



SERBIAN ACADEMY OF SCIENCES AND ARTS

University of Novi Sad | Faculty of Sciences

DEPARTMENT OF GEOGRAPHY, TOURISM AND HOTEL MANAGEMENT

INTERNATIONAL CONFERENCE

**GEOSPATIAL AND
ENVIRONMENTAL DYNAMICS:
*Between Fundamental
and Applied Scientific Research***

ABSTRACT BOOK

Novi Sad, 2024



SERBIAN ACADEMY OF SCIENCES AND ARTS
University of Novi Sad | Faculty of Sciences
DEPARTMENT OF GEOGRAPHY, TOURISM AND HOTEL MANAGEMENT

INTERNATIONAL CONFERENCE

**GOSPATIAL AND ENVIRONMENTAL
DYNAMICS: BETWEEN FUNDAMENTAL
AND APPLIED SCIENTIFIC RESEARCH**

ABSTRACT BOOK

Novi Sad, 2024



SERBIAN ACADEMY OF SCIENCES AND ARTS

University of Novi Sad | Faculty of Sciences
DEPARTMENT OF GEOGRAPHY, TOURISM AND HOTEL MANAGEMENT

INTERNATIONAL CONFERENCE

Geospatial and Environmental Dynamics: Between Fundamental and Applied Scientific Research

ISBN 978-86-7031-693-5

Editor in Chief

Slobodan B. Marković

Corresponding member of SASA

Srđan Rončević

Dean of Faculty of Sciences

Lazar Lazić

Director of Department for Geography, Tourism and Hotel Management

Editorial Board

Tin Lukić

Slobodan B. Marković

Lazar Lazić

Nemanja Tomić

Milica G. Radaković

Printed by

Sajnos, Novi Sad

Circulation

150

Dejan Dodić, Nikola R. Bačević, Milena Nikolić, Rastko S. Marković, Dušan Kićović, Dušan Regodić, Vuk Vujović, Nikola Milutinović, Slobodan B. Marković, Tin Lukić
Prediction of snowy and stormy days at Kopaonik for the 2024/25 season using an LSTM Model: Analysis of meteorological data from 1994. to 2024

Vojislav Filipović, Aleksandar Bulatović
Shift in landscape use strategies during the transition from the Bronze to Iron age in northwest Serbia

THEMATIC SESSION

GEOSPATIAL AND ENVIRONMENTAL DYNAMICS II

Marko Ivanišević, Goran Trbić, Tin Lukić, Luka Sabljic
Geospatial analysis of late frost events with emphasis on the fruit sector: a case study of the Prijedor region, Bosnia and Herzegovina

Ivan Potić, Dejan Đorđević
Integration of SWAT Modelling and Multi-Criteria Decision-Making Analysis for Spatial Valuation in Hydropower Development

Ognjen Antonijević, Milan Kilibarda, Branislav Bajat, Dragutin Protić, Aleksandar Sekulić, Milutin Pejović, Marko Kazimirović
Above-ground forest biomass estimation based on remote sensing and in-situ data

Syedehmehrmanzar Sohrab, Nándor Csikos, Péter Szilassi
Impact of Landscape Metrics on PM₁₀ Air Pollution in Urban Environment

Radivoj Tomić, Nenad Grba, Višnja Mihajlović, Božo Dalmacija, Milena Belečić-Tomin, Slobodan B. Marković, Slaven Tenodi
Complex multivariate water quality impact assessment on Krivaja River

Nenad Grba, Stefan Norra, Elisabeth Eiche, Maria Petala, Ioannis Katsoyiannis, Slobodan B. Marković, Miloš Dubovina
Sustainable water resource management in the era of climate change: global practices and their application on European level

Ovidiu Răzvan Gaceu, Tudor Caciora, Stefan Baias, Cezar Morar, Mihai Dudaș, Marius Stupariu, Maria Maxim
Reconstruction of climatic events from the 17th century in Transylvania: Interdisciplinary analysis based on historical sources

Viktória Blanka-Végi, Boudewijn van Leeuwen, György Sipos, Károly Barta, Zsófia
Testing of machine learning methods for estimating the spatial and temporal variability of surface soil moisture

Integration of SWAT Modelling and Multi-Criteria Decision-Making Analysis for Spatial Valuation in Hydropower Development

Ivan Potić, Dejan Đorđević*

Military Geographical Institute – “General Stevan Bošković”, Belgrade, Serbia

*Corresponding author: dejandjordjevic.vgi@gmail.com

This study integrates SWAT modelling with Multi-Criteria Decision-Making (MCDM) analysis to thoroughly assess and evaluate the spatial suitability for small hydropower development. The SWAT model was employed to perform a comprehensive hydrological analysis of the study area, which included detailed assessments of water balance, erosion processes, sediment transport, and the complex interplay of these factors under varying climatic conditions. Furthermore, the analysis examined the potential impacts of climate change on the catchment's hydropower capacity, providing a robust framework for understanding future variability in water resources and ensuring that hydropower projects can remain viable in the long term. The SWAT model's outputs were validated meticulously by comparing simulated results with historical hydrological data and relevant empirical studies. This rigorous validation confirmed the model's accuracy and reinforced its applicability in hydropower planning, particularly in regions with similar hydrological and environmental conditions. The robust nature of the SWAT model enables a precise characterisation of the hydrological dynamics within the catchment, ensuring that the derived data accurately reflects the physical realities of the region, which, in turn, enhances the reliability of subsequent spatial analyses. The outputs from the SWAT analysis were subsequently utilised as critical inputs for the MCDM analysis. This analysis integrated various spatial and environmental factors, including terrain slope, soil type, land cover, proximity to existing infrastructure, and potential environmental impacts. Integrating these diverse datasets allowed for the development of comprehensive grid maps that delineate areas within the catchment most suitable for small hydropower development. These maps identify optimal locations and balance ecological sensitivity with socio-economic considerations, ensuring that development is both sustainable and beneficial to local communities. The findings from this integrated approach provide valuable insights for regional planners and policymakers, offering a scientifically grounded basis for the strategic development of small hydropower projects. This research significantly contributes to advancing spatial planning methodologies in Serbia, highlighting the importance of integrating advanced hydrological modelling with sophisticated decision-support tools in contemporary environmental management and infrastructure development.

Keywords: SWAT modelling; Multi-Criteria Decision-Making analysis; Hydrological assessment; Spatial valuation; Small hydropower plants