利用EOS-MODIS数据提取作物冠层温度研究

Algorithm for estimating crop canopy temperature using EOS-MODIS data

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英文关键词：crop canopy temperature; land surface temperature; linear mixture model; VI-Ts method; EOS-MODIS Data

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中文摘要：

利用EOS-MODIS遥感数据，基于线性混合模型，提出了一种新的作物冠层温度反演方法。首先，利用EOS-MODIS数据提取了陆地表面温度LST和植被指数NDVI。然后，假定地表只有植被和裸地两种组分，通过植被指数温度VI-Ts方法来估算裸土的组分温度，作物冠层温度通过线性混合模型来求解。为了验证反演的地表温度和冠层温度的精度，把反演的地表温度与NASA MODIS地表温度产品进行差值运算，在差值图像中90%以上的像元灰度值分布在-1和1之间，像元灰度的平均值小于0.5；同时在河北固城农业气象试验站对冬小麦冠层温度进行同步观测，通过与反演的冠层温度进行比较，其误差在±1.5℃左右。结果表明，文中所提出的作物冠层温度反演方法精度较高，其结果能够满足有关作物生长模型以及土壤水分模型对输入参数的精度要求。

英文摘要：

Land Surface Temperature(LST) observed from satellite-platform is mixed temperature by various objects. How to estimate component temperature of vegetation in a pixel has become a hot issue all over the world. In this article, a new approach to extracting the component temperature of vegetation based on linear mixture model was developed. In this algorithm, firstly, land surface temperature and Normal Difference Vegetation Index(NDVI) were retrieved from EOS-MODIS Data. By comparison, the retrieved LST is almost consistent with the NASA MODIS LST product. Then, the landscape was simplified as a mixture of vegetation and bare soil. The component temperature of bare soil was estimated by using VI-Ts method and component temperature of vegetation was obtained from the linear mixture model. In order to check the performance of the algorithm, the retrieved component temperature of vegetation was compared with validation data observed at a few test sites in Hebei Province and the accuracy of the algorithm is within ±1.5℃. The research results show that the algorithm for estimating crop canopy temperature presented in this paper has higher accuracy, which can meet the accuracy requirements of related crop growth models and soil moisture models.

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