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基于拟合物候参数的植被遥感决策树分类

Decision tree classification based on fitted phenology parameters from remotely sensed vegetation data

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中文关键词: [遥感](#) [植被](#) [分类](#) [决策树](#) [物候](#) [时间序列](#) [MODIS](#) [双Logistic函数拟合](#)

英文关键词: [remote sensing](#) [vegetation](#) [classification](#) [decision trees](#) [phenology](#) [time series](#) [MODIS](#) [double logistic function fitting](#)

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中文摘要:

针对目前遥感分类较少利用植被物候特征参数的现状, 该研究以内蒙古自治区额尔古纳、根河两市作为试验区, 基于2012年根河土地覆盖数据, 采用双Logistic函数拟合的方法对跨度范围为2011年7月下旬至2013年7月下旬的时间序列MODIS EVI 数据进行植被物候参数的分析与提取, 并依据物候参数特征构建决策树对试验区土地覆盖进行分类。研究表明, 不同植被的物候有较明显的特征, 森林、草原与作物的生长季开始时间依次滞后, 作物的生长季最短, 森林与草原生长季基本持平; 利用植被物候特征参数进行决策树分类, 作物和森林2种植被类型取得较好分类效果, 分类的总体精度达到73.67%, 优于该区域MODIS土地覆盖产品的总体精度(66.08%)。该研究可为呼伦贝尔地区生态环境评价和农、牧、林业生产活动提供一定的参考。

英文摘要:

Abstract: Phenology refers to periodic plant life cycle events influenced by climate and other environmental factors, such as sprouting, flowering, fruiting and leaves falling, etc. Different vegetation types have distinct growth characteristics, and phenology can be a good representative parameter to classify vegetation types. Phenological parametric analysis is mainly used to find out significant changes in specific time points and extract corresponding characteristic VI values, by analyzing a time-series vegetation index, e.g., start of season (SOS), end of season (EOS), length of season (LOS), max of EVI (MOE) and amplitude of EVI (AOE). These key phenology parameters can be used to classify vegetation types. Eerguna and Genhe in Hulunbeier city, Inner Mongolia Autonomous Region were selected as the study area. A double logistic function fitting method was used to smooth the time series MODIS-EVI data. The time range was from the summer of 2011 (DOY=209) to the summer of 2013 (DOY=193), and the total number of images was 46. Then, 100 points of each land cover type (grass, forest, crops, other non-vegetation) were chosen as classification samples. Five key phenological parameters mentioned above were extracted and used to build the decision tree classifier. The overall classification accuracy of the results reached to 73.67%. The results show that vegetation in Hulunbeier northern region had obvious unique features. The season of forest started earliest (145-160 days, DOY, hereinafter), and ended quiet early (250-275 days); the season of grass started slightly later than forest (160-170 days), but the length of season was similar to forest, both were from 90 to 120 days. The season of crops started late and ended early, so the season of crops was short and concentrated, the length of the samples was from 60 to 90 days. The classification achieved better results than MODIS land cover products (66.08%). Except for grass' user accuracy being a little lower, producer accuracy and user accuracy of the 4 kinds of land cover types reached to 79%. The phenological information extracted in this paper had a high consistency with existing research results; it is shown that monitoring phenology based on time-series EVI data was reliable. This research can provide a reference to ecological environment evaluation and agriculture, animal husbandry, forestry production activities in the Hulunbeier northern region.

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