Paper ID: 27579
student

EARTH OBSERVATION SYMPOSIUM (B1)
Interactive Presentations (IP)

Author: Ms. Polina Lemenkova
Charles University, Czech Republic

EXPLORING CITIES FROM SPACE: THE USE OF EARTH OBSERVATION DATA AND GIS FOR SPATIAL ANALYSIS OF URBAN GROWTH ON THE ISLAND OF TAIWAN

Abstract

In the past decades, the process of urbanization has become more notable in the East Asia. Since past decades, Taipei city (Taiwan Island) undergone serious urban changes. Recently, the country quickly transformed from an agriculture-based traditional economy into a highly industrialized society. Necessarily, this caused notable changes in the face of the country, modifying its landscape patterns. Taiwan is nowadays a highly urbanized country with majority of the total population living in urban areas. The process of urbanization triggered transformation of natural landscapes: land cover types are being transformed into artificial surfaces. Rapid urbanization affects complex interrelations of natural and urban ecosystems, changes their structure, size and shape, which gradually became a serious environmental problem. This paper contributes to the urban monitoring of the city of Taipei during the 15-year period of 1990-2005 using Earth Observation data. In this research the analysis of changes in landscapes has been done using tools of geospatial analysis. Two satellite images Landsat TM have been processed and classified using ENVI GIS software in following steps: data capture, pre-processing, creating color composites, visual landscape analysis, selection of areas of interest, analysis of spectral properties, subdividing classes, classification, spatial analysis, thematic mapping. The chosen classification method (K-means algorithm) enabled visualize situation of land cover types at both satellite images. As a result of classification, the areas occupied by different landscape types have been calculated and analyzed at two time periods: 1990 and 2005. It has been detected that different parts of the city of Taipei were developing with different rate and intensity. Three (3) different residential types of the city were recognized and mapped. The results of this work have following outcomes: 1) detected intensive urban development of the city of Taipei during 15-year time span; 2) detected decline of green areas and natural spaces and, on the contrary, increase in anthropogenic urban spaces; 3) proved different intensity of urban growth in various districts of the city. Finally, the research successfully demonstrated application of the Earth Observation data together with geospatial tools (GIS modules) for urban studies and mapping of the cities.