

生态学研究

城市生态系统长期研究展望

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摘要:

随着全球和中国的快速城市化, 城市生态系统的长期研究受到了高度关注。在分析城市生态系统结构、格局、过程和功能特点的基础上, 评述了近些年来城市生态系统研究的主要框架和学术观点, 比较了Phoenix、Baltimore和北京3个城市生态系统研究站在研究目的、基本科学问题、研究内容和研究方法上的特点, 并介绍了这3个城市生态站的一些主要研究思路和研究成果, 指出了今后城市生态系统的研究重点是从理论上和研究方法上创新, 将自然过程和人类社会经济过程很好地结合起来, 为城市可持续发展提供科学依据。

关键词: 城市;生态系统;长期演变

Perspectives in Long-term Studies of Urban Ecosystem

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Abstract:

With accelerating urbanization in China as well as in the world, the profound environment impact of urban land has been concerned because urban system consumes large quantities of natural resources and releases large quantities of wastes which contain pollutants. The natural resources over exhausted and air and water pollution seriously deteriorated the urban and suburban environments humans reside in. The degradation in urban environment has attracted the interests of ecologists in the last three decades. The ecology in cities has been developed to ecology of city. The latter as a holistic study focuses on the structure, pattern, process and function of urban ecosystem. It is widely recognized that urban ecosystem is a human dominated system with artificial infrastructure, higher density of inputs and outputs of energy and materials, artificial path and human controlled transportation of energy and materials and high efficient of social and economic production. In 1997, two long term ecological studies programs initiated in Baltimore and Phoenix supported by National Sciences Foundation USA. In 2001, Beijing Urban Ecosystem Research Station was initiated to monitor and investigate environmental changes in Beijing. In this paper, we reviewed the research framework of urban ecosystem developed in recent years, and compared the Phoenix, Baltimore and Beijing long term urban ecosystems studies in terms of goal, basic scientific principles, themes and methodology. The investigation of urban ecosystems should combine social economic and natural physical templates, study the changes in structure and function of urban ecosystem under short term pulses and long term stresses, assess these changes effects on ecosystem services, and formulate policy to manage and regulate urban systems. Beijing Urban Ecosystem Station would aim to understand the evolution of structure pattern process function and to provide scientific basis for preventing water shortage and environmental pollution, raising living quality, and improving social and economic development, by deploying remote sensing technology, long term plots survey, long term stationary and mobile monitoring and social survey, monitoring the structural and functional indicators of urban ecosystem, investigating long term evolution of urban ecosystem, energy and materials flows of urban ecosystem, water resource and utilization, and environmental response of urban organism, and building eco planning, eco management and eco engineering demonstrations for urban sustainable development. Innovations of theory and methodology in urban ecology and coupling physical and human processes in urban ecosystem are important issues for long term studies in the future.

Keywords: Urban ecosystem long-term evolution

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