



# Journal of Geoscience and Environment Protection





### **Journal Editorial Board**

ISSN 2327-4336 (Print) ISSN 2327-4344 (Online) https://www.scirp.org/journal/gep

#### **Editor-in-Chief**

Prof. Valentine Udoh James Clarion University of Pennsylvania, USA

#### **Editorial Board**

Prof. Sheikh D. Abubakar Usmanu Danfodiyo University, Nigeria

**Dr. Tapos Kumar Acharjee** Department of Irrigation and Water Management, Bangladesh

Agricultural University, Mymensingh-2202, Bangladesh

Prof. Ayad M. Fadhil Al-QuraishiTishk International University, IraqProf. Mokhles K. AzerNational Research Centre, Egypt

Dr. Mukesh Singh Boori Samara University, Russia
Prof. Jianmin Chen Fudan University, China

Prof. Elizabeth Gordon ColónCentral University of Venezuela, VenezuelaProf. Mohamed Abdelhamid DawoudNational Water Research Center, Egypt

**Dr. Silvério Manuel Domingues Figueiredo** Unidade Departamental de Arqueologia, Conservação e Restauro e

Património, Quinta do Contador-Estrada da Serra, Tomar, Portugal

Prof. Peter G. FloodUniversity of New England, AustraliaProf. Yehia Yehia HafezKing Abdulaziz University, Saudi ArabiaProf. Benedict IlozorEastern Michigan University, USA

Dr. Pathmakumara Jayasingha Department of Geography, University of Colombo, Colombo, Sri Lanka

Prof. M. A. Khalifa Menoufia University, Egypt

Dr. Juan MaFayetteville State University, USAProf. Reccab Manyala OchiengUniversity of Zambia, ZambiaProf. Orhan PolatDokuz Eylul University, TurkeyDr. Marcello RubertiUniversity of Salento, ItalyDr. Amirhomayoun SaffarzadehKyushu University, Japan

Prof. V. I. SolomatinRussian Academy of Nature Science, RussiaDr. Mustafa Din SubariUniversiti Teknologi Malaysia, Malaysia

**Dr. Kelestemur Gülüzar Tuna** Firat University, Turkey

Dr. Rahul Verma Botswana International University of Science and Technology, Botswana

Prof. Leiming YinChinese Academy of Sciences, ChinaDr. Xiaochun ZhangCarnegie Institution for Science, USA

Prof. Qixing Zhou Nankai University, China



ISSN Online: 2327-4344 ISSN Print: 2327-4336

# **Table of Contents**

Volume 9 Number 5	May 2021
Spatial Analysis of Risks and Vulnerabilities to Major Hazards in Mada Multi-Criteria Method Based on the Analytical Hierarchy Process (AH	· ·
T. R. Rakotoarison, A. R. Hajalalaina, A. Raonivelo, A. Raherinirina, R. T. Zojao	na15
Effects of Urban Land Use Change on Selected Public Utilities for Sust in Akure, Nigeria	ainable Development
F. O. Akinluyi, M. A. Oyinloye, C. O. Aladekoyi	25
Simultaneous Modelling of Gravity and Magnetic Data in a Measured I Characterize Geothermal Heat Sources: A Case for Eburru Geothermal	
E. R. Nyakundi, G. J. Gitonga, M. O. K'Orowe	40
Hydraulic Fracturing, Cumulative Development and Earthquakes in the of British Columbia, Canada	e Peace River Region
A. R. Chapman	55
Mercury Concentration Profile in Sediment Cores of a Tropical Lagoor Anthropogenic Activities around an Urban City—Abidjan, Côte d'Ivoi	•
A. Gueu, S. K. Ouffoué, B. Z. Digbéhi	83
Spatial Identification of Urban Ecological Function on the North Slope Based on Ecological Sensitivity—A Case Study in Baoji, China	e of Qinling Mountains
P. Wang, L. G. Hou, X. Q. He	95
Studying the Application and Advances of Diffusive Gradients in-Thin (DGTs) to Constrain Mobility and Bioavailability of Heavy Metals in S	<b>-</b>
G. M. Ndzana, A. D. Kolleh, K. A. Kubar, L. M. B. Bidjeck, E. Bekoa, P. A. Tamf T. M. A. Koa, E. Temgoua, M. AA. Abane, L. D. Bitom	
Monitoring of Soil Bulk Density in Context with Its Small-Scale Spatia	l Heterogeneity
M. Širáň, J. Makovníková	138
Lead Phytoremediation in Contaminated Soils Using Ornamental Land	lscape Plants
D. Thompson, E. Bush, H. Kirk-Ballard	152

# Journal of Geoscience and Environment Protection (GEP) Journal Information

#### SUBSCRIPTIONS

The *Journal of Geoscience and Environment Protection* (Online at Scientific Research Publishing, <a href="https://www.scirp.org/">https://www.scirp.org/</a>) is published monthly by Scientific Research Publishing, Inc., USA.

#### Subscription rates:

Print: \$39 per issue.

To subscribe, please contact Journals Subscriptions Department, E-mail: sub@scirp.org

#### **SERVICES**

#### Advertisements

Advertisement Sales Department, E-mail: service@scirp.org

#### Reprints (minimum quantity 100 copies)

Reprints Co-ordinator, Scientific Research Publishing, Inc., USA.

E-mail: sub@scirp.org

#### **COPYRIGHT**

#### Copyright and reuse rights for the front matter of the journal:

Copyright © 2021 by Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

http://creativecommons.org/licenses/by/4.0/

#### Copyright for individual papers of the journal:

Copyright © 2021 by author(s) and Scientific Research Publishing Inc.

#### Reuse rights for individual papers:

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

#### Disclaimer of liability

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

#### PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact:

E-mail: gep@scirp.org



## Call for Papers

# Journal of Geoscience and Environment Protection (GEP)

ISSN 2327-4336 (Print) ISSN 2327-4344 (Online) https://www.scirp.org/journal/gep

Journal of Geosciences and Environment Protection (GEP) is an international journal dedicated to the latest advancement of Geoscience and Environment Protection. The goal of this journal is to provide a platform for scientists and academicians all over the world to promote, share, and discuss various new issues and developments in different areas of Geoscience and Environment Protection. All manuscripts must be prepared in English, and are subject to a rigorous and fair peer-review process.

#### **Subject Coverage**

This journal invites original research and review papers that address the following issues. Topics of interest include, but are not limited to:

#### **Environmental Protection**

- Air Pollution
- Chemical Pollution
- Climate Change
- Disasters Management
- Environmental Earth Sciences
- Environmental Geology and Rehabilitation
- Environmental Law and Policies
- Environmental Risk
- Global Environmental Protection Technology
- Global Warming
- Landfill Waste Management
- Mineral Processing, Waste Management and Recycling
- Nuclear Energy and Environmental Protection
- Pollution Control and Technologies
- Soil Environment and Soil Science in Other Disciplines
- Sustainability of Resources and Environment
- Waste Water Management and Aquaculture
- Water Engineering

- Water Resources Management and Water Quality Geoscience
- BioGeomarkers and Their Significance for Astrogeology and Astrobiology
- Crystallography and Mineralogy
- Education and Capacity Building in Geosciences
- Endogenous, Exogenous Petrology and Geochemistry
- Energy and Mineral Deposits
- Geodynamics
- Geoethics
- Geographic Information Science
- Geological Collections and Museology
- Geophysics
- Hydrology and Hydrogeology
- International Partnership in Geosciences
- Medical and Forensic Geology
- Meteorites and Planetary Geology
- Natural Hazards
- Paleontology
- Stratigraphy and Sedimentology

We are also interested in short papers (letters) that clearly address a specific problem, and short survey or position papers that sketch the results or problems on a specific topic. Authors of selected short papers would be invited to write a regular paper on the same topic for future issues of the GEP.

#### **Notes for Intending Authors**

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Paper submission will be handled electronically through the website. All papers are refereed through a peer review process. For more details about the submissions, please access the website.

#### Website and E-Mail

https://www.scirp.org/journal/gep E-mail: gep@scirp.org

#### What is SCIRP?

Scientific Research Publishing (SCIRP) is one of the largest Open Access journal publishers. It is currently publishing more than 200 open access, online, peer-reviewed journals covering a wide range of academic disciplines. SCIRP serves the worldwide academic communities and contributes to the progress and application of science with its publication.

#### What is Open Access?

All original research papers published by SCIRP are made freely and permanently accessible online immediately upon publication. To be able to provide open access journals, SCIRP defrays operation costs from authors and subscription charges only for its printed version. Open access publishing allows an immediate, worldwide, barrier-free, open access to the full text of research papers, which is in the best interests of the scientific community.

- High visibility for maximum global exposure with open access publishing model
- Rigorous peer review of research papers
- Prompt faster publication with less cost
- Guaranteed targeted, multidisciplinary audience





Website: https://www.scirp.org Subscription: sub@scirp.org Advertisement: service@scirp.org