ESTIMATING URBAN GREEN VOLUME USING AIRBORNE LIDAR DATA AND HIGH RESOLUTION REMOTE SENSING IMAGES

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ABSTRACT: Urban green volume is an important indicator for urban green structural analysis, ecological evaluation, and green-economic estimation. This paper aims at urban green volume estimation combining three-dimensional information from airborne LiDAR data and vegetation information from high resolution remote sensing images in the case of Lujiazui, Shanghai, P. R. China. In this study, the airborne LiDAR data offer the possibility to extract individual trees and measure the attributes of trees, such as tree height and crown diameter. The high resolution remote sensing image is used for identifying the urban vegetation distribution and tree species. The urban green volume is the sum of two broad portion-individual trees volume and grassland volume. The estimation method consists of following steps: generating and filtering the normalized Digital Surface Model (nDSM), extracting the nDSM of urban vegetation based on the NDVI, segmenting the individual tree crowns and grassland, and calculating the urban green volume by different tree species and grassland. The results show the quantity and distribution characteristics of urban green volume in Lujiazui, and provide valuable parameters for urban green planning and management. It is also concluded from this paper that the integrated application of LiDAR data and image data presents an effective way to estimate urban green volume.