER, BLOODS, AND KIDNEY) Unggul P. Juswono, Arinto Y. P. Wardoyo, Chomsin S. Widodo, and Johan A. E. Noor
1530-1550	***Afternoon Refreshments***
1550-1600	***Group Photo***
1600-1620	***Discussion on Journal Publications, Room A***
1620-1820	**1620-1820 Oral Session 5 (Room A) Wednesday, 21 November 2018** **Chair: Dr. Chollada Kanjanakul** **10X12mins including Q & A** **8198, 8213, 8224, 8236, 8249, 8250, 8261, 8299, 8324, 8330** CORROSION CURRENT DENSITY OF MACROCELL OF HORIZONTAL STEEL BARS IN REINFORCED CONCRETE COLUMN SPECIMEN Nevy Sandra, Keiyu Kawaai and Isao Ujike SIMULATING LUNAR HIGH LAND ROCKS USING JAPANESE IGNEOUS ROCKS Hiroyuki Ii and Hiroshi Kanamori RELIABILITY ASSESSMENT OF WOODEN TRUSSES OF A HISTORICAL SCHOOL Alvin Quizon and Lessandro Estelito Garciano EXPERIMENTAL STUDY ON CHEMICAL GROUTING INTO CALCIUM-CONTAINING SAND Hidetake Matsui, Yusuke Tadano and Hiroyasu Ishii EXPERIMENTAL STUDY ON THE EFFECT OF REBAR CORROSION ON THE MEASUREMENTS OF VARIOUS NONDESTRUCTIVE TESTS Kohei Mishima, Kenichi Kondo, Isao Ujike, Chun Pang-jo and Keiyu Kawaai BASIC STUDY OF CEMENT SOLIDIFICATION TECHNOLOGY FOR SOLIDIFICATION OF CESIUM ADSORBED ZEOLITE EVALUATION OF MICROSCOPIC STRUCTURE OF CEMENT SOLIDIFICATION Taisei SAKAI and Kazuhito NIWASE EFFECT OF CHEMICAL ADMIXTURE ON CEMENT SOLIDIFICATION OF CESIUM ADSORBED ZEOLITE Sora SUTO and Kazuhito NIWASE PARAMETRIC STUDY OF CES COMPOSITE COLUMNS WITH FRC USING FINITE ELEMENT ANALYSIS Fauzan, Ruddy Kurniawan, Zev Al Jauhari, and Nabila Felicia

	ASSESSMENT TECHNIQUES FOR ALKALI SILICA REACTION DIAGNOSIS IN MASS CONCRETE STRUCTURE Suvimol Sujjavanich, Thanawat Meesak, Krit Won-in and Viggo Jensen BACK PROPAGATION ARTIFICIAL NEURAL NETWORK MODELING OF FLEXURAL AND COMPRESSIVE STRENGTH OF CONCRETE REINFORCED WITH POLYPROPYLENE FIBERS Stephen John C. Clemente, Edward Caezar D.C. Alimorong and Nolan C. Concha **1620-1820 Oral Session 6 (Room B) Wednesday, 21 November 2018** **Chair: Dr. Nik Norsyahariati Nik Daud 10X12mins including Q & A** **8123, 8124, 8129, 8130, 8141, 8147, 8148, 8149, 8150, 8154** INVESTIGATING THE EFFECTIVENESS OF RICE HUSK ASH AS STABILIZING AGENT OF EXPANSIVE SOIL Mary Ann Q. Adajar, Christian James P. Aquino, Joselito D. Dela Cruz II INDUSTRIAL BY-PRODUCT-BASED BINDERS FOR USE IN DEEP SOIL MIXING TECHNIQUE Mohammadjavad Yaghoubi, Arul Arulrajah, Mahdi Miri Disfani, Suksun Horpibulsuk and Stephen Darmawan QUEZON CITY SOIL PROFILE REFERENCE Joenel G. Galupino and Jonathan R. Dungca
1620-1820	GEOTECHNICAL PROPERTIES OF SLUDGE BLENDED WITH CRUSHED CONCRETE AND INCINERATION ASH Muhammad Rashid Iqbal, Kento Hashimoto, Shinya Tachibana, and Ken Kawamoto LIQUEFACTION ANALYSIS OF ROAD EMBANKMENT IN PIDIE JAYA DUE TO ACEH EARTHQUAKE IN 2016 M Sofian Asmirza, Anissa Maria Hidayati and Abdul Hakam, M Maisaquddus Hape RELATIONSHIP BETWEEN CONSTRUCTION METHOD OF CRUSHED STONE PILE AND BEARING CAPACITY CHARACTERISTICS Seiya Yamazaki,Naoaki Suemasa, Kazuya ito, Makoto Hotta A STUDY ON INFLUENCE OF PENETRATION DISTANCE ON GEL TIME OF CHEMICAL GROUT Ryota Nakamura, Naoaki Suemasa, Sakamitsu Sasaki, Syunsuke Shimada A STUDY ON STRENGTH DEVELOPMENT OF SUSPENDED TYPE INJECTION MATERIAL USING MICROPARTICLES USED FOR LIQUEFACTION COUNTERMEASURE Takuya MOUE, Kentaro UEMURA , Koichi NAGAO , Naoaki SUEMASA , Kazuya ITO and Shunsuke SHIMADA, Takamitsu SASAKI BIO-INSPIRED STABILIZATION OF EMBANKMENT SOIL MEDIATING PSYCHROBACILLUS SP. AND LOW-GRADE CHEMICALS: PRELIMINARY LABORATORY INVESTIGATION Sivakumar Gowthaman, Shumpei Mitsuyama, Kazunori Nakashima, Masahiro Komatsu and Satoru Kawasaki EXPERIMENTAL STUDY ON RAINFALL INTENSITY AND SHALLOW LANDSLIDES WITH QUASI-SATURATED STATE Kota Okazaki, Keigo Koizumi, Kazuhiro Oda, Katuo Sasahara and Keiji Sakuradani

GEOMATE 2018 – PROGRAM DETAILS

Wednesday, 21 November 2018 Poster Sessions (1)	
1300-1700	**Poster Session-1 (hang at 1300 ~ , remove at 1700)) Q&A 1530** **8113, 8114, 8119, 8125, 8128, 8131, 8132, 8133, 8134, 8135, 8143** DYNAMIC BEHAVIOUR OF RAILWAY BALLAST EXPOSED TO FLOODING CONDITION Sakdirat Kaewunruen and Tao Tang MECHANICAL PROPERTIES OF CONCRETE WITH RECYCLED COMPOSITE AND PLASTIC AGGREGATES Dan Li and Sakdirat Kaewunruen THE EFFECT OF FLOOD TO QUALITY INDEX OF SOIL PHYSICAL PROPERTIES AT THE DOWNSTREAM OF KURANJI RIVER WATERSHED, PADANG CITY Aprisal, Bambang Istijono, Taufika Ophiyandri and Nurhamidah ENVIRONMENTAL PARAMETERS CONTROLLING THE HABITAT OF THE BRACKISH WATER CLAM CORBICULA JAPONICA IDENTIFIED BY PREDICTIVE MODELLING Yukari Sugiyama, Mikio Nakamura , Suguru Senda and Michiko Masuda CYCLIC MECHANICAL PROPERTIES OF SANDY SOILS BY MIXING RECYCLED ASPHALT PAVEMENT MATERIAL Shoji Yokohama and Atsuko Sato THE MANAGEMENT OF RIVERBANK MAINTAINS THE DUNE PLANT POPULATION, ESPECIALLY AN ENDANGERED SPECIES, FIMBRISTYLIS SERICEA Michiko Masuda, Sota Yotsuya and Fumitake Nishimura NUMERICAL ANALYSIS FOR 3D INFLUENCE OF PILE PULLING-OUT HOLES ON SURROUNDING GROUND Shuichi Kuwahara and Shinya Inazumi POSSIBILITY OF NEUTRAL-BASED SOLIDIFYING MATERIALS FOR PREVENTING ELUTION OF RADIOACTIVE SUBSTANCES FROM RESERVOIRS Hiroyuki Hashida, Shinya Inazumi LEAKAGE RISK ASSESSMENT ON SIDE IMPERVIOUS WALLS AT COASTAL LANDFILL SITES Ken-ichi Shishido and Shinya Inazumi DEVELOPMENT OF METAL-INSOLUBILIZING MATERIAL ON SOIL CONTAMINATED WITH HEAVY METALS USING CHEMICAL AND MINERAL ANALYSIS Shinya Inazumi, Ken-ichi Shishido and Hiroyuki Hashida MEASUREMENT OF CEMENT CONTENT IN CEMENT MIXED SOIL BY HYDROCHLORIC ACID HEAT REACTION METHOD Hiroshi Kubo, Toshihiko Miura and Shinya Inazumi
1830-2030	**Banquet & Awards Ceremony**
1830	Group Photo in Banquet Hall
1930	Awards Ceremony
2030	Adjournment for the Day

GEOMATE 2018 – PROGRAM DETAILS

Thursday, 22 November 2018 Oral Sessions	
0830-1600	Registration
0830-1030	**<u>0830-1030 Oral Session 7 (Room A) Thursday, 22 November 2018</u>** **<u>Chair: Prof. Abdul Hakam</u> 10X12mins including Q & A** **8155, 8156, 8158, 8159, 8161, 8164, 8170, 8178, 8181, 8263** COLLAPSE MECHANISM OF STEEL PILES BELOW HIGH-RISE BUILDING IN LIQUEFIED SOIL Moeko Matoba and Yoshihiro Kimura MODIFIED NATURAL FIBER ON SOIL STABILIZATION WITH LIME AND ALKALINE ACTIVATION TREATED MARINE CLAY Fatin Amirah binti Kamaruddin, Bujang B.K Huat, Vivi Anggraini and Haslinda Nahazanan ASSESSMENT OF LANDSLIDE HAZARD AND PREDICTION OF SLOPE FAILURES USING AREA BASED AND INDIVIDUAL BASED METHOD Mohd Taufik bin Haron and Bujang B.K Huat SOIL STABILIZED WITH GEOPOLYMERS FOR LOW COST AND ENVIRONMENTALLY FRIENDLY CONSTRUCTION Wisam Dheyab, Afshin Asadi, Bujang B.K. Huat, Mohd Saleh Jaafar, and Lokmane Abdeldjouad EFFECTS OF ALKALI-ACTIVATED WASTE BINDER IN SOIL STABILIZATION Tan Teing Teing, Bujang B.K. Huat, Sanjay Kumar Shukla, Vivi Anggraini and Haslinda Nahazanan EVALUATION OF FILLER MATERIAL BEHAVIOR IN PRE-BORED PILE FOUNDATION SYSTEM DUE TO SLOW CYCLIC LATERAL LOADING IN SANDY SOIL Adhitya Yoga Purnama, Noriyuki Yasufuku and Ahmad Rifa'i DIAPHRAGM WALL SUPPORTED BY GROUND ANCHORS AND INCLINED STRUTS: A CASE STUDY Adnan Anwar Malik, Gorkem Dora, Ramy Derar and Majid Naeem AN ANALYSIS OF VERIFICATION ON THE INFLUENCE OF LIQUEFACTION ON UNDERGROUND STRUCTURE Keita Sugito, Tetsuya Okano and Ryoichi Fukagawa CALCULATION FORMULA FOR PULLOUT RESISTANCE EXERTED BY OPEN-WING-TYPE GROUND ANCHOR Kota Kono, Akihisa Nakahashi, and Ryoichi Fukagawa SETTLEMENT BEHAVIOUR OF PARIT NIPAH PEAT UNDER STATIC EMBANKMENT Adnan Zainorabidin, Mohamad Niizar Abdurahman, Azman Kassim, Mohd Firdaus Md DanAzlan and Siti Nooraiin Razali **<u>0830-1030 Oral Session 8 (Room B) Thursday, 22 November 2018</u>** **<u>Chair: Dr. Rajaraman Jambunathan</u> 10X12mins including Q & A** **8191, 8193, 8205, 8221, 8228, 8230, 8233, 8237, 8240, 8247** INVESTIGATION OF CYLINDRICAL SPECIMEN COLLAPSE BEHAVIOR USING 3D SMOOTHED-PARTICLE HYDRODYNAMIC ANALYSIS Tetsuya Okano, Yukiko Sumi, Tsutomu Matsuo, and Ryoichi Fukagawa CALIBRATION OF EARTH PRESSURE CELL FOR A SPECIFIED LABORATORY APPLICATION Mohammad Zahidul Islam Bhuiyan, Shanyong Wang, Scott William Sloan, Daichao Sheng and Harry Michel

0830-1030	SLOPE STABILITY ANALYSIS OF FRICTIONAL FILL MATERIALS PLACED ON PURELY COHESIVE CLAY Kongkit Yingchaloenkitkhajorn WEST SUMATRA COASTLINE CHANGE DUE TO ABRASION PROTECTION STRUCTURES: PADANG BEACH Abdul Hakam, Junaidi, Bayu M Adji, Shafira Rahmadilla Hape EFFECT OF TUNNEL SIZE AND LINING THICKNESS ON TUNNEL DEFORMATION DUE TO ADJACENT PILE UNDER LOADING Prateep Lueprasert, Pornkasem Jongpradist, Kodchamon Ruangvirrojanakul and Suchatvee Suwansawat DISCRETE PARTICLE SIMULATION MODEL FOR SLAKING OF GEOMATERIALS INCLUDING SWELLING CLAY MINERALS Yutaka Fukumoto and Satoru Ohtsuka FUNDAMENTAL STUDY OF THE EFFECT OF WATER LEVEL LOWERING IN THE GROUNDWATER DRAINAGE WORK UTILIZING SIPHON Takeshi YAMAMOTO, Yuki MINAMIGUCHI, Keigo KOIZUMI, Mitsuru KOMATSU, Kazuhiro ODA, and Adrin THOHARI METHODS TO MEASURE THE INITIAL QUASI-SATURATED VOLUMETRIC WATER CONTENT OF SOIL Miki Nishimura, Hiroshi Kita, Mitsuru Komatsu, Keigo Koizumi, Kazuhiro Oda and Keiji Sakuradani DESIGN CONCEPT FOR AN ANCHORED DIAPHRAGM WALL IN PROJECT ADP ASTANA, KAZAKHSTAN Askar Zhussupbekov, Abdulla Omarov,Gulzhanat Tanyrbergenova and Karlygash Borgekova SLOPE STABILITY ANALYSIS OF INTEGRATED MUNICIPAL DISPOSAL SITE BASED ON ORGANIC CONTENT CHANGE TO OPTIMIZE EMBANKMENT CAPACITY Ahmad Rifa'i, I Wayan Ariyana Basoka and Fikri Faris
1030-1050	***Morning Refreshments***
1050-1250	**<u>1050-1250 Oral Session 9 (Room A) Thursday, 22 November 2018</u>** **<u>Chair: Dr. Roohollah Kalatehjari</u>** **10X12mins including Q & A** **8320, 8323, 8325, 8345, 8349, 8104, 8179, 8187, 8190, 8201** THE NECESSITY OF EMPLOYING THREE DIMENSIONAL CONCEPTS IN SLOPE STABILITY ANALYSIS Roohollah Kalatehjari, Ahmad Safuan Abdul Rashid, and Mostafa Babaeian Jelodar SEISMIC MICROZONATION OF SEMARANG, INDONESIA, BASED ON PROBABILISTIC AND DETERMINISTIC COMBINATION ANALYSIS W. Partono, M. Irsyam, M. Asrurifak, I.W. Sengara, A. Mulia, M. Ridwan and L. Faizal UNDRAINED RESPONSE OF SILTY SAND UNDER STATIC AND CYCLIC LOADING Akhila M, Dr. K Rangaswamy and Dr. N Sankar QUANTITATIVE ANALYSIS OF MOISTURE INDUCED ALTERATIONS ON THE DIMENSIONS OF GRAVITY FLOW EXTRACTION ELLIPSOID OF COARSE GRAINED PARTICLES IN A GLASS-BOX MODEL Uziell Boringot and Juan Fidel Calaywan INFLUENCE OF INITIAL CONDITIONS ON UNSATURATED GROUNDWATER FLOW MODELS Aizat Mohd Taib, Mohd Raihan Taha and Dayang Zulaika Abang Hasbollah TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA T. Listyani R.A., Nana Sulaksana, Boy Yoseph CSSSA and Adjat Sudradjat

1050-1250	SHEAR BEHAVIOUR OF CONNECTION BETWEEN STEEL AND REINFORCED CONCRETE MEMBERS ADOPTING A NEW COLUMN BASE SYSTEM ALLOWING THE STEEL MOMENT-RESISTING FRAME TO PERFORM BEAM YIELDING MECHANISM Sachi Furukawa, Yoshihiro Kimura, Katsunori Kaneda and Akira Wada THE INFILTRATION CAPACITY OF THREE-DIAMOND PAVER TYPE IN LOW RAINFALL INTENSITY Jeanely Rangkang, Lawalenna Samang, Sakti Adji Adisasmita and Muralia Hustim INFLUENCE OF FLOODS ON THE INCLINATION OF STUPAS IN AYUTTHAYA, THAILAND Yuko Ishida, Ayaka Oya, Weerakaset Suanpaga, Chalemnchai Trakulphudphong, Chaweewan Denpaiboon and Ryoichi Fukagawa EFFICIENT REPAIR SCHEDULING STRATEGY OF A MULTIPLE-SOURCE LIFELINE NETWORK USING CONSTRAINED SPANNING FOREST (CSF) Lessandro Estelito Garciano, Agnes Garciano, Mark Tolentino and Abraham Matthew Carandang
1050-1250	**1050-1250 Oral Session 10 (Room B) Thursday, 22 November 2018** **Chair: Dr. Nabila Shah Jilani** **10X12mins including Q & A** **8267, 8281, 8286, 8287, 8297, 8307, 8313, 8314, 8341, 8342** INTEGRATION OF SPATIAL CHARACTERISTIC TO HEALTH SERVICES: A CASE STUDY OF CHILDREN HEALTH IMPROVEMENT COMPARE TO THE ENVIRONMENTAL MANAGEMENT AT DEPOK CITY SCALE- INDONESIA Irene Sondang Fitrinitia, Esty Suyanti, Purnawan Junadi, Hardya Gustada THE ASSOCIATION AND DISSOCIATION OF ENVIRONMENTALLY SIGNIFICANT MINERALS ON STRENGTH PROPERTIES OF SEDIMENTS IN OCEAN ENVIRONMENT J.Rajaraman, PhD, S.Narasimha Rao,PhD CFD IMPACT OF AIR POLLUTION AND ITS MULTIFARIOUS ADVANTAGES (CASE: SUDIRMAN-THAMRIN STREET, JAKARTA) Heidy Octaviani Rachman and Lita Sari Barus SPATIO-TEMPORAL ANALYSIS OF RICE FIELD PHENOLOGY USING SENTINEL-1 IMAGE IN KARAWANG REGENCY, WEST JAVA, INDONESIA Supriatna, Rokhmatuloh, Adi Wibowo, Iqbal Putut Ash Shidiq, Glen Putra Pratama and Laju Gandharum DEVELOPMENT OF GREEN INFRASTRUCTURE IN URBAN CATCHMENT AREA (CASE STUDY: TANJUNG BARAT SUB-DISTRICT, SOUTH JAKARTA) Dimas Ario Nugroho, Jachrizal Soemabrata, Hendricus Andy Simarmata, Dwinanti Rika Marthanty INFLUENCE OF DIESEL OIL CONTAMINANTS ON GGBS BLENDED WITH BENTONITE AND LATERITIC SOIL AS LINERS Devarangadi Manikanta, Uma Shankar M, B.R. Phanikumar IS WATER AVAILABLE IN THE PUBLIC PLACES SAFE TO DRINK IN BANGLADESH? Ijaj Mahmud Chowdhury, Istiakur Rahman, Sk. Sadman Sakib, Kazi Ismile Hossain and Shoumic Shahid Chowdhury A STUDY TO IMPROVE THE WATER QUALITY PARAMETRS OF THREE MAJOR RIVERS SURROUNDING THE CAPITAL CITY OF BANGLADESH THROUGH COAGULATION Istiakur Rahman, Sk. Sadman Sakib, Md. Rezoan Khan Nafiz, Shadman Alam, Md. Rwanakul Islam Chowdhury

1050-1250	CORAL REEFS DEGRADATION PATTERN AND ITS EXPOSURE TOWARDS CLIMATE CHANGE IN BUNAKEN NATIONAL PARK Nafil Rabbani Attamimi, Ratna Saraswati CORAL REEFS DEGRADATION PATTERN AND ITS EXPOSURE TOWARDS CLIMATE CHANGE IN BUNAKEN NATIONAL PARK Nafil Rabbani Attamimi, Ratna Saraswati
1250-1350	***Lunch***
1350-1630	**1350-1630 Oral Session 11 (Room A) Thursday, 22 November 2018** **Chair: A/Prof. Akhila M.** **12X12mins including Q & A** **8109, 8258, 8259, 8264, 8274, 8284, 8290, 8293, 8295, 8306, 8312, 8315, 8358** A STUDY ON LANDSLIDE AND COLLAPSE CAUSED BY THE 2016 KUMAMOTO EARTHQUAKE IN JAPAN Naomasa Honda STABILITY PERFORMANCE OF LOADING TEST FOR SHORT PILED RAFT FOUNDATION SYSTEM ON PEAT Sajiharjo Marto Suro, Adnan Zainorabidin, Agus Sulaeman and Ismail Bakar ASSESSING THE ULTIMATE BEARING CAPACITY OF FOOTING IN A TWO-LAYERED CLAYEY SOIL SYSTEM USING THE RIGID PLASTIC FINITE ELEMENT METHOD Kazuhiro KANEDA, Masamichi AOKI and Satoru OHTSUKA A FUNDAMENTAL EXPERIMENT ON PNEUMATIC TOMOGRAPHY OF UNSATURATED SOIL GROUND USING A HORIZONTAL ONE-DIMENSIONAL COLUMN Naoya Nishihara and Mitsuru Komatsu LAND SUBSIDENCE IN SUMATERA PEATLAND FOREST Nurhamidah Nurhamidah, Bujang Rusman, Bambang Istijono, Abdul Hakam, Ahmad Junaidi, Taufika Ophiyandri THE EFFECT OF L-SHAPED SHEAR WALL ON STUDENT DORMITORY BUILDING OF ANDALAS UNIVERSITY, PADANG, INDONESIA Fauzan, F A Ismail, M W Rizki, I Fikri, and Z A Jauhari STRUCTURAL EVALUATION OF NURUL HAQ SHELTER BUILDING CONSTRUCTED ON LIQUEFACTION PRONE AREA IN PADANG CITY-INDONESIA Rina Yuliet, Fauzan, Abdul Hakam, Helza Riani TESTING OF FOAM CONCRETE FOR DEFINITION OF LAYER INTERACTING WITH SUBSOIL IN GEOTECHNICAL APPLICATIONS Marian Drusa, Jozef Vlcek, Walter Scherfel and Bronislav Sedlar SEDIMENT FLOW CHARACTERISTICS ON SEABED SUBJECTED TO STATIONARY WAVES WITH DIAGONAL INCIDENT WAVE LOADING NEAR LINE STRUCTURES Anh Quang TRAN, Kinya MIURA, Tatsuya MATSUDA and Takahito YOSHINO THE SIMPLE METHOD OF SHEAR WAVE VELOCITY PROFILE FROM EXPLOSION SOURCE IN SURIN, THAILAND Pithan Pairojn LOADED SWELL TESTS TO ESTIMATE THE HEAVE OF THE EXPANSIVE SOIL IN INSTRUMENTED SOIL COLUMN Udukumburage RS, Gallage C and Dawes L MULTI-CHANNEL FIBRE BRAGG GRATING SENSORS (MC-FBGs) FOR UNIAXIAL COMPRESSIVE TEST ON LIMESTONE ELASTICITY BEHAVIOUR Isah B. W., Mohamad H. and Ahmad N. R. STRENGTH AND FLOWABILITY OF HIGH WATER CONTENT STABILIZED SOIL AT EARLY CURING TIME Vincentius Harry, Luky Handoko, Sumiyati Gunawan, John Tri Hatmoko and Jim Shiau

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<tr><td>1350-1630</td><td>

<u>1350-1630 Oral Session 12 (Room B) Thursday, 22 November 2018</u>
<u>Chair: Dr. Tatyana Krupnova</u> 12X12mins including Q & A
8157, 8197, 8215, 8218, 8220, 8242, 8251, 8253, 8270, 8272, 8301, 8340

CENTRIFUGE TEST OF SUPERSTRUCTURE-SC PILE-LIQUEFIED SOIL SYSTEM AND SC PILES’ DYNAMIC BUCKLING BEHAVIOR
Hiroki Goto, Moeko Matoba and Yoshihiro Kimura

CONCENTRATIONS OF METAL(LOID)S IN OUTDOOR AND INDOOR DUST FROM RUSSIAN CITY
T.G. Krupnova, I.V. Mashkova, S.V. Gavrilkina, E.D. Scalev and N.O. Egorov

THE EFFECT OF REBAR IN A SHORT HEIGHT CONCRETE WALL FOR THE ULTIMATE LATERAL STRENGTH
Tetsuya Ohmura, Dong Hesong, Kyouhei Iwasaki and Mamoru Kawasaki

3D MODEL-BASED IMAGE REGISTRATION FOR CHANGE DETECTION IN HISTORICAL STRUCTURES VIA UNMANNED AERIAL VEHICLE
Apichat Buatik and Krisada Chaiyasarn

DEFECT-DRIVEN DEVELOPMENT: A NEW SOFTWARE DEVELOPMENT MODEL FOR BEGINNERS
Wacharapong Nachiengmai, Sakgasit Ramingwong and Kenneth Cosh

BUILDING MASS RAIL TRANSIT IN KUALA LUMPUR: IS IT GOOD TRANSPORT ECONOMICS?
Hamid AHA, Tabassi AA and Samsurijan MS

SEISMIC RELIABILITY ANALYSIS OF LIFELINE: A CASE STUDY ON THE WATER NETWORK SYSTEM OF BIÑAN CITY, LAGUNA
Rainier Lawrence A. Valdez, Lessandro Estelito O. Garciano and Takeshi Koike

PASSENGER BEHAVIORAL MAPPING AND STATION FACILITIES DESIGN AT COMMUTER LINE TRAIN STATION (CASE: TANGERANG STATION, INDONESIA)
Ahmad Zubair, Lita Sari Barus and Jachrizal Soemabrata

EVALUATION OF DRAINAGE PROCESS IN POROUS MEDIA BY INVADED PERCOLATION PROBABILITY
Junichiro Takeuchi and Masayuki Fujihara

DAMAGE DETECTION AND LOCALIZATION IN MASONRY STRUCTURE USING FASTER REGION CONVOLUTIONAL NETWORKS
Luqman Ali, Wasif Khan and Krisada Chaiyasarn

INFLUENCE OF RAILINGS STIFFNESS ON WHEEL LOAD DISTRIBUTION IN THREE- AND FOUR-LANE CONCRETE SLAB BRIDGES
Ghassan Fawaz, Mohammad Abou Nouh, Mounir Mabsout, and Kassim Tarhini

EXPERIMENTAL STUDY FOR EVALUATING THE SEISMIC PERFORMANCE OF RC FRAME STRUCTURE WITH PARTIALLY INFILLED BY BRICK MASONRY
Jafril Tanjung, Febrin Anas Ismail, Oscar Fithrah Nur, Maidiawati, Hamdeni Medriosa and Mahlil

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<tr><td>1630-1650</td><td>Afternoon Refreshments</td></tr>
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GEOMATE 2018 – PROGRAM DETAILS

	Thursday, 22 November 2018: Poster Sessions (2)
0900-1250	**Poster Session-2 (hang at 0900 ~ , remove at 1250) Q&A 1030** **8160, 8162, 8165, 8169, 8211, 8217, 8241, 8254, 8257, 8273, 8300** EFFECT OF CURING TEMPERATURE ON THE DEVELOPMENT OF HARD STRUCTURE OF ALKALI-ACTIVATED SOIL Lokmane Abdeldjouad, Afshin Asadi, Bujang B.K.Huat, Mohd Saleh Jaafar, Wisam Dheyab, and Ahmed Giuma Elkhebu ROLE DIFFERENCE AMONG RIVERS AFFECTED BY VOLCANIC ACTIVITIES OF MT. ONTAKE FOR WATER QUALITY OF THE NIGORIGAWA RIVER Akiko Usami, Yoshitaka Matsumoto, Megumi Nobori, Akihiko Yagi and Eiji Iwatsuki DENSITY DISTRIBUTIONS WITHIN CERAMIC MATERIALS SATURATED FOR USE IN SUCTION MEASUREMENT Katsuyuki KAWAI, Shinya KIKUI, Naoki YOSHIKAWA and Takayuki FUMOTO PREDICTION METHOD FOR LONG-TERM SETTLEMENT OF HIGLY ORGANIC SOIL USING NATURAL STRAIN Shoji Kamao PHYSIO-ECOLOGICAL ACTIVITY OF PHRAGMITES JAPONICA AS A GREEN INFRASTRUCTURE PLANT Taizo Uchida, Teruo Arase, Yohei Sato and Daisuke Hayasaka FORECAST OF PRODUCTIVE AND BIOLOGICAL EFFECTS OF METAL NANOPARTICLES ACCORDING TO TOLERANCE INDEX Elena Sizova, Sergey Miroshnikov, Nikolai Balakirev EVALUATION OF THE CALIBRATION ACCURACY OF SOIL MOISTURE USING A NEW MICROCHIP SENSOR Mitsuru Komatsu, Masato Futagawa and Yasushi Fuwa PHYSICAL ANALYSIS CONDITIONS AROUND MRT STATION TO BE A TRANSIT ORIENTED DEVELOPMENT AREA BY SOME INDICATORS (CASE STUDY: LEBAK BULUS MRT STATION, SOUTH JAKARTA, INDONESIA) Doddy Apriansyah, Lita Sari Barus, Ahmad Zubair, H. Andi Simarmata, Jachrizal Sumabrata DEVELOPMENT OF RISK EVALUATION METHOD CONSIDERING AFTERSHOCKS Sei'ichiro Fukushima, Hiroyuki Watabe and Harumi Yashiro TEMPORAL CHANGES OF SESIMIC LOADS USING PROBABILISTIC SEISMIC HAZARD ANALYSIS WITH A RENEWAL PROCESS Takayuki Hayashi and Harumi Yashiro REMOVAL OF ACID ORANGE II DYE BY GRANITIC NANO-ZERO VALENT IRON (nZVI) COMPOSITE Nur 'Aishah Zarime, Wan Zuhairi Wan Yaacob and Habibah Jamil

GEOMATE 2018 – PROGRAM DETAILS

	Thursday, 22 November 2018: Poster Sessions (3)
1300-1700	**Poster Session-3 (hang at 1300 ~ , remove at 1700)) Q&A 1630** **8152, 8232, 8316, 8329** EFFECTS OF THRUST PROTECTING METHOD FOR BURIED PIPE USING GEOGRID GABION OF DIFFERENT SIZES Hiroyuki Araki and Daiki Hirakawa EVALUATION OF BEARING CAPACITY ON SOIL-CEMENT MIXING WALL USING PERMANET PILE Koji Watanabe and Minoru Mizumoto VOLUME LOSS CAUSED BY TUNNELLING IN KENNY HILL FORMATION C.M. Khoo, T. Gopalan, N.A. Abdul Rahman and H. Mohamad CONSTRUCTION OF EARTH FILL STRUCTURE FOR SMALL FARM POND BY USING BHUTANESE TRADITIONAL WALL MAKING METHOD UENO Kazuhiro, NATSUKA Isamu, SATO Shushi, ONJO Norio, Karma Tshethar and Kelzang Tenzin
1630-1650	***Afternoon Refreshments***
1650-1700	Discussion on Journal Publication, Closure of Conference, Room A

	Friday, 23 November 2018
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TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA

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ABSTRACT: West Progo Hills is one of some hard water area in Indonesia. It doesn't belong to the groundwater basin because it is difficult to get groundwater. Groundwater can be found in some places with a random point. Dug wells are usually found in the narrow area, as well as springs. By hydrogeological as well as hydro isotope approaches, this research wants to know about groundwater potential in West Progo Hills especially at the central part of it. The groundwater mapping has been done at Girimulyo - Kaligesing and surrounding area, to get some geologic data, water table measurement, and geomorphological data. The result of the research shows that the groundwater table usually follows the local topography. Groundwater table ranges 0.9 – 8 m below surface, it means shallow groundwater table. Dug wells are only locally found, as well as springs. Some springs often found at break of slope, it means that they're controlled by topography. Based on the groundwater table from dug wells data, groundwater is conformable to the topographic condition. The relationship between elevation and groundwater table gives correlation coefficient (r) as much as 99.99%. It means that relief is followed by groundwater level. It can be concluded that relief has a strong correlation with shallow groundwater in the research area, although the stable isotopic data doesn't support the altitude effect of it. Groundwater flows from high to low lands, such as the upper slope of hills to valleys.

Keywords: Groundwater, Topography, Spring, Dug well, Stable isotope

1. INTRODUCTION

This research has been carried out in a central part of West Progo Hills, which includes Kaligesing, Central Java Province and Girimulyo, West Progo, Yogyakarta Province, Indonesia (Fig. 1). The center of West Progo Hills is a hard water area. It is difficult to find groundwater resources. However, some dug wells and spring still can be found in random places, narrow area although in small numbers.

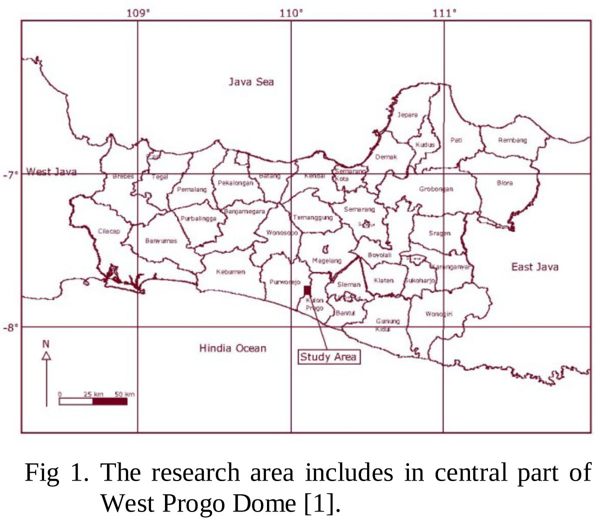

Fig 1. The research area includes in central part of West Progo Dome [1].

West Progo Hills belongs to West Progo Dome physiography [1]. This area even includes in non-groundwater basin [2]. This area is not potential for groundwater. However, in this research area, it can be found some springs and dug wells. The springs and dug wells spread in the random area, sometimes many of them gathered in a narrow area, but it may be not found in other areas.

It is necessary to study water resource at non-groundwater basin area, moreover to meet the land use changes associated with the construction of a new airport in West Progo and the development of new tourist sites in the area. The rapid expansion of land use will have a significant impact on the availability of water resource [3]. Therefore, it is important to know changes in the water resource. Global estimates of groundwater storage changes can be used to estimate that groundwater depletion trends at any region throughout the world [4].

Groundwater resource in the research area has been studied by several researchers. The potential of groundwater in relation to the lineament also analyzed to understand the influence of lineament's characteristics [5]. There is a strong correlation between the distance of lineament – spring to the numbers of spring. The springs are usually acted as a discharge of groundwater flow in the local area.

Groundwater resource of the study area can be evaluated by looking at numbers of spring as well as dug well. This potential of groundwater can also be discussed in its relationship to the topography.

The study area is hilly morphology with mainly steep slope and high dissected morphology [5]. The coarse relief is usually shown by a narrow valley, steep slope, and blunt peak hills. There are some breaks of slope feature in several locations in which the spring may appear.

Hydrogeology characteristics should be understood to know water resource. Furthermore, the hydrological model may be developed for basin management which is useful for soil and water conservation [6]. One aspect that needs to be studied is the topographic relationship model for groundwater flow patterns.

2. METHODS

The research has been done by hydrogeological and geomorphological mapping in the central of West Progo Hills. The data which have been collected include hydrogeological variables (groundwater table and spring type) and also geomorphological variables (slope, elevation, relief).

Geological equipment was used include GPS, hammer, compass, and loupe. The slope is calculated from a topographic map and also directly measured in the field.

Stable isotopic data of ^{18}O and D have been taken to complete the analysis. These stable isotopes data have been taken from groundwater samples of selected springs and tested in Hydrology Laboratory of Indonesia National Nuclear Power Agency. The springs include 7 locations in Jonggrangan Formation and 7 locations in Old Andesite Formation aquifers.

3. REGIONAL HYDROGEOLOGY

West Progo Hills is a dome physiography which has built mainly by three big ancient volcanoes i.e. Gadjah, Ijo, and Menoreh [1]. These volcanoes produced andesitic rocks such as andesite breccia and andesite lava. These volcanic products include in Old Andesite Formation. Beside this formation, West Progo Hills is also built by a series of Tertiary sedimentary Formation such as Nanggulan, Sentolo, and Jonggrangan formation. The research area in the central part of the dome is mainly built by Jonggrangan and Old Andesite Formations. Jonggrangan Formation is consists of coral, bedded limestone, tuffaceous marl, conglomerate and calcareous sandstone [7].

The aquifer system in the study area was constructed by andesitic volcanic rocks with a thickness of more than 300 m. These rocks have locally undergone quite intensive weathering, and form a thick soil (5-10 m). Based on the characteristic layers of massive, densely fractured rock, and groundwater occupies the cracks, the aquifer system in the study area can be classified as a cracked volcanic aquifer [8]. Groundwater in this cracked aquifer system flows as a complex flow and creates seepages. On a local scale, the groundwater level is not related in one place to another.

The existence of the basement rock of the Old Andesite Formation aquifer in stratigraphy cannot be detected because this formation is a body of intrusion and thick lava. The aquifer system in this area is interpreted as aquifers that are completely composed of volcanic rocks reach the basement. Because these volcanic rocks are exposed widely on the surface and are directly related to the atmosphere, the aquifer system can be classified as an unconfined aquifer [8].

Jonggrangan Formation mainly consists of bedded tuffaceous limestone which built an aquifer by its intergranular porosity. This formation is also densely cracked therefore secondary porosity is also well developed. This aquifer is supported by cracks and solution hole porosity, especially in coral, reef limestone.

4. RESULT AND DISCUSSION

4.1 Morphology of Research Area

The study area occupies in central West Progo Hills or core of dome physiography. It has variable morphology, mainly composed of high dissected, steep slope morphology. This area has an elevation of 187.5 to 850 m above sea level (asl), with slope developed from 5% (undulating) until more than 100% (very steep) [5].

Fig. 2 shows some lineaments of escarpments of the research area. This morphology can also be looked in the 3D block diagram as shown in Fig. 3.

Similar to Fig. 3, the morphology of the research area can be noticed from the southern side [3]. This landform shows a hard rock terrain built by hard, compacted rocks and made the rough relief.

The research wants to know about the relationship between groundwater flow and topographic aspects, therefore the observation locations have been chosen in dug wells and surroundings area (Table 1; Fig. 4). This table shows morphometric variables include elevation and slope of landform.

From the slope map on Fig. 4, it appears that the research area is dominated by a landform with fairly steep slopes. The valley between the hills usually has a relatively gentle slope and generally found locally at a relatively narrow area.

The landscape of research area is similar with Samigaluh area which is located on the east of it, which has coarse relief, strong dissected hilly morphology [9]. This area is usually affected by balanced erosion, both horizontal and vertical erosion. However, there is a poor correlation between elevation as well as the other morphometric variable responses of a stream.

Fig. 2. Morphology of research area as seen from Jatimulyo Village, Girimulyo (top); and from Tlogoguwo Village, Kaligesing (bottom).

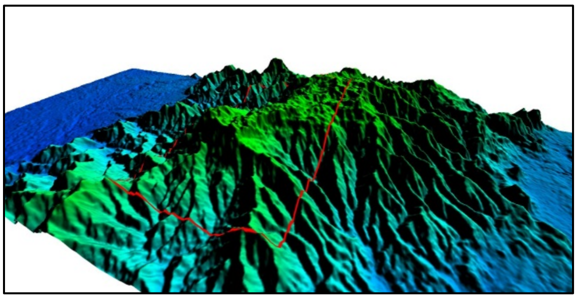

Fig. 3. Morphology of research area in 3D diagram as seen from east direction.

Table 1. Location of dug well as observation spot area.

Well	UTM coordinate		Eleva-tion (m)	Slope (%)	Gw. table (m)
	Northing	Easting			
W1	402803	9146709	717	15	715.5
W2	403055	9146716	741	17	736.4
W3	402914	9146504	716	18	711.44
W4	402972	9146491	716	15	710.6
W5	403071	9146491	427	17	424.8
W6	403323	9144843	734	14	730.2
W7	403644	9144597	743	20	738.83
W8	403578	9144480	754	21	747.9
W9	399443	9143192	298	25	296.1
W10	399483	9143149	294	28	292.1
W11	401554	9142896	600	28	598.8
W12	401440	9142800	600	24	598.6
W13	403058	9143528	687	12	682
W14	403056	9143501	687	14	681.5
W15	402955	9143421	687	13	680.5
W16	402868	9143319	687	15	681
W17	402905	9143289	687	15	680.5
W18	403033	9143066	725	17	719.2
W19	403033	9143019	725	20	719
W20	402912	9142833	750	21	744.3
W21	403302	9143013	717.46	25	716.56
W22	402746	9139995	669.4	30	667.4
W23	402877	9139999	643.6	31	635.6
W24	403430	9138812	520.88	30	519.6
W25	403527	9138406	482.67	33	481.45
W26	403071	9138006	324.3	32	321.3
W27	399665	9138373	462.68	15	461.6
W28	399723	9138318	465.8	18	464.8
W29	399015	9137910	391.8	45	390.6
W30	399333	9137742	476.8	47	474.8
W31	399284	9137727	476.6	46	475.1
W32	400808	9143186	502	25	499.9
W33	400865	9143223	512	15	511
W34	400002	9138458	444	35	441.1
W35	399839	9138247	437	30	434.2

4.2 Groundwater Flow

Groundwater flow can be interpreted based on the local groundwater table (Fig. 5). Unfortunately, dug wells are only found locally in several locations, even many areas do not have dug wells. It means that the availability of dug wells at research area relatively small and the distribution is uneven.

Due to the availability of dug wells and local distribution, the groundwater contour pattern cannot be generated throughout the study area. This pattern of groundwater contours can only be made around dug wells areas so that the groundwater flow pattern cannot be interpreted in relation to other areas.

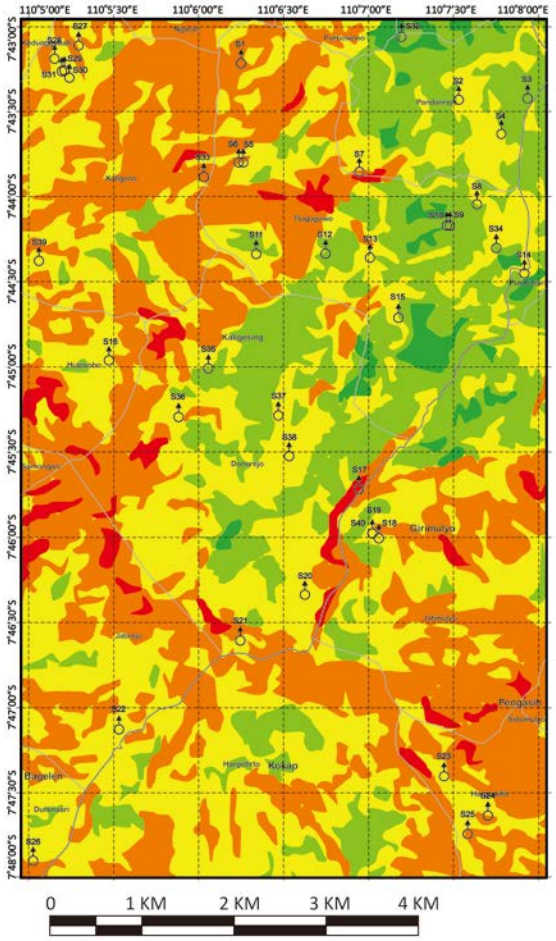

Fig 4. Map of a slope of landform in the study area.

Legend:
: Spring
: Slope > 100%
: Slope 45% - 100%
: Slope 25% - 45%
: Slope 15% - 25%
: Slope 0 - 15%

Groundwater flow develops as local flow system in the area. This system usually develops along with local relief [10]. In the local flow condition, the topography usually influences the groundwater table. The water table is coincident with the ground surface in the valley, sometimes produced spring, and forms a weak replica of the topography on the hills (Fig. 6). The flow lines deliver groundwater from recharge areas to discharge areas.

Discharge of groundwater occurs in nature when water emerges from underground [7]. Most natural discharge occurs as flow into surface water bodies, flow to the surface appears as a spring. This phenomenon let the appearance of depression spring type. The depression spring is formed where the ground surface intersects the water table.

There are some depression springs found in the research area (Table 2 and Fig. 4). These springs mainly found at the steep morphology of Old Andesite Formation, and sometimes can be met at Jonggrangan Formation rocks with single or combination type. For example, Mudal spring (S17) develops as depression, fracture, tubular spring. The tubular porosities even grow to be cavity ones.

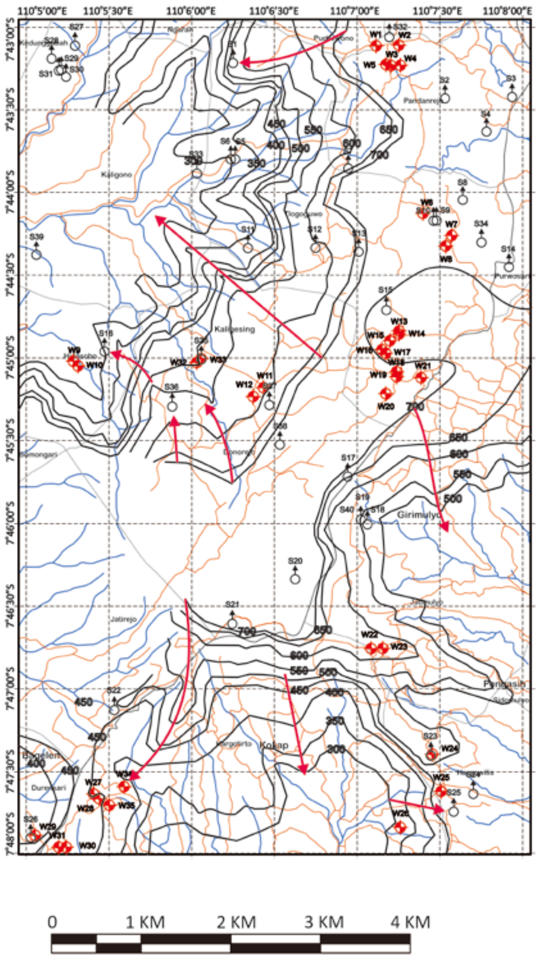

Fig. 5. Groundwater flow of shallow aquifer.

Legend:
Dug well
Spring
Groundwater table contour
Groundwater flow

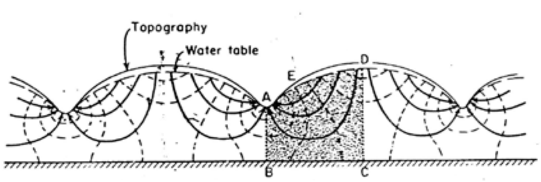

Fig. 6. Groundwater flow net in a two-dimensional vertical cross section (after Hubert, 1940 in [10]).

The depression springs prove that there are groundwater table lines cross steep cliffs or slope of morphology. It means that actually morphology or topography also control groundwater flow. In this term, spring will be a discharge of groundwater flow. Therefore, some groundwater flow lines usually lead toward spring as a discharge of it.

4.3 Topographic Control on Groundwater Flow

There are at least two parameters of topography that can be analyzed to see their influence to groundwater flow, i.e. elevation and slope. Groundwater tends to flow from a higher hydrostatic head (groundwater table) to the lower ones. The groundwater flow is represented as a groundwater table. These relationships can be seen in Fig. 7 - 8.

Table 2. Some depression type springs in the research area.

Spring code	Location	Coordinate		Spring Type
		Northing	Easting	
S1	Pandanrejo	401223	9146528	Depression
S2	Tlogoguwo	403580	9146131	Depression
S5	Tuk Songo	401210	9145447	Depression
S6	Tuk Songo	401208	9145447	Depression
S8	Tlogoguwo	403774	9145005	Depression
S9	Tlogoguwo	403471	9144773	Depression
S10	Tlogoguwo	403468	9144755	Depression
S11	Pagertengah	401387	9144466	Depression
S12	Tlogoguwo	402137	9144468	Depression
S15	Kalilo	402925	9143777	Depression
S16	Hulosobo	399792	9143316	Depression
S17	Mudal	402496	9141923	Depression, fracture, cavity
S24	Clapar 1	403892	9138389	Depression
S27	Kaligono	399464	9146723	Depression
S28	Kaligono	399223	9146585	Depression
S29	Kaligono	399205	9146580	Depression
S30	Kaligono	399314	9146451	Depression
S31	Kaligono	399368	9146377	Depression

The relationship between elevation and the groundwater table gives a coefficient correlation value of 99.99% (Fig. 7). It means that the groundwater table always follows relief or topography. There are many variations in groundwater table depth in a peak of the hill if it is compared within the valley. Sometimes, the groundwater table is found deeper in the hilltop. But in general, the shape of the groundwater flow line in a vertical cross section will be similar to topography (see Fig. 6).

Meanwhile, the relationship between slope and the groundwater table show worse value (Fig. 8). This relation is indicated moderate correlation by the r^2 value of 0.2933 or coefficient correlation (r) of 54.16%. Slopes generally affect rainfall to be infiltrated or runoff. The amount of rainwater that infiltrates the slope is also an important factor to the stability of soil [11]. Slope instability in a tropical country normally triggered by the high seasonal rainfall event as well as geological factors [12].

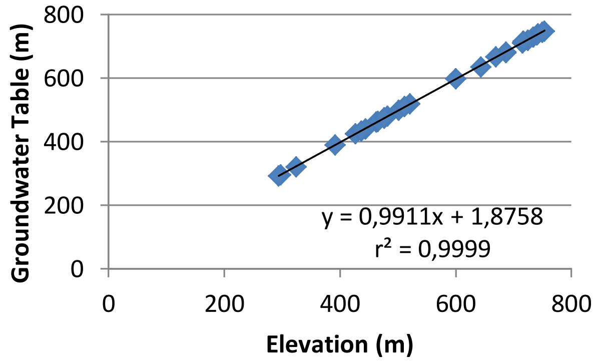

Fig 7. The relationship between elevation with the groundwater table.

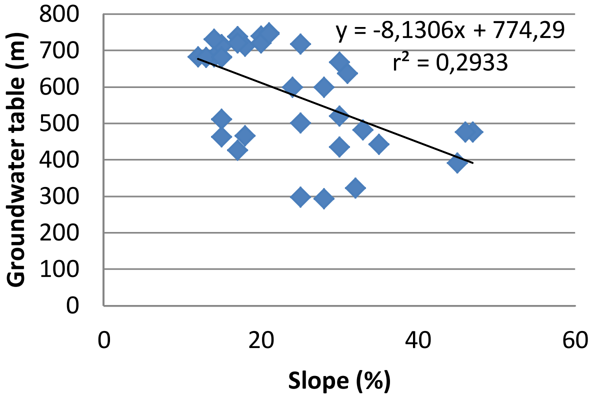

Fig. 8. The relationship between slope with the groundwater table.

Although the relationship between slope and groundwater flow only shows moderate correlation, there are many discharges of groundwater flow controlled by break of a slope of landforms. It means that landforms actually control groundwater flow because the flow usually goes toward spring as a discharge point.

Many steep slope landscapes made a break of slope in the research area. This condition triggers the occurrence of springs. Then, those springs can change the direction of groundwater flow. The groundwater flows principally from recharge to discharge area [13].

There may be changes in water resource such as groundwater pattern or its quantity. It is related to behavior and trends of dynamic change include relationship and interaction of variables in the system under different a spatial and temporal parameter such as water quality [14]. Therefore, the topographic changes may influence groundwater flow pattern.

Such as the pattern of groundwater flow in free aquifers in general, the pattern of shallow groundwater flow in the study area flows following the topography. This condition does not only occur in free aquifers, but it can occur in confined aquifers. The direction of groundwater movement in the artesian aquifer may coincide with the flow of the rivers, and the slope of the groundwater flow varies, with the large values in the groundwater discharge zone [15].

The addition of dug wells will also cause the groundwater flow to change direction. Therefore, in an urban area, groundwater flow may vary locally from time to time and can change depending abstraction. Nevertheless, the study area is not an urban area so there is rarely the addition of dug wells.

The isotopic data are evaluated to complete the analysis (Table 3). From the 40 springs found in the field, 14 well-selected springs were chosen to collect isotope data. All data were taken in dry season.

In any certain area regionally, there is an altitude effect can be determined from isotopic data of springs from some different elevations. These phenomena yield a distinct correlation exists between the ^{18}O and D values and elevation [9]. Principally, precipitation will have a light isotope content in place with higher elevation [17] as well as shown in Jakarta Basin [18]. Unfortunately, this altitude effect in the research area is invisible (Fig. 9).

Table 3. Stable isotope data from springs.

No.	h (m)	δ^{18}O (‰)	δD (‰)
S1	512	-7,4	-42,1
S4	747	-7,25	-45,5
S7	665	-6,84	-42,2
S11	409	-7,34	-43,1
S13	705	-7,4	-46,6
S14	710	-6,6	-39,3
S16	340	-6,88	-41,1
S17	664	-7,39	-45,1
S20	728	-6,72	-38,9
S21	706	-7,39	-41,2
S25	437	-5,51	-34,7
S26	400	-6,45	-36,8
S29	311	-6,45	-38,8
S39	211	-6,8	-41,3

Fig. 9 explains that there is a very weak correlation between elevation and groundwater. This correlation only has r^2 very small. Nevertheless, the isotopic value usually lighter with the increase of altitude.

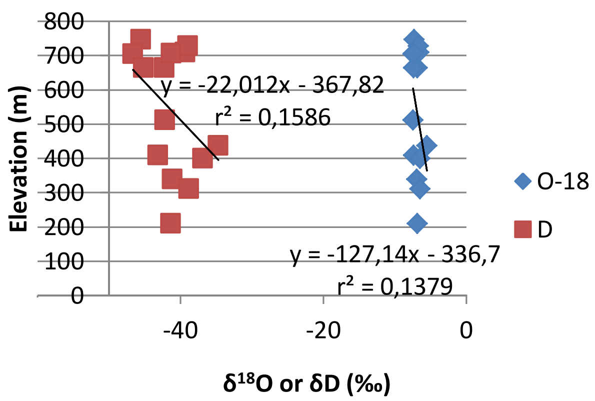

Fig. 9. The poor relationship between δ^{18}O or δD values with elevation in the research area.

Actually, there is a narrow range of altitude in the study area. Moreover, there is a coarse relief result in an unclear difference in isotopic values. It can also be interpreted that groundwater flows in the local system, in a short time, where the evolution process hasn't been occurred to make any change of isotopic value or enrichment. The recharge may be in near area with no significant difference of altitude, therefore the value of isotopic enrichment is still unclear. Poor correlation may also be caused by a narrow altitude range and a wide range of isotope values. Therefore, the estimated elevation of the recharge zone is difficult to determine based on groundwater isotope content in the study area.

5. CONCLUSION

The topographic parameters that affect groundwater flow are elevation and slope of landscape with moderate - very strong correlation. The relationship between elevation and groundwater gives a correlation coefficient (r) of 99.99% (very strong), while slope makes r-value of 54.16% (moderate). Unfortunately, the isotopic value doesn't support this phenomenon, however, this isotopic data prove a variable value of local groundwater flow that is not controlled by altitude effect.

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TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA

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ABSTRACT: West Progo Hills is one of some hard water area in Indonesia. It doesn't belong to the groundwater basin because it is difficult to get groundwater. Groundwater can be found in some places with a random point. Dug wells are usually found in the narrow area, as well as springs. By hydrogeological as well as hydro isotope approaches, this research wants to know about groundwater potential in West Progo Hills especially at the central part of it. The groundwater mapping has been done at Girimulyo - Kaligesing and surrounding area, to get some geologic data, water table measurement, and geomorphological data. The result of the research shows that the groundwater table usually follows the local topography. Groundwater table ranges 0.9 – 8 m below surface, it means shallow groundwater table. Dug wells are only locally found, as well as springs. Some springs often found at break of slope, it means that they're controlled by topography. Based on the groundwater table from dug wells data, groundwater is conformable to the topographic condition. The relationship between elevation and groundwater table gives correlation coefficient (r) as much as 99.99%. It means that relief is followed by groundwater level. It can be concluded that relief has a strong correlation with shallow groundwater in the research area, although the stable isotopic data doesn't support the altitude effect of it. Groundwater flows from high to low lands, such as the upper slope of hills to valleys.

Keywords: Groundwater, Topography, Spring, Dug well, Stable isotope

1. INTRODUCTION

This research has been carried out in a central part of West Progo Hills, which includes Kaligesing, Central Java Province and Girimulyo, West Progo, Yogyakarta Province, Indonesia (Fig. 1). The center of West Progo Hills is a hard water area. It is difficult to find groundwater resources. However, some dug wells and spring still can be found in random places, narrow area although in small numbers.

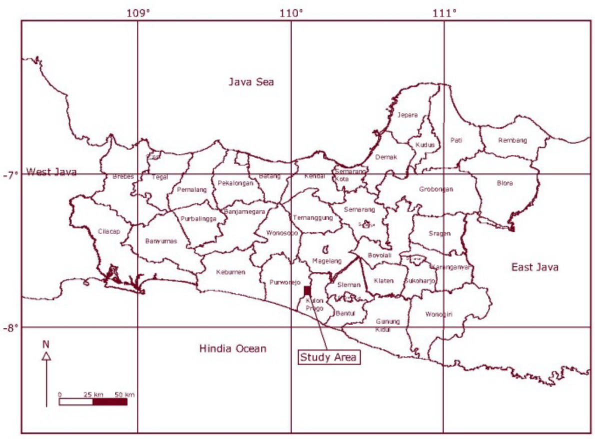

Fig 1. The research area includes in central part of West Progo Dome [1].

West Progo Hills belongs to West Progo Dome physiography [1]. This area even includes in non-groundwater basin [2]. This area is not potential for groundwater. However, in this research area, it can be found some springs and dug wells. The springs and dug wells spread in the random area, sometimes many of them gathered in a narrow area, but it may be not found in other areas.

It is necessary to study water resource at non-groundwater basin area, moreover to meet the land use changes associated with the construction of a new airport in West Progo and the development of new tourist sites in the area. The rapid expansion of land use will have a significant impact on the availability of water resource [3]. Therefore, it is important to know changes in the water resource. Global estimates of groundwater storage changes can be used to estimate that groundwater depletion trends at any region throughout the world [4].

Groundwater resource in the research area has been studied by several researchers. The potential of groundwater in relation to the lineament also analyzed to understand the influence of lineament's characteristics [5]. There is a strong correlation between the distance of lineament – spring to the numbers of spring. The springs are usually acted as a discharge of groundwater flow in the local area.

Groundwater resource of the study area can be evaluated by looking at numbers of spring as well as dug well. This potential of groundwater can also be discussed in its relationship to the topography.

The study area is hilly morphology with mainly steep slope and high dissected morphology [5]. The coarse relief is usually shown by a narrow valley, steep slope, and blunt peak hills. There are some breaks of slope feature in several locations in which the spring may appear.

Hydrogeology characteristics should be understood to know water resource. Furthermore, the hydrological model may be developed for basin management which is useful for soil and water conservation [6]. One aspect that needs to be studied is the topographic relationship model for groundwater flow patterns.

2. METHODS

The research has been done by hydrogeological and geomorphological mapping in the central of West Progo Hills. The data which have been collected include hydrogeological variables (groundwater table and spring type) and also geomorphological variables (slope, elevation, relief).

Geological equipment was used include GPS, hammer, compass, and loupe. The slope is calculated from a topographic map and also directly measured in the field.

Stable isotopic data of ^{18}O and D have been taken to complete the analysis. These stable isotopes data have been taken from groundwater samples of selected springs and tested in Hydrology Laboratory of Indonesia National Nuclear Power Agency. The springs include 7 locations in Jonggrangan Formation and 7 locations in Old Andesite Formation aquifers.

3. REGIONAL HYDROGEOLOGY

West Progo Hills is a dome physiography which has built mainly by three big ancient volcanoes i.e. Gadjah, Ijo, and Menoreh [1]. These volcanoes produced andesitic rocks such as andesite breccia and andesite lava. These volcanic products include in Old Andesite Formation. Beside this formation, West Progo Hills is also built by a series of Tertiary sedimentary Formation such as Nanggulan, Sentolo, and Jonggrangan formation. The research area in the central part of the dome is mainly built by Jonggrangan and Old Andesite Formations. Jonggrangan Formation is consists of coral, bedded limestone, tuffaceous marl, conglomerate and calcareous sandstone [7].

The aquifer system in the study area was constructed by andesitic volcanic rocks with a thickness of more than 300 m. These rocks have locally undergone quite intensive weathering, and form a thick soil (5-10 m). Based on the characteristic layers of massive, densely fractured rock, and groundwater occupies the cracks, the aquifer system in the study area can be classified as a cracked volcanic aquifer [8]. Groundwater in this cracked aquifer system flows as a complex flow and creates seepages. On a local scale, the groundwater level is not related in one place to another.

The existence of the basement rock of the Old Andesite Formation aquifer in stratigraphy cannot be detected because this formation is a body of intrusion and thick lava. The aquifer system in this area is interpreted as aquifers that are completely composed of volcanic rocks reach the basement. Because these volcanic rocks are exposed widely on the surface and are directly related to the atmosphere, the aquifer system can be classified as an unconfined aquifer [8].

Jonggrangan Formation mainly consists of bedded tuffaceous limestone which built an aquifer by its intergranular porosity. This formation is also densely cracked therefore secondary porosity is also well developed. This aquifer is supported by cracks and solution hole porosity, especially in coral, reef limestone.

4. RESULT AND DISCUSSION

4.1 Morphology of Research Area

The study area occupies in central West Progo Hills or core of dome physiography. It has variable morphology, mainly composed of high dissected, steep slope morphology. This area has an elevation of 187.5 to 850 m above sea level (asl), with slope developed from 5% (undulating) until more than 100% (very steep) [5].

Fig. 2 shows some lineaments of escarpments of the research area. This morphology can also be looked in the 3D block diagram as shown in Fig. 3.

Similar to Fig. 3, the morphology of the research area can be noticed from the southern side [3]. This landform shows a hard rock terrain built by hard, compacted rocks and made the rough relief.

The research wants to know about the relationship between groundwater flow and topographic aspects, therefore the observation locations have been chosen in dug wells and surroundings area (Table 1; Fig. 4). This table shows morphometric variables include elevation and slope of landform.

From the slope map on Fig. 4, it appears that the research area is dominated by a landform with fairly steep slopes. The valley between the hills usually has a relatively gentle slope and generally found locally at a relatively narrow area.

The landscape of research area is similar with Samigaluh area which is located on the east of it, which has coarse relief, strong dissected hilly morphology [9]. This area is usually affected by balanced erosion, both horizontal and vertical erosion. However, there is a poor correlation between elevation as well as the other morphometric variable responses of a stream.

Fig. 2. Morphology of research area as seen from Jatimulyo Village, Girimulyo (top); and from Tlogoguwo Village, Kaligesing (bottom).

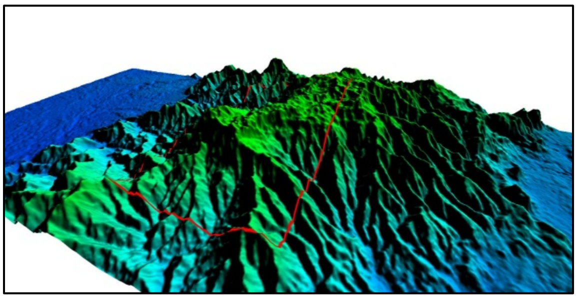

Fig. 3. Morphology of research area in 3D diagram as seen from east direction.

Table 1. Location of dug well as observation spot area.

Well	UTM coordinate		Elevation (m)	Slope (%)	Gw. table (m)
	Northing	Easting			
W1	402803	9146709	717	15	715.5
W2	403055	9146716	741	17	736.4
W3	402914	9146504	716	18	711.44
W4	402972	9146491	716	15	710.6
W5	403071	9146491	427	17	424.8
W6	403323	9144843	734	14	730.2
W7	403644	9144597	743	20	738.83
W8	403578	9144480	754	21	747.9
W9	399443	9143192	298	25	296.1
W10	399483	9143149	294	28	292.1
W11	401554	9142896	600	28	598.8
W12	401440	9142800	600	24	598.6
W13	403058	9143528	687	12	682
W14	403056	9143501	687	14	681.5
W15	402955	9143421	687	13	680.5
W16	402868	9143319	687	15	681
W17	402905	9143289	687	15	680.5
W18	403033	9143066	725	17	719.2
W19	403033	9143019	725	20	719
W20	402912	9142833	750	21	744.3
W21	403302	9143013	717.46	25	716.56
W22	402746	9139995	669.4	30	667.4
W23	402877	9139999	643.6	31	635.6
W24	403430	9138812	520.88	30	519.6
W25	403527	9138406	482.67	33	481.45
W26	403071	9138006	324.3	32	321.3
W27	399665	9138373	462.68	15	461.6
W28	399723	9138318	465.8	18	464.8
W29	399015	9137910	391.8	45	390.6
W30	399333	9137742	476.8	47	474.8
W31	399284	9137727	476.6	46	475.1
W32	400808	9143186	502	25	499.9
W33	400865	9143223	512	15	511
W34	400002	9138458	444	35	441.1
W35	399839	9138247	437	30	434.2

4.2 Groundwater Flow

Groundwater flow can be interpreted based on the local groundwater table (Fig. 5). Unfortunately, dug wells are only found locally in several locations, even many areas do not have dug wells. It means that the availability of dug wells at research area relatively small and the distribution is uneven.

Due to the availability of dug wells and local distribution, the groundwater contour pattern cannot be generated throughout the study area. This pattern of groundwater contours can only be made around dug wells areas so that the groundwater flow pattern cannot be interpreted in relation to other areas.

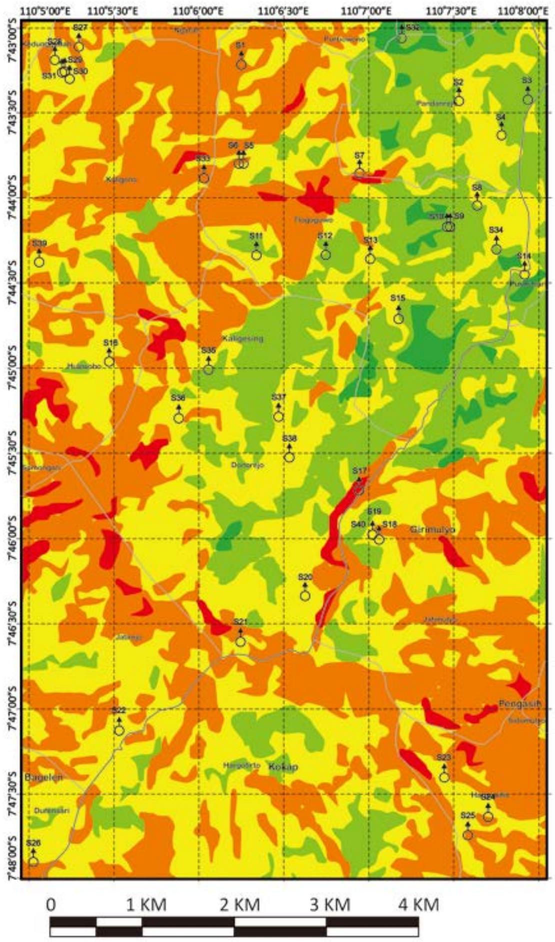

Fig 4. Map of a slope of landform in the study area.

Legend:

: Spring

: Slope > 100%

: Slope 45% - 100%

: Slope 25% - 45%

: Slope 15% - 25%

: Slope 0 - 15%

Groundwater flow develops as local flow system in the area. This system usually develops along with local relief [10]. In the local flow condition, the topography usually influences the groundwater table. The water table is coincident with the ground surface in the valley, sometimes produced spring, and forms a weak replica of the topography on the hills (Fig. 6). The flow lines deliver groundwater from recharge areas to discharge areas.

Discharge of groundwater occurs in nature when water emerges from underground [7]. Most natural discharge occurs as flow into surface water bodies, flow to the surface appears as a spring. This phenomenon let the appearance of depression spring type. The depression spring is formed where the ground surface intersects the water table.

There are some depression springs found in the research area (Table 2 and Fig. 4). These springs mainly found at the steep morphology of Old Andesite Formation, and sometimes can be met at Jonggrangan Formation rocks with single or combination type. For example, Mudal spring (S17) develops as depression, fracture, tubular spring. The tubular porosities even grow to be cavity ones.

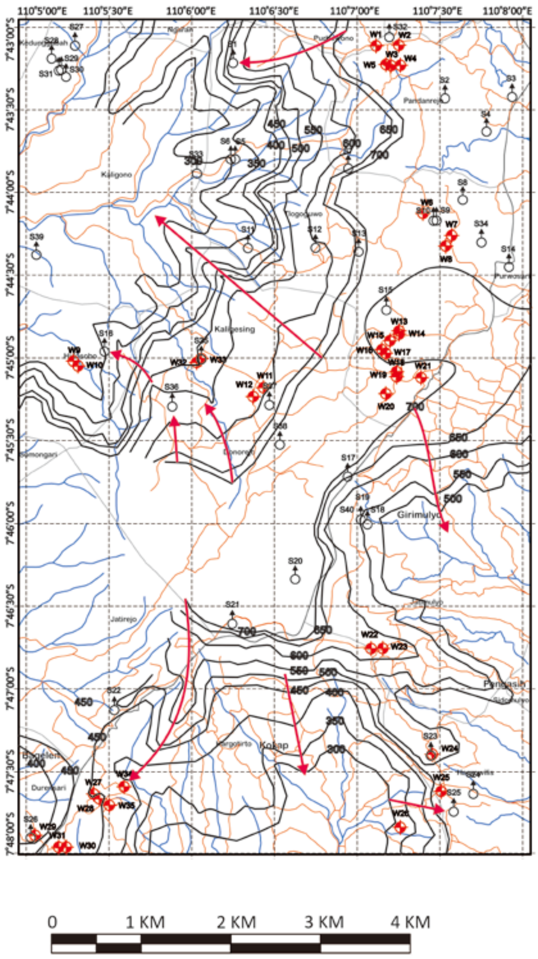

Fig. 5. Groundwater flow of shallow aquifer.

Legend:

Dug well

Spring

Groundwater table contour

Groundwater flow

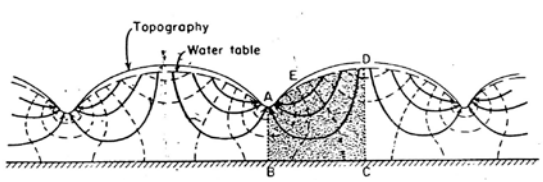

Fig. 6. Groundwater flow net in a two-dimensional vertical cross section (after Hubert, 1940 in [10]).

The depression springs prove that there are groundwater table lines cross steep cliffs or slope of morphology. It means that actually morphology or topography also control groundwater flow. In this term, spring will be a discharge of groundwater flow. Therefore, some groundwater flow lines usually lead toward spring as a discharge of it.

4.3 Topographic Control on Groundwater Flow

There are at least two parameters of topography that can be analyzed to see their influence to groundwater flow, i.e. elevation and slope. Groundwater tends to flow from a higher hydrostatic head (groundwater table) to the lower ones. The groundwater flow is represented as a groundwater table. These relationships can be seen in Fig. 7 - 8.

Table 2. Some depression type springs in the research area.

Spring code	Location	Coordinate		Spring Type
		Northing	Easting	
S1	Pandanrejo	401223	9146528	Depression
S2	Tlogoguwo	403580	9146131	Depression
S5	Tuk Songo	401210	9145447	Depression
S6	Tuk Songo	401208	9145447	Depression
S8	Tlogoguwo	403774	9145005	Depression
S9	Tlogoguwo	403471	9144773	Depression
S10	Tlogoguwo	403468	9144755	Depression
S11	Pagertengah	401387	9144466	Depression
S12	Tlogoguwo	402137	9144468	Depression
S15	Kalilo	402925	9143777	Depression
S16	Hulosobo	399792	9143316	Depression
S17	Mudal	402496	9141923	Depression, fracture, cavity
S24	Clapar 1	403892	9138389	Depression
S27	Kaligono	399464	9146723	Depression
S28	Kaligono	399223	9146585	Depression
S29	Kaligono	399205	9146580	Depression
S30	Kaligono	399314	9146451	Depression
S31	Kaligono	399368	9146377	Depression

The relationship between elevation and the groundwater table gives a coefficient correlation value of 99.99% (Fig. 7). It means that the groundwater table always follows relief or topography. There are many variations in groundwater table depth in a peak of the hill if it is compared within the valley. Sometimes, the groundwater table is found deeper in the hilltop. But in general, the shape of the groundwater flow line in a vertical cross section will be similar to topography (see Fig. 6).

Meanwhile, the relationship between slope and the groundwater table show worse value (Fig. 8). This relation is indicated moderate correlation by the r^2 value of 0.2933 or coefficient correlation (r) of 54.16%. Slopes generally affect rainfall to be infiltrated or runoff. The amount of rainwater that infiltrates the slope is also an important factor to the stability of soil [11]. Slope instability in a tropical country normally triggered by the high seasonal rainfall event as well as geological factors [12].

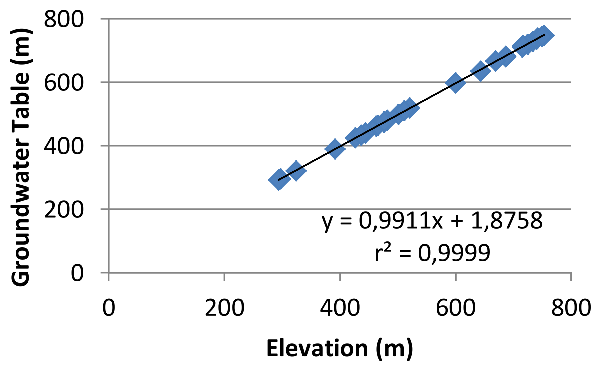

Fig 7. The relationship between elevation with the groundwater table.

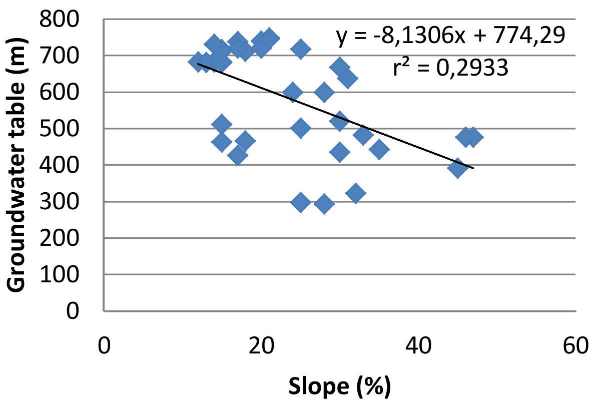

Fig. 8. The relationship between slope with the groundwater table.

Although the relationship between slope and groundwater flow only shows moderate correlation, there are many discharges of groundwater flow controlled by break of a slope of landforms. It means that landforms actually control groundwater flow because the flow usually goes toward spring as a discharge point.

Many steep slope landscapes made a break of slope in the research area. This condition triggers the occurrence of springs. Then, those springs can change the direction of groundwater flow. The groundwater flows principally from recharge to discharge area [13].

There may be changes in water resource such as groundwater pattern or its quantity. It is related to behavior and trends of dynamic change include relationship and interaction of variables in the system under different a spatial and temporal parameter such as water quality [14]. Therefore, the topographic changes may influence groundwater flow pattern.

Such as the pattern of groundwater flow in free aquifers in general, the pattern of shallow groundwater flow in the study area flows following the topography. This condition does not only occur in free aquifers, but it can occur in confined aquifers. The direction of groundwater movement in the artesian aquifer may coincide with the flow of the rivers, and the slope of the groundwater flow varies, with the large values in the groundwater discharge zone [15].

The addition of dug wells will also cause the groundwater flow to change direction. Therefore, in an urban area, groundwater flow may vary locally from time to time and can change depending abstraction. Nevertheless, the study area is not an urban area so there is rarely the addition of dug wells.

The isotopic data are evaluated to complete the analysis (Table 3). From the 40 springs found in the field, 14 well-selected springs were chosen to collect isotope data. All data were taken in dry season.

In any certain area regionally, there is an altitude effect can be determined from isotopic data of springs from some different elevations. These phenomena yield a distinct correlation exists between the ^{18}O and D values and elevation [9]. Principally, precipitation will have a light isotope content in place with higher elevation [17] as well as shown in Jakarta Basin [18]. Unfortunately, this altitude effect in the research area is invisible (Fig. 9).

Table 3. Stable isotope data from springs.

No.	h (m)	$\delta^{18}O$ (‰)	δD (‰)
S1	512	-7,4	-42,1
S4	747	-7,25	-45,5
S7	665	-6,84	-42,2
S11	409	-7,34	-43,1
S13	705	-7,4	-46,6
S14	710	-6,6	-39,3
S16	340	-6,88	-41,1
S17	664	-7,39	-45,1
S20	728	-6,72	-38,9
S21	706	-7,39	-41,2
S25	437	-5,51	-34,7
S26	400	-6,45	-36,8
S29	311	-6,45	-38,8
S39	211	-6,8	-41,3

Fig. 9 explains that there is a very weak correlation between elevation and groundwater. This correlation only has r^2 very small. Nevertheless, the isotopic value usually lighter with the increase of altitude.

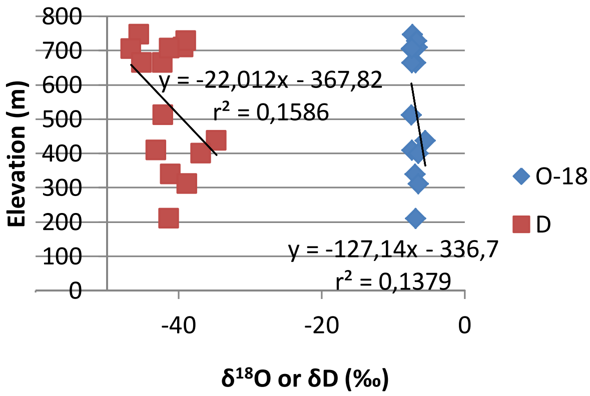

Fig. 9. The poor relationship between $\delta^{18}O$ or δD values with elevation in the research area.

Actually, there is a narrow range of altitude in the study area. Moreover, there is a coarse relief result in an unclear difference in isotopic values. It can also be interpreted that groundwater flows in the local system, in a short time, where the evolution process hasn't been occurred to make any change of isotopic value or enrichment. The recharge may be in near area with no significant difference of altitude, therefore the value of isotopic enrichment is still unclear. Poor correlation may also be caused by a narrow altitude range and a wide range of isotope values. Therefore, the estimated elevation of the recharge zone is difficult to determine based on groundwater isotope content in the study area.

5. CONCLUSION

The topographic parameters that affect groundwater flow are elevation and slope of landscape with moderate - very strong correlation. The relationship between elevation and groundwater gives a correlation coefficient (r) of 99.99% (very strong), while slope makes r-value of 54.16% (moderate). Unfortunately, the isotopic value doesn't support this phenomenon, however, this isotopic data prove a variable value of local groundwater flow that is not controlled by altitude effect.

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b) **Febrin Anas Ismail**: testing of specimens, analysis and interpretation of data, review the article draft.

c) **Rio Sandi**: testing of specimens, analysis and interpretation of data, drafting the article.

d) **Nurhasan Syah**: specimen design and testing of specimens

e) **Annisa Prita Melinda**: testing of specimens, acquisition, analysis and interpretation of data.

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TOPOGRAPHIC CONTROL ON GROUNDWATER FLOW IN CENTRAL OF HARD WATER AREA, WEST PROGO HILLS, INDONESIA

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ABSTRACT: West Progo Hills is one of some hard water area in Indonesia. It doesn't belong to the groundwater basin because it is difficult to get groundwater. Groundwater can be found in some places with a random point. Dug wells are usually found in the narrow area, as well as springs. By hydrogeological as well as hydro isotope approaches, this research wants to know about groundwater potential in West Progo Hills especially at the central part of it. The groundwater mapping has been done at Girimulyo - Kaligesing and surrounding area, to get some geologic data, water table measurement, and geomorphological data. The result of the research shows that the groundwater table usually follows the local topography. Groundwater table ranges 0.9 – 8 m below surface, it means shallow groundwater table. Dug wells are only locally found, as well as springs. Some springs often found at break of slope, it means that they're controlled by topography. Based on the groundwater table from dug wells data, groundwater is conformable to the topographic condition. The relationship between elevation and groundwater table gives the correlation coefficient (r) as much as 99.99%. It means that relief is followed by the groundwater level. It can be concluded that relief has a strong correlation with shallow groundwater in the research area, although the stable isotopic data doesn't support the altitude effect of it. Groundwater flows from high to low lands, such as the upper slope of hills to valleys.

Keywords: Groundwater, Topography, Spring, Dug well, Stable isotope

1. INTRODUCTION

This research has been carried out in a central part of West Progo Hills, which includes Kaligesing, Central Java Province and Girimulyo, West Progo, Yogyakarta Province, Indonesia (Fig. 1). The center of West Progo Hills is a hard water area. It is difficult to find groundwater resources. However, some dug wells and spring still can be found in random places, narrow area although in small numbers.

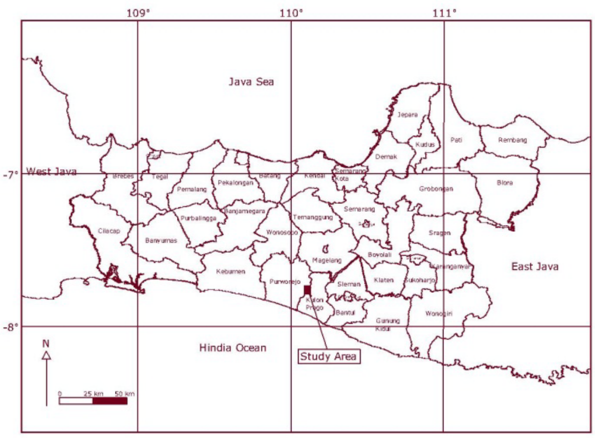


Fig 1. The research area includes in the central part of West Progo Dome [1].

West Progo Hills belongs to West Progo Dome physiography [1]. This area even includes in non-groundwater basin [2]. This area is not potential for groundwater. However, in this research area, it can be found some springs and dug wells. The springs and dug wells spread in the random area, sometimes many of them gathered in a narrow area, but it may be not found in other areas.

It is necessary to study water resource at non-groundwater basin area, moreover to meet the land use changes associated with the construction of a new airport in West Progo and the development of new tourist sites in the area. The rapid expansion of land use will have a significant impact on the availability of water resource [3]. Therefore, it is important to know changes in the water resource. Global estimates of groundwater storage changes can be used to estimate that groundwater depletion trends in any region throughout the world [4].

Groundwater resource in the research area has been studied by several researchers. The potential of groundwater in relation to the lineament also analyzed to understand the influence of lineament's characteristics [5]. There is a strong correlation between the distance of lineament – spring to the numbers of spring. The springs are usually acted as a discharge of groundwater flow in the local area.

Groundwater resource of the study area can be evaluated by looking at numbers of spring as well as dug well. This potential of groundwater can also be discussed in its relationship to the topography.

The study area is hilly morphology with a mainly steep slope and high dissected morphology [5]. The coarse relief is usually shown by a narrow valley, steep slope, and blunt peak hills. There are some breaks of slope feature in several locations in which the spring may appear.

Hydrogeology characteristics should be understood to know water resource. Furthermore, the hydrological model may be developed for basin management which is useful for soil and water conservation [6]. One aspect that needs to be studied is the topographic relationship model for groundwater flow patterns.

2. METHODS

The research has been done by hydrogeological and geomorphological mapping in the central of West Progo Hills. The data which have been collected include hydrogeological variables (groundwater table and spring type) and also geomorphological variables (slope, elevation, relief).

Geological equipment was used include GPS, hammer, compass, and loupe. The slope is calculated from a topographic map and also directly measured in the field.

Stable isotopic data of ^{18}O and D have been taken to complete the analysis. These stable isotopes data have been taken from groundwater samples of selected springs and tested in Hydrology Laboratory of Indonesia National Nuclear Power Agency. The springs include 7 locations in Jonggrangan Formation and 7 locations in Old Andesite Formation aquifers.

3. REGIONAL HYDROGEOLOGY

West Progo Hills is dome physiography which has built mainly by three big ancient volcanoes i.e. Gadjah, Ijo, and Menoreh [1]. These volcanoes produced andesitic rocks such as andesite breccia and andesite lava. These volcanic products include in Old Andesite Formation. Beside this formation, West Progo Hills is also built by a series of Tertiary sedimentary Formation such as Nanggulan, Sentolo, and Jonggrangan formation. The research area in the central part of the dome is mainly built by Jonggrangan and Old Andesite Formations. Jonggrangan Formation is consists of coral, bedded limestone, tuffaceous marl, conglomerate and calcareous sandstone [7].

The aquifer system in the study area was constructed by andesitic volcanic rocks with a thickness of more than 300 m. These rocks have locally undergone quite intensive weathering, and form a thick soil (5-10 m). Based on the characteristic layers of massive, densely fractured rock, and groundwater occupies the cracks, the aquifer system in the study area can be classified as a cracked volcanic aquifer [8]. Groundwater in this cracked aquifer system flows as a complex flow and creates seepages. On a local scale, the groundwater level is not related in one place to another.

The existence of the basement rock of the Old Andesite Formation aquifer in stratigraphy cannot be detected because this formation is a body of intrusion and thick lava. The aquifer system in this area is interpreted as aquifers that are completely composed of volcanic rocks reach the basement. Because these volcanic rocks are exposed widely on the surface and are directly related to the atmosphere, the aquifer system can be classified as an unconfined aquifer [8].

Jonggrangan Formation mainly consists of bedded tuffaceous limestone which built an aquifer by its intergranular porosity. This formation is also densely cracked therefore secondary porosity is also well developed. This aquifer is supported by cracks and solution hole porosity, especially in coral, reef limestone.

4. RESULT AND DISCUSSION

4.1 Morphology of Research Area

The study area occupies in central West Progo Hills or core of dome physiography. It has variable morphology, mainly composed of high dissected, steep slope morphology. This area has an elevation of 187.5 to 850 m above sea level (asl), with slope developed from 5% (undulating) until more than 100% (very steep) [5].

Fig. 2 shows some lineaments of escarpments of the research area. This morphology can also be looked in the 3D block diagram as shown in Fig. 3.

Similar to Fig. 3, the morphology of the research area can be noticed from the southern side [3]. This landform shows a hard rock terrain built by hard, compacted rocks and made the rough relief.

The research wants to know about the relationship between groundwater flow and topographic aspects, therefore the observation locations have been chosen in dug wells and surroundings area (Table 1; Fig. 4). This table shows morphometric variables include the elevation and slope of landform.

From the slope map on Fig. 4, it appears that the research area is dominated by a landform with fairly steep slopes. The valley between the hills usually has a relatively gentle slope and generally found locally at a relatively narrow area.

The landscape of research area is similar to Samigaluh area which is located on the east of it, which has coarse relief, strong dissected hilly morphology [9]. This area is usually affected by balanced erosion, both horizontal and vertical erosion. However, there is a poor correlation between elevation as well as the other morphometric variable responses of a stream.

Fig. 2. Morphology of research area as seen from Jatimulyo Village, Girimulyo (top); and from Tlogoguwo Village, Kaligesing (bottom).

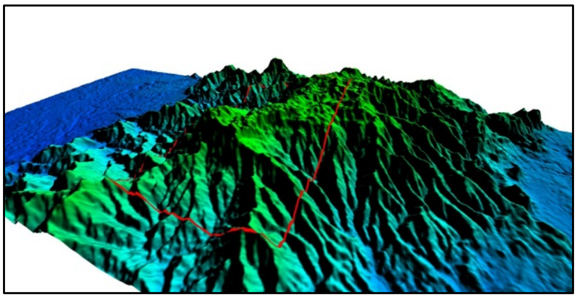


Fig. 3. Morphology of research area in the 3D diagram as seen from east direction.

Table 1. Location of dug well as observation spot area.

Well	UTM coordinate		Eleva-tion (m)	Slope (%)	Gw. table (m)
	Northing	Easting			
W1	402803	9146709	717	15	715.5
W2	403055	9146716	741	17	736.4
W3	402914	9146504	716	18	711.44
W4	402972	9146491	716	15	710.6
W5	403071	9146491	427	17	424.8
W6	403323	9144843	734	14	730.2
W7	403644	9144597	743	20	738.83
W8	403578	9144480	754	21	747.9
W9	399443	9143192	298	25	296.1
W10	399483	9143149	294	28	292.1
W11	401554	9142896	600	28	598.8
W12	401440	9142800	600	24	598.6
W13	403058	9143528	687	12	682
W14	403056	9143501	687	14	681.5
W15	402955	9143421	687	13	680.5
W16	402868	9143319	687	15	681
W17	402905	9143289	687	15	680.5
W18	403033	9143066	725	17	719.2
W19	403033	9143019	725	20	719
W20	402912	9142833	750	21	744.3
W21	403302	9143013	717.46	25	716.56
W22	402746	9139995	669.4	30	667.4
W23	402877	9139999	643.6	31	635.6
W24	403430	9138812	520.88	30	519.6
W25	403527	9138406	482.67	33	481.45
W26	403071	9138006	324.3	32	321.3
W27	399665	9138373	462.68	15	461.6
W28	399723	9138318	465.8	18	464.8
W29	399015	9137910	391.8	45	390.6
W30	399333	9137742	476.8	47	474.8
W31	399284	9137727	476.6	46	475.1
W32	400808	9143186	502	25	499.9
W33	400865	9143223	512	15	511
W34	400002	9138458	444	35	441.1
W35	399839	9138247	437	30	434.2

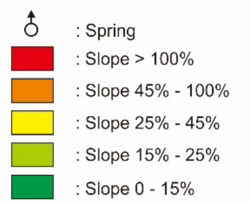
4.2 Groundwater Flow

Groundwater flow can be interpreted based on the local groundwater table (Fig. 5). Unfortunately, dug wells are only found locally in several locations, even many areas do not have dug wells. It means that the availability of dug wells at the research area relatively small and the distribution is uneven.

Due to the availability of dug wells and local distribution, the groundwater contour pattern cannot be generated throughout the study area. This pattern of groundwater contours can only be made around dug wells areas so that the groundwater flow pattern cannot be interpreted in relation to other areas.

Fig 4. Map of a slope of landform in the study area.

Legend:



Groundwater flow develops as a local flow system in the area. This system usually develops along with local relief [10]. In the local flow condition, the topography usually influences the groundwater table. The water table is coincident with the ground surface in the valley, sometimes produced spring, and forms a weak replica of the topography on the hills (Fig. 6). The flow lines deliver groundwater from recharge areas to discharge areas.

Discharge of groundwater occurs in nature when water emerges from underground [7]. Most natural discharge occurs as flow into surface water bodies, flow to the surface appears as a spring. This phenomenon let the appearance of depression spring type. The depression spring is formed where the ground surface intersects the water table.

There are some depression springs found in the research area (Table 2 and Fig. 4). These springs mainly found at the steep morphology of Old Andesite Formation, and sometimes can be met at Jonggrangan Formation rocks with single or combination type. For example, Mudal spring (S17) develops as depression, fracture, tubular spring. The tubular porosities even grow to be cavity ones.

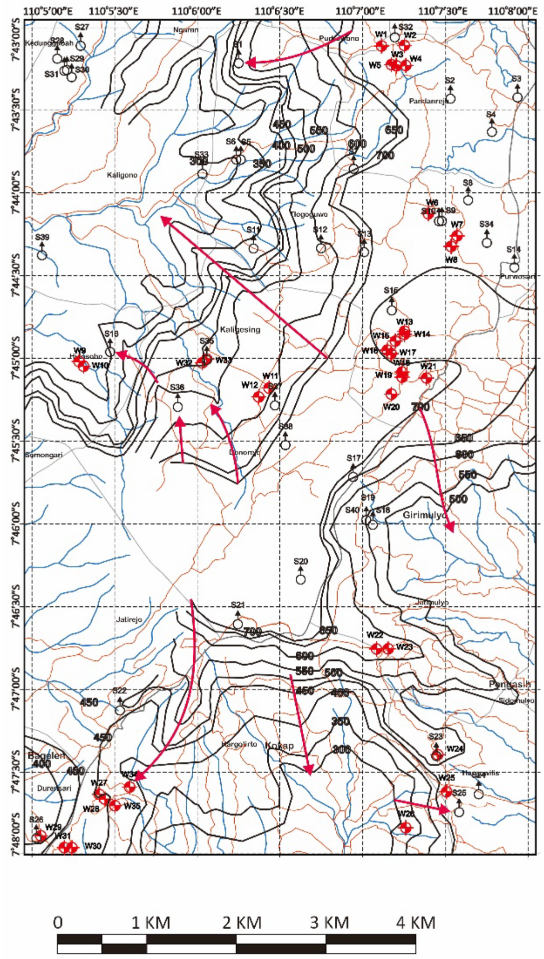


Fig. 5. Groundwater flow of shallow aquifer.

Legend:

Dug well

Spring

Groundwater table contour

Groundwater flow

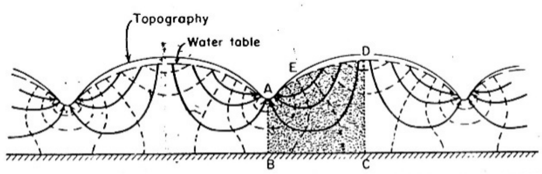


Fig. 6. Groundwater flow net in a two-dimensional vertical cross section (after Hubert, 1940 in [10]).

The depression springs prove that there are groundwater table lines cross steep cliffs or slope of morphology. It means that actually morphology or topography also control groundwater flow. In this term, spring will be a discharge of groundwater flow. Therefore, some groundwater flow lines usually lead toward spring as a discharge of it.

4.3 Topographic Control on Groundwater Flow

There are at least two parameters of topography that can be analyzed to see their influence on groundwater flow, i.e. elevation and slope. Groundwater tends to flow from a higher hydrostatic head (groundwater table) to the lower ones. The groundwater flow is represented as a groundwater table. These relationships can be seen in Fig. 7 - 8.

Table 2. Some depression type springs in the research area.

Spring code	Location	Coordinate		Spring Type
		Northing	Easting	
S1	Pandanrejo	401223	9146528	Depression
S2	Tlogoguwo	403580	9146131	Depression
S5	Tuk Songo	401210	9145447	Depression
S6	Tuk Songo	401208	9145447	Depression
S8	Tlogoguwo	403774	9145005	Depression
S9	Tlogoguwo	403471	9144773	Depression
S10	Tlogoguwo	403468	9144755	Depression
S11	Pagertengah	401387	9144466	Depression
S12	Tlogoguwo	402137	9144468	Depression
S15	Kalilo	402925	9143777	Depression
S16	Hulosobo	399792	9143316	Depression
S17	Mudal	402496	9141923	Depression, fracture, cavity
S24	Clapar 1	403892	9138389	Depression
S27	Kaligono	399464	9146723	Depression
S28	Kaligono	399223	9146585	Depression
S29	Kaligono	399205	9146580	Depression
S30	Kaligono	399314	9146451	Depression
S31	Kaligono	399368	9146377	Depression

The relationship between elevation and the groundwater table gives a coefficient correlation value of 99.99% (Fig. 7). It means that the groundwater table always follows relief or topography. There are many variations in groundwater table depth in a peak of the hill if it is compared within the valley. Sometimes, the groundwater table is found deeper in the hilltop. But in general, the shape of the groundwater flow line in a vertical cross section will be similar to topography (see Fig. 6).

Meanwhile, the relationship between the slope and the groundwater table show a worse value (Fig. 8). This relation is indicated moderate correlation by the r^2 value of 0.2933 or coefficient correlation (r) of 54.16%. Slopes generally affect rainfall to be infiltrated or runoff. The amount of rainwater that infiltrates the slope is also an important factor in the stability of soil [11]. Slope instability in a tropical country normally triggered by the high seasonal rainfall event as well as geological factors [12].

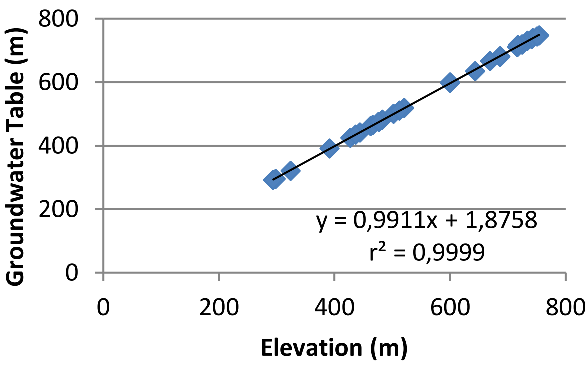


Fig 7. The relationship between elevation with the groundwater table.

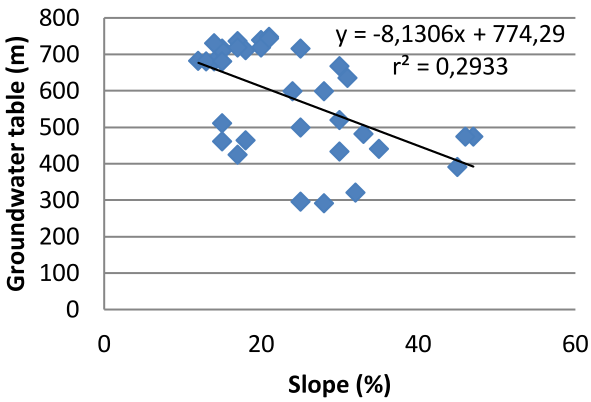


Fig. 8. The relationship between the slope with the groundwater table.

Although the relationship between slope and groundwater flow only shows moderate correlation, there are many discharges of groundwater flow controlled by the break of a slope of landforms. It means that landforms actually control groundwater flow because the flow usually goes toward spring as a discharge point.

Many steep slope landscapes made a break of slope in the research area. This condition triggers the occurrence of springs. Then, those springs can change the direction of the groundwater flow. The groundwater flows principally from recharge to discharge area [13].

There may be changes in water resource such as groundwater pattern or its quantity. It is related to behavior and trends of dynamic change include relationship and interaction of variables in the system under different a spatial and temporal parameter such as water quality [14]. Therefore, the topographic changes may influence the groundwater flow pattern.

Such as the pattern of groundwater flow in free aquifers in general, the pattern of shallow groundwater flow in the study area flows following the topography. This condition does not only occur in free aquifers, but it can occur in confined aquifers. The direction of groundwater movement in the artesian aquifer may coincide with the flow of the rivers, and the slope of the groundwater flow varies, with the large values in the groundwater discharge zone [15].

The addition of dug wells will also cause the groundwater flow to change direction. Therefore, in an urban area, groundwater flow may vary locally from time to time and can change depending abstraction. Nevertheless, the study area is not an urban area so there is rarely the addition of dug wells.

The isotopic data are evaluated to complete the analysis (Table 3). From the 40 springs found in the field, 14 well-selected springs were chosen to collect isotope data. All data were taken in dry season.

In any certain area regionally, there is an altitude effect can be determined from isotopic data of springs from some different elevations. These phenomena yield a distinct correlation exists between the ^{18}O and D values and elevation [9]. Principally, precipitation will have a light isotope content in place with higher elevation [17] as well as shown in Jakarta Basin [18]. Unfortunately, this altitude effect in the research area is invisible (Fig. 9).

Table 3. Stable isotope data from springs.

No.	h (m)	$\delta^{18}O$ (‰)	δD (‰)
S1	512	-7,4	-42,1
S4	747	-7,25	-45,5
S7	665	-6,84	-42,2
S11	409	-7,34	-43,1
S13	705	-7,4	-46,6
S14	710	-6,6	-39,3
S16	340	-6,88	-41,1
S17	664	-7,39	-45,1
S20	728	-6,72	-38,9
S21	706	-7,39	-41,2
S25	437	-5,51	-34,7
S26	400	-6,45	-36,8
S29	311	-6,45	-38,8
S39	211	-6,8	-41,3

Fig. 9 explains that there is a very weak correlation between elevation and groundwater. This correlation only has r^2 very small. Nevertheless, the isotopic value usually lighter with the increase of altitude.

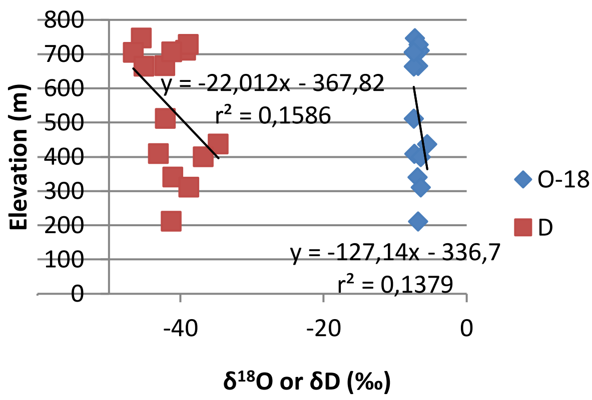


Fig. 9. The poor relationship between $\delta^{18}O$ or δD values with elevation in the research area.

Actually, there is a narrow range of altitude in the study area. Moreover, there is a coarse relief result in an unclear difference in isotopic values. It can also be interpreted that groundwater flows in the local system, in a short time, where the evolution process hasn't been occurred to make any change of isotopic value or enrichment. The recharge may be in a near area with no significant difference of altitude, therefore the value of isotopic enrichment is still unclear. Poor correlation may also be caused by a narrow altitude range and a wide range of isotope values. Therefore, the estimated elevation of the recharge zone is difficult to determine based on groundwater isotope content in the study area.

5. CONCLUSION

The topographic parameters that affect groundwater flow are elevation and slope of landscape with a moderate - very strong correlation. The relationship between elevation and groundwater gives a correlation coefficient (r) of 99.99% (very strong), while the slope makes r-value of 54.16% (moderate). Unfortunately, the isotopic value doesn't support this phenomenon, however, this isotopic data prove a variable value of local groundwater flow that is not controlled by altitude effect.

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