

基于植被指数的作物产量监测方法研究

Monitoring crop yield using NOAA/AVHRR-based vegetation indices

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英文关键词: crop yield estimation; non-linear regression models; NDVI; VCI; TCI

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中文摘要:

在作物收获以前进行大范围的作物长势评价与作物产量估测, 对粮食供需平衡、贸易、农业政策制定非常重要。该文收集了1984年到2002年的NOAA卫星和农业统计资料, 计算耕地范围的植被状态指数VCI、温度状态指数TCI和植被生长状态指数VHI, 分析了遥感植被指数与作物产量间的相关关系, 分别建立了基于植被指数的线性回归模型和非线性回归模型。结果表明, 遥感植被指数与作物产量间存在较好的相关性, 其非线性回归模型在拟合精度上高于线性回归模型。研究目的是利用卫星资料得出应用于监测作物长势的植被指数, 建立作物产量监测模型, 应用于农作物遥感监测业务化运行系统。

英文摘要:

Satellite remote sensing is the most effective means to monitor crop production on a regional scale. When figuring the vegetation growth condition and distribution on a large scale, vegetation indices derived from NOAA polar orbiting satellite work better than meteorological data derived from weather station. In this paper, vegetation indices including VCI (Vegetation Condition Index), TCI (Temperature Condition Index) and VHI (Vegetation Health Index) are extracted from 16 km seven-day composite NOAA AVHRR/NDVI time series images. Then, the values of VCI, TCI and VHI distribution on arable land were calculated. Based on the calculated vegetation indices and the crop yield statistical data, the linear regression models and the non-linear regression models were established, respectively, to express the relationships between the vegetation indices and crop yield. The major conclusions in this study are (1) the vegetation indices and crop yield have good correlation in a certain week of the crop growth season, (2) the fitting accuracies of the non-linear regression models are much higher than those of the linear regression models, namely, the results obtained from the non-linear regression models are more accordant with the agricultural statistic data in comparison with those from the linear regression models. Those methods can be used in the operational system of crop yield estimation on a national scale.

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