

典型草原通量塔通量贡献区地上生物量和叶面积指数的时空变异

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Spatiotemporal variations of aboveground biomass and leaf area index of typical grassland in tower flux footprint.

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- 摘要
- 参考文献
- 相关文章

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摘要

引入循环采样方法,在生长期(7月初、7月末和8月末)测量了典型草原植被生物量和叶面积指数,并利用地统计方法分析了二者的空间分布格局.结果表明:在7月初、7月末和8月末3个时期,地上生物量递增,叶面积指数(LAI)先增大后减小,地上生物量和LAI均具有良好的空间自相关性,二者空间格局相似且具有相似的时间演变规律,由条带状逐渐变为斑块状.从7月初到8月末,地上生物量和LAI的块金值/基台值 $[C_0/(C+C_0)]$ 显著降低,表明其空间自相关程度从中度自相关变为强相关;变程逐渐缩小,空间连续性变差;分维值逐渐降低,空间依赖性增强.地形和草地管理方式是影响草原植被生物量和叶面积指数空间分布格局的重要因素,导致水热因子空间差异,进而对牧草生长产生影响.

关键词: 叶面积指数 生物量 循环取样 地统计 草原

Abstract:

By using cyclic sampling method, the aboveground biomass and leaf area index (LAI) of typical grassland in tower flux footprint were measured at three growth stages, *i.e.*, early July (July 2-7), late July (July 20-26), and late August (Aug. 25-30), with their spatial patterns analyzed by geostatistics. At the three stages, the aboveground biomass of the grassland kept rising, while the LAI decreased after an initial increase. Both the two variables had good spatial autocorrelation, with similar spatial pattern and temporal evolution trend, and changed from stripe to patch. From early July to late August, the $C_0/(C+C_0)$ of the aboveground biomass and LAI all decreased significantly, indicating that the spatial autocorrelation of the two variables changed from medium to high. The change ranges of the two variables gradually decreased, presenting the decrease of spatial continuity. The fractal dimension (D) also decreased gradually, suggesting the increase of spatial dependence. Topography and field management were the main factors affecting the spatial distribution of aboveground biomass and LAI, which induced the spatial variability of water and heat, and further, affected the grass growth.

Key words: LAI biomass cyclic sampling geostatistics grassland

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