INTRODUCTION AND OBJECTIVES

The role of humans as integral parts of ecosystems, both driving biogeochemical change and affected by these changes, has only recently been accepted into mainstream ecological thought. The realization that virtually all ecosystems on Earth have experienced some degree of alteration due to human activities highlights the need to incorporate human and their environmental effects on ecosystem function and structure into ecological research. Urban centers are now acknowledged as highly productive areas that support large human populations, yet their ecological characteristics differ significantly from natural ecosystems. Urban centers are characterized by high edge density resulting from buildings, streets, etc. that are reflected in high NDVI and texture values. Current assessment of urban centers and their ecological characteristics is based primarily on physical and biological indicators, which do not provide a useful means of understanding processes in human-dominated systems. Hence, there is a need for novel approaches to understand urban centers as a unique type of ecosystems with unique characteristics.

METHODOLOGY

The authors utilize a matrix of classified NDVI, texture, and spectral classifications as input to calculate Pixel Per Unit Area (PPU) index values. These index values are recast into percent fragmentation (Index Level) values and used with classified NDVI, texture, and spectral classifications to produce land cover classifications for urban centers using a multi-resolution of the import classifications system of Stefanov et al. (2010).

RESULTS AND DISCUSSION

The results presented here are based solely on ASTER data. The high spatial and spectral resolution allows for classification accuracy estimated at 75-80% overall of both built and natural materials, however spatial and temporal coverage of the data is not uniform. This difficulty is overcome by using a weighted average for ASTER data and the incorporation of other datasets (such as Landsat Thematic Mapper, Enhanced Thematic Mapper Plus, and Advanced Land Imager) and sentinel photoctherapy to create a more uniform temporal and spatial dataset for each city.

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