"Gheorghe Asachi" Technical University of Iasi, Romania

FACTORS AFFECTING THE PATTERN OF VEGETATION CARBON DENSITY IN A KARST REGION IN NORTHWEST GUANGXI, CHINA

Mingyang Zhang[1,4], Kelin Wang[1,4]*, Huiyu Liu[2], Weijian Luo[3], Jing Wang[1,4], Yuemin Yue[1,4]

[1]*Key Laboratory of Agro-ecological Processes in Subtropical Region, Institute of Subtropical Agriculture,*
Chinese Academy of Sciences, Hunan 410125, China
[2]*College of Geography Science, Nanjing Normal University, Nanjing 210046, China*
[3]*Central South Forest Inventory and Planning Institute of State Forestry Administration, Changsha 410014, China*
[4]*Huanjiang Observation and Research Station for Karst Ecosystems, Chinese Academy of Sciences, Huanjiang, 547100, China*

Abstract

The changing characteristics of vegetation carbon patterns in the karst region of northwest Guangxi, China and their impact factors were analyzed on the basis of vegetation inventory data from 2005 to 2010. A radial basis function network model (RBFN) was constructed using data from 1377 samples and 13 environmental factors. The results for the 5-year study period were as follows: (1) The total carbon storage of vegetation had increased with an annual growth rate of 1.84% and the carbon density of vegetation increased from 29.04 t hm^{-2} to 29.57 t hm^{-2}. The carbon density in the west (>40 t hm^{-2}) was greater than that in the Middle East (<25 t hm^{-2}). Hot spot analysis revealed a random distribution of vegetation carbon density in 2005, but a highly aggregated distribution in 2010. (2) The four most important impact factors on spatial distribution of vegetation carbon density in this area were land type, forest type, forest category, and vegetation type (significance <50%). The least important factors were location, slope, aspect, and elevation (significance of 2–11%). Vegetation carbon density increased significantly with the implementation of rocky desertification control measures. Factors changed by human activities had much greater impacts than topographic factors on the spatial distribution of vegetation carbon density. Therefore, the Ecological Immigration Program, returning farmland to forests, and rocky desertification control measures had an important effect on the pattern of vegetation carbon density.

Key words: Guangxi China, impact factors, karst, northwest, pattern characteristic, radial basis function network (RBFN), vegetation carbon

Received: February, 2014; Revised final: August, 2014; Accepted: September, 2014; Published in final edited form: July 2018

---

* Author to whom all correspondence should be addressed: e-mail: my_1223@163.com; Phone: +86 731 84615208; Fax: +86 731 84612685