

西南地区不同植被类型归一化植被指数与气候因子的相关分析

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Correlation analysis on |normalized difference vegetation index (NDVI) of different |vegetations and climatic factors in Southwest China.

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- 摘要
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摘要

基于中国西南地区1982—2006年的归一化植被指数(NDVI)遥感数据集和气象数据,运用GIS技术对年均气温、年降水量和干旱指数进行插值,分析了西南地区不同植被类型(沼泽、灌丛、草丛、草原、草甸、针叶林、阔叶林、高山植被、栽培植被)NDVI的年际变化及其与气候因子的相关性.结果表明:研究期间,西南地区NDVI、年均气温、年降水量总体呈上升趋势,其中,年均气温的上升趋势达极显著水平,干旱指数则呈下降趋势;在9种植被类型中,沼泽和草丛NDVI呈下降趋势,且草丛的下降趋势达显著水平,其他7种植被类型的NDVI均呈上升趋势,且针叶林、草甸和高山植被的NDVI上升趋势达显著水平,灌丛NDVI呈极显著上升趋势.9种植被类型所在地区的年均气温均显著上升;年降水量的变化均不显著;沼泽、草丛和栽培植被所在地区的干旱指数呈上升趋势,草甸和高山植被所在地区的干旱指数显著下降,其他4种植被类型所在地区的干旱指数呈不明显的下降趋势.研究区灌丛和针叶林NDVI与年均气温呈显著正相关,灌丛和草甸NDVI与干旱指数呈显著负相关.在保持其他2个气候因子不变的情况下,针叶林、阔叶林、高山植被NDVI与年均气温的相关性最大,草丛NDVI与年降水量的相关性最大,沼泽、灌丛、草原、草甸和栽培植被NDVI与干旱指数的相关性最大.气象因子之间存在一定的相关性,如果剔除这种相关性,NDVI与气候因子之间相关的显著性会有所降低.

关键词: 归一化植被指数 温度 降水量 干旱指数 气候变化

Abstract:

Based on the 1982-2006 NDVI remote sensing data and meteorological data of Southwest China, and by using GIS technology, this paper interpolated and extracted the mean annual temperature, annual precipitation, and drought index in the region, and analyzed the correlations of the annual variation of NDVI in different vegetation types (marsh, shrub, bush, grassland, meadow, coniferous forest, broad-leaved forest, alpine vegetation, and cultural vegetation) with corresponding climatic factors. In 1982-2006, the NDVI, mean annual temperature, and annual precipitation had an overall increasing trend, and the drought index decreased. Particularly, the upward trend of mean annual temperature was statistically significant. Among the nine vegetation types, the NDVI of bush and mash decreased, and the downward trend was significant for bush. The NDVI of the other seven vegetation types increased, and the upward trend was significant for coniferous forest, meadow, and alpine vegetation, and extremely significant for shrub. he mean annual temperature in the areas with all the nine vegetation types increased significantly, while the annual precipitation had no significant change. The drought index in the areas with marsh, bush, and cultural vegetation presented an increasing trend, that in the areas with meadow and alpine vegetation decreased significantly, and this index in the areas with other four vegetation types had an unobvious decreasing trend. The NDVI of shrub and coniferous forest had a significantly positive correlation with mean annual temperature, and that of shrub and meadow had significantly negative correlation with drought index. Under the onditions of the other two climatic factors unchanged, the NDVI of coniferous forest, broad-leaved forest, and alpine vegetation showed the strongest correlation with mean annual temperature, that of grass showed the strongest correlation with annual precipitation, and the NDVI of mash, shrub, grass, meadow, and cultural vegetation showed the strongest correlation with drought index. There existed definite correlations among the climatic factors. If the correlations among the climatic factors were ignored, the significant level of the correlations between NDVI and climatic factors would be somewhat reduced.

Key words: normalized difference vegetation index temperature precipitation drought index climate change

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