

**Volume 34**  
**Number 2**  
**ISSN: 0125 9849**  
**e-ISSN: 2354 6638**



# **Riset Geologi dan Pertambangan** ***Geology and Mining Research***



**BRIN**

BADAN RISET  
DAN INOVASI NASIONAL

Published by Badan Riset dan Inovasi Nasional

<https://jrisetgeotam.brin.go.id/index.php/jrisgeotam>

# RISET

## GEOLOGI DAN PERTAMBANGAN

### GEOLOGY AND MINING RESEARCH

Volume 34 No. 2, 2024

ISSN 0125-9849

e-ISSN 2354-6638

---

**Accredited as a Scientific Periodic Journal based on the General Director of Research Strengthening and Development, Ministry of Research, Technology and Higher Education of the Republic of Indonesia Decree.  
Nomor : 3/E/KPT/2019**

Riset Geologi dan Pertambangan - Geology and Mining Research is a scientific periodical journal in geology, geophysics, mining, and other related earth sciences.  
This journal is published twice a year, in June and December.

#### Editorial Board

##### Co Editors-in-Chief

Dr. M. Maruf Mukti, *Geological Resources, Indonesia - Sedimentary geology, Tectonics*

Prof. Dr. Adi Maulana, *Universitas Hasanuddin, Indonesia - Metamorphic petrology, Geochemistry, Tectonics*

Hendy Setiawan, Ph.D., *Gadjah Mada University (UGM), Yogyakarta, Indonesia - Landslide*

##### Advisory Editors

Prof. Dr. Mary Elliot, *Nantes Université, France - Climate, paleoclimate, paleoceanography*

Dr. Agung Harijoko, *Gadjah Mada University (UGM), Yogyakarta, Indonesia - Geochemistry, Geothermal, Volcanology*

Prof. Dr. Ir. Mega F Rosana, *Padjadjaran University (UNPAD), Indonesia - Economic Geology, Petrology*

Prof. Dr. Sri Widiyantoro, *Bandung Institute of Technology (ITB), Indonesia - Geophysics, Seismology*

##### Editorial Boards

Irwan Iskandar, S.T., M.T., Ph.D., *Bandung Institute of Technology (ITB) - Isotope Geochemistry*

Kegomoditswe Koitsiwe, M.Sc., Ph.D., *University of Botswana, Republic of Botswana - Mineral Economics*

Dr. Lindung Zalbuin Mase, *University of Bengkulu, Indonesia - Geotechnical engineering, Civil engineering*

Dr. Eng. Patchawee Meow, *Mahidol University, Thailand - Granite Petrology*

Dr. Res. Sc. Jennielyn T Padrones, *University of Philippines, Philippines - Geochemistry*

Dr. Carolus Prasetyadi, *Universitas Pembangunan Nasional "Veteran", Yogyakarta, Indonesia - Structural geology, Tectonics*



Dr. Purna Sulastya Putra, M.T., *Research Center for Geological Disaster, National Research and Innovation Agency*

Dr. Fadhila Rosyid, *Bandung Institute of Technology (ITB), Indonesia - Coal Mine Geology*

Anna F Rusydi, Ph.D., *Research Center for Limnology & Water Resources, Indonesia - hydrogeochemistry*

Dr. Dwi Sarah, *Research Center for Geological Disasters, Indonesia - Engineering geology, Mining*

Dr. Yoga A. Sendjaja, *Universitas Padjadjaran (UNPAD), Indonesia - Geology, Geochemistry*

Dr. Iwan Setiawan, *Geo-resources Research Center BRIN, Indonesia - Petrology, Economic Geology, Rare earth elements*

Prof. Dr. Ir. Edy Sunardi, *Padjadjaran University (UNPAD), Indonesia - Sedimentology, Basin analysis, Petroleum geology*

Prof. Dr. S Syafrizal, *Bandung Institute of Technology (ITB), Indonesia - Economic Geology, Mining Exploration, Resources Geology*

Dr. Arifan Jaya Syahbana, M.Eng., *Research Center for Geological Disaster, National Research and Innovation Agency*

Nguyen Truong Tai, Ph.D., *Academia Sinica, Taiwan - Basalt Petrology*

Dr. Eng. Mutia Dewi Yuniati, *Geo-resources Research Center BRIN, Indonesia - Mineral Engineering*

#### **Managing Editor**

Dr. Lina Handayani

Wilda Naili, M.T

Anita Yuliyanti, M.A

#### **Publication Assistant**

Siti Mutiara Fitry, BRIN, Indonesia

#### **Secretariat and manuscript submission:**

BRIN Publishing, member of Ikapi  
Gedung B.J. Habibie, Lantai 8, Jl. M.H. Thamrin No. 8, Kebon Sirih,  
Menteng, Jakarta Pusat, Daerah Khusus Ibukota Jakarta 10340  
Phone: +62 811-8612-369  
Email: [penerbit@brin.go.id](mailto:penerbit@brin.go.id), [jurnal@rmpi.brin.go.id](mailto:jurnal@rmpi.brin.go.id)  
Website: <https://jrisetgeotam.brin.go.id/index.php/jrisgeotam>

**Reviewer in this edition**

1. Dr. Ir. Dicky Muslim, M.Sc. (Engineering Geology, Indonesia).
2. Dr. Sukristiyanti (Landslide Susceptibility Modeling with GIS, Indonesia).
3. Aza Shelina, S.T., Ph.D Candidate (Geotechnical Earthquake Engineering, Thailand).
4. Anna Dewi, S.T., M.Tr.I (Geotechnical Engineering, Indonesia).
5. Dr. Eng. Mutia Dewi Yuniati (Mineral Engineering, Indonesia).
6. Dr. Eng. Aditya Wibawa (Minerals and Coal Processing, Indonesia).
7. Dr. Muhammad Ma'ruf Mukti (Sedimentary Geology, Indonesia).
8. Dr. Lina Handayani (Geophysics, Indonesia).
9. Dr. Bambang Setiadi (Geoinformatics, Indonesia).

# A Preface from the Editors

Dear RGP readers,

We present the second issue of Volume 34 of *Riset Geologi dan Pertambangan* (Geology and Mining Research). This second issue publishes five papers dealing with engineering geology, geological resources, sedimentary geology, and hydrogeology. In the first article, **Dzaki *et al.*** present landslide susceptibility zone using the weight of evidence method in the south of Yogyakarta. Their landslide susceptibility map shows that the research location is predominantly characterized by areas with medium to high susceptibility to landslides. Furthermore, the medium and high susceptibility zones are situated close to the rivers that related to the alignment of faults.

**Kamal *et al.*** discuss modelling a two-dimensional map of soil parameters in Bengkulu based on research points strategically distributed throughout the city. The parameters include shear wave velocity, cone resistance, and corrected standard penetration test. The research points represent the diverse soil conditions in the area, making the modelled soil parameters useful for planning construction.

The third article by **Solihin *et al.*** briefly reviews different aspects of nickel ore, such as its history, types, distribution, demand, and the technology used for mining and processing it. Indonesia has significant nickel ore deposits, primarily in the form of laterite, due to its tropical climate with high temperatures and rainfall. The authors also discuss advanced materials made from laterite ore, including photocatalysts and batteries.

In the fourth article, **Anhaer *et al.*** clarify sedimentary facies and sedimentation mechanism of volcanoclastics of Cikarang Member of Jampang Formation in southern part of Bogor Trough. They measured stratigraphy of the rock units supported by petrographic analysis and paleontological analysis. The rock units consist of 11 lithofacies deposited in inner-middle fan with changes in depositional sub-environment variations of channels, sandy lobes, silty-sandy distal lobes, and proximal levees. The volcanoclastics are deposited by turbulent current with various cohesive debris flows.

The last paper by **Nugraha *et al.*** evaluates the performance of the Krylov Subspace method with adaptive preconditioning compared to classical iterative methods, such as Gauss-Seidel, Jacobi, and Successive Over-Relaxation (SOR), in the simulation of steady-state groundwater flow on a 2D grid. They conclude that the Krylov Subspace method with adaptive preconditioning is the best solution for applications that require high efficiency in groundwater flow computing.

We sincerely acknowledge all the authors and reviewers for their valuable contributions to this issue. We recognize all the editorial members and staffs for their continuous fineness support for the publication of this volume. Happy new year and we wish all of you a successful continuation in scientific work and achieving interesting results of scientific research in the coming year, all the best!

The Editors of RGP



**RISET**  
**GEOLOGI DAN PERTAMBANGAN**  
**GEOLOGY AND MINING RESEARCH**

**Volume 34 No. 2, 2024**

**ISSN 0125-9849**  
**e-ISSN 2354-6638**

---

**Table of Contents**

<b>Landslide susceptibility zonation using weight of evidence method in Mertelu and Tegalrejo, Gedangsari, Gunungkidul, Special Region of Yogyakarta, Indonesia .....</b>	<b>67</b>
Mochammad Farhan Dzaki, Hendy Setiawan, Rahmadi Hidayat	
<b>Density distribution of shear wave velocity, cone resistance and corrected SPT in the dominant soils of Bengkulu City, Indonesia.....</b>	<b>83</b>
Thomas Mustafa Kamal, Lindung Zalbuin Mase, Rena Misliniyati, Fepy Supriani, Refrizon	
<b>A systematic review of geological resource containing nickel: Resource, distribution, mining, extraction, and advanced material synthesis.....</b>	<b>97</b>
Solihin, Anisya Lidiana, and Eki Naidania Dida	
<b>Facies analysis and sedimentation mechanism of volcaniclastics of Cikarang Member of Jampang Formation in West Java .....</b>	<b>111</b>
Naufal Anhaer, Moch. Indra Novian, Dian Novita	
<b>Adaptive preconditioning Krylov Subspace methods for efficient numerical groundwater flow modeling in steady-state conditions .....</b>	<b>131</b>
Gumilar Utamas Nugraha, Hendra Bakti, Rachmat Fajar Lubis	