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INFLUENCE OF TOPOGRAPHIC SHADOWS ON REMOTE SENSING VEGETATION INDICES: A CASE STUDY IN TARA NP, SERBIA

Darko Jaramaz¹, Irina Marina Stević¹, Marijana Jovanović Todorović¹,
Darko Jakšić¹, Mladen Petrović¹, Dragan Čakmak², Veljko Perović²

¹Institute of Agricultural Economics; Belgrade, Republic of Serbia

²Institute for Biological Research Siniša Stanković, University of Belgrade; Belgrade, Republic of Serbia

Corresponding author: darko_ja@iep.bg.ac.rs

ABSTRACT

Vegetation indices obtained from optical satellite images enable assessments and monitoring of vegetation cover through an efficient and economically viable approach. Optical satellite images are based on capturing reflected solar radiation that can be blocked by surface topographic characteristics; an object can face away from the sun because of its own slope and aspect (self-shadowing), or one object can block the sunlight of another object (cast shadowing).

The topographic shadows can cause reduced values of remote sensing vegetation indices on high-relief terrains and their surroundings, which impacts the accuracy of the vegetation indices results within the affected areas.

This study evaluates the influences of topographic shadows calculated from a Digital Elevation Model (DEM), in conjunction with sun azimuth and altitude data, on remote sensing vegetation indices: Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI). The Copernicus DEM, as well as the Copernicus Sentinel-2 mission data from March 2025, are employed for research purposes. The research suggests excluding certain parts of the results obtained for vegetation indices due to the influence of topographic shadows within the study area (Tara National Park, Serbia).

Key words: remote sensing, topographic shadows, vegetation indices, NDVI

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ORCID

Darko Jaramaz	[https://orcid.org/0000-0003-1715-1748]
Irina Marina Stevic	[https://orcid.org/0000-0002-5894-363X]
Marijana Jovanović Todorović	[https://orcid.org/0000-0003-2048-0411]
Darko Jakšić	[https://orcid.org/0000-0002-3186-8932]
Mladen Petrović	[https://orcid.org/0000-0002-4390-9711]
Dragan Čakmak	[https://orcid.org/0000-0002-2888-494X]
Veljko Perović	[https://orcid.org/0000-0003-3315-6936]