
ABSTRACT
In recent decades, mapping of urban areas and growth has been a vital tool in facing many environmental challenges. In spite of this, a standard operational definition of “urban” is lacking in the GIS and remote sensing literature. Definitions tend to vary depending upon the specific application for which information is required. The purpose of this study was to develop a pixel-level dasymetric technique for mapping urban areas and their change over time utilizing two fundamental criteria for an urban environment: urban population density and the presence of impervious surface. These sources were used complementarily, as remote sensing methods for urban detection neglect well-vegetated areas with urban population density, while the use of population data alone neglects many commercial and industrial areas, blighted or abandoned urban areas, and other developed areas where no one resides. Integrating satellite-derived land-cover data with dasymetrically-derived population distribution data, urban areas and change of the St. Louis Metropolitan Statistical Area (MSA) from 1990 to 2000 are mapped and analyzed. It was shown that the use of one data source alone detects only roughly 73% of the total urban area, which stresses the necessity of using both data sources for urban area delineation. An accuracy assessment was performed on the classification. Both the 1989 and 2000 classifications achieved 89.6% accuracy. The dasymetric results were compared with the original 1990 and 2000 census block population data and covered 82.5% and 84.0% of the same area, respectively.