

干旱、半干旱环境降水脉动对生态系统的影响

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Precipitation pulses and ecosystem responses in arid and semiarid regions: A review.

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摘要

干旱、半干旱环境降水事件通常以脉动的形式发生, 其发生时间、持续时间以及降水强度均具有较大变异性, 降水事件的间断性和不可预知特征导致土壤水分与养分等关键资源的获得也呈不连续的脉动状态. 资源脉动对生态系统的影响涉及个体、种群、甚至群落各个尺度. 本文从干旱、半干旱环境资源脉动对生态系统的影响, 以及生态系统对脉动事件的响应两方面系统综述了近年来的最新研究进展. 指出国内外在资源脉动特征对生态系统的影响、不同生态系统资源脉动效应之间存在的差异、影响资源脉动持续时间的生态水文机制、资源可获得性对生态过程的影响等方面的研究尚处于尝试阶段, 在全球气候变化、降水格局显著改变背景下, 干旱区不同时空尺度资源脉动影响和生态系统响应是未来的研究重点.

关键词: 降水脉动 资源脉动 生态系统响应 干旱半干旱区 土壤水分

Abstract:

Precipitation events in arid/semi-arid environment are usually occurred in “pulses”, with highly variable arrival time, duration, and intensity. These discrete and largely unpredictable features may lead to the pulsed availability of soil water and nutrients in space and time. Resources pulses can affect the life history traits and behaviors at individual level, numerous responses at population level, and indirect effects at community level. This paper reviewed the most recent research advances in the related fields from the aspects of the effects of resources pulses and the responses of ecosystems. It was emphasized that the following issues are still open, e.g., the effects of the pulsed features of resources availability on ecosystems, the discrepancy among the effects of resources pulses in different ecosystems, the eco-hydrological mechanisms that determine the persistence of pulsed resources effects, and the effects of the pulsed resources availability on ecosystem processes. Given the potential global climate and precipitation pattern change, an important research direction in the future is to determine how the resources pulses affect the ecosystem responses at different scales under different climate scenarios.

Key words: precipitation pulses resources pulses ecosystem responses arid and semiarid region soil water

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