

新疆不同植被NDVI的变化及其与气候因子的关系

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摘要:

使用归一化植被指数(Normalized Difference Vegetation Index, NDVI)和气象数据研究了全球气候变化背景下, 1982—2003年新疆10种植被类型NDVI时间动态变化及其与气候因子的关系。研究区植被生长季NDVI以0.58%的年平均增长率显著增加, 并且春、夏、秋三季的总体及各种植被类型NDVI都显著增加($P<0.01$); 通过对生长季NDVI和气候因子的相关分析, 发现有5种植被类型与降水量呈显著正相关, 主要是阔叶林、荒漠、草原、草丛和草甸; 与温度显著相关的植被类型为针叶林、灌木、高寒沼泽和高山植被; 农田生长季NDVI与降水和温度均不显著相关。通过研究各个季节不同植被类型NDVI与气候因子关系表明, 春季植被NDVI与温度关系密切, 夏季植被NDVI与降水呈显著正相关关系, 秋季NDVI的增加是温度和降水量共同作用的结果。

关键词: 新疆; 归一化差异植被指数; 趋势变化; 植被类型; 气温; 降水; 气候变化

The Variations in NDVI of different vegetation types in Xinjiang and its relation to climate factors

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Abstract:

The NOAA/AVHRR NDVI data, as an important index, is universally used to analyze vegetation dynamic growth and global climate change. In order to explore the inter-annual variation in various vegetation types, this study analyzes the temporal dynamic of Normalized Difference Index (NDVI) for 10 vegetation types in Xinjiang and investigates the relationships between NDVI and climatic variables over the period of 1982-2003. The results demonstrate that: 1) Average NDVI of the study area increased significantly at rates of 0.58% each year in the growing season (April-October), 0.53% in the spring (March-May), 0.50% in the summer (June-August) and 0.65% in autumn (September-November). The inter-annual variation of NDVI in growing season, spring, summer, and autumn were increased significantly ($P<0.01$). 2) Then the coefficient of correlation(r) ($P<0.05$ or $P<0.01$) was gained to describe relationship between NDVI and climatic variable. The NDVI of 5 vegetation types were related significantly with precipitation ($P<0.05$), the types were broadleaf forest, desert, grassland, herbosa and meadow. The vegetation types related significantly with temperature were coniferous forest, shrub, alpine swamp and alpine vegetation. The correlation of NDVI value with the precipitation and temperature was not significant in growing season of farmland. 3) The NDVI of most vegetation was correlated significantly to temperature ($P<0.05$) in spring, and to precipitation in summer, the increase of NDVI correlated to interaction of precipitation and temperature in autumn.

Keywords: Xinjiang Normalized Difference Vegetation Index (NDVI) trends change vegetation types temperature precipitation climate change

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