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EXPLORING THE POTENTIAL OF EO DATA AND GIS FOR ECOSYSTEM HEALTH MODELING IN RESPONSE TO WILDFIRE: A CASE STUDY IN CENTRAL GREECE

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Abstract

In this study, the development of a suitable methodology for establishing and monitoring indicators of Ecosystem Health (EH) and its responses to wildfire using Earth Observation (EO) data synergistically with Geographical Information Systems (GIS) is investigated. The proposed methodology combined GIS and Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper Plus (ETM+) data to assess ecosystem characteristics, including its vigor, organization and resilience, for a case study in Central Greece. These parameters were quantified primarily by utilizing EO-based techniques focusing on the analysis of the Normalized Difference Vegetation Index (NDVI). Topographic features, including slope, aspect and a Compound Topographic Index (CTI) were also derived from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (GDEM), and integrated in a modeling scheme to assess EH. The developed modeling scheme illustrates the effect of wildfires on EH accurately, demonstrating correlations between areas of past wildfires and their associated recovery. Our findings thus provide useful information to land managers and policy makers of fire affected regions alike, and could provide important contributions to the potential development of an operational estimation of EH recovery after wildfire.

Key words: Earth observation, ecosystem health modeling, GIS, resilience, wildfire

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