Innovations in Environmental Indices, Urban Heat Island Analysis, and Eco-environmental Vulnerability Assessment

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Abstract

This research addresses critical environmental challenges intensified by climate change and urbanization, with a focus on novel environmental indices, urban heat islands (UHIs), and eco-environmental vulnerability assessment. Introducing innovative indices — NDLI (Normalized Difference Latent Heat Index), TMDI (Temperature-Soil Moisture Dryness Index), and SWATI (Surface Water Availability-Temperature Index)—this study provides advanced tools for monitoring land surface wetness and detecting spatio-temporal environmental changes.

The research also explores mechanisms underlying UHI formation and their driving factors, alongside strategies for mitigating urban heat stress and risks associated with changes in urban greenspace patterns. Additionally, it investigates global eco-environmental vulnerability shifts influenced by reduced human activities, highlighting the importance of sustainable geo-health strategies.

By integrating geospatial data, interdisciplinary methodologies, and vulnerability assessment frameworks, this study offers actionable insights to enhance urban resilience and promote sustainable development.

Keywords: NDLI; TMDI; SWATI; urban heat islands; eco-environmental vulnerability; resilience; geospatial analysis; sustainable development.

References - Google Scholar: https://scholar.google.com.tw/citations?user=Q5buHUQAAAAJ&hl=zh-TW