



A GEOBIA-based approach for mapping Urban Green Spaces using PlanetScope imagery: the case of Athens

Evangelos Dosiadis¹, Dimitris Triantakostas², Ana-Maria Popa³, Spyridon E. Detsikas^{1,2}, Ionut Sandric³, George P. Petropoulos¹, Diana Onose³, and Christos Chalkias¹

¹Department of Geography, Harokopio University of Athens, El. Venizelou 70, Kallithea, 17671, Athens, Greece

²Department of Soil Science of Athens, Institute of Soil and Water Resources, Hellenic Agricultural Organization – DIMITRA, 1 Sofokli Venizelou, 14123, Lycovrisi, Attikis, Greece

³Faculty of Geography, University of Bucharest, Bd. N. Balcescu, 1, 010041 Bucharest, Romania

The technological developments in geoinformatics in recent decades have allowed the inclusion of geospatial data and analysis techniques in a wide range of scientific disciplines. One such field is associated with the study of urban green spaces (UGS). Those are defined as open, undeveloped areas that provide residents with recreational space, improving the aesthetic and environmental quality of the neighboring areas. Mapping accurately their spatial extent is absolutely essential requirement in urban planning and their preservation and expansion in Metropolitan areas are of high importance to protect the environment and public health.

The objective of this study is to explore the use of high spatial resolution satellite imagery from PlanetScope combined with the Geographic Object-Based Image Analysis (GEOBIA) classification approach in mapping UGS in Athens, Greece. For the UGS retrieval, an object-based classification (GEOBIA) method was developed utilizing a multispectral PlanetScope imagery acquired in June 2020. Accuracy assessment was performed with a confusion matrix utilizing a set of randomly selected control points within the image selected from field visits and image photo-interpretation. In addition, the obtained UGS were compared versus independent estimates of the Green Urban Areas from the Urban Atlas global operational product. All the geospatial data analysis was conducted in a GIS environment (ArcGIS Pro).

Results demonstrated the usefulness of GEOBIA technique when combined with very high spatial-resolution satellite imagery from PlanetScope in mapping UGS, as was demonstrated by the high accuracy results that were obtained from the statistical comparisons. With the technological evolution in the Earth Observation datasets acquisition and image processing techniques, mapping UGS has been optimized and facilitated and this study contributes in this direction.

KEYWORDS: Urban Green Spaces, Athens, PlanetScope, Earth Observation, GEOBIA