研究论文

用MODIS数据监测冬小麦冠层反照率变化信息的方法研究

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摘要　　采用冬小麦主要生育期内冠层反照率的地面观测数据和MODIS反照率产品数据，分析了在冬小麦生长期时间序列上MODIS遥感图像端元反照率与地面观测不同空间尺度反照率的变化规律。提出了基于高空间分辨率图像分类的先验知识提取MODIS端元反照率的方法。研究结果表明，MODIS端元反照率与地面观测反照率随冬小麦生育期的变化趋势相同，两种观测尺度反照率的观测值差别小于4%，研究方法为MODIS反照率产品在大面积农田研究中的应用提供了参考。

关键词　　反照率　空间尺度　冬小麦　生长期　MODIS反照率产品

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An Approach on Monitoring the Albedo of Winter Wheat at Growing Period by Using MODIS Data

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Abstract Albedo is an important parameter reflecting the energy balance of winter wheat field. For monitoring the albedo changing during winter wheat growing period, the albedo measured by the albedometer in ground fields can't represent the spatial distribution well. So the remote sensing data should be helpful if we can use them effectively. MODIS（moderate resolution imaging spectro-radiometer）data products are used widely in many remote sensing application fields now. Validations are necessary before using the MODIS albedo products in the large-area crop research. Due to the different scales between MODIS albedo product and the albedo measured in ground field, some data processing method should be adopted. In this paper a method based on prior knowledge was developed to validate the MODIS albedo products and how albedo changed in the winter-wheat's growing period in different spatial scales was analyzed. The available albedo observations included two scales: ground measurements by albedometer and MODIS albedo products. And the ground data was acquired in Luancheng, Hebei Province, North of China from March 20, 2001 to May 31, 2001. So did the MODIS data. The ASTER classification image was used as prior knowledge to unmixed the MODIS imagery and got the albedo of endmember(winter wheat). The results presented this method can unmix the MODIS pixels well. Fig.4 was the comparing result of the winter wheat's albedo between satellite observation scale and ground measurements scale, in which the same trend existed at every growth stage and the maximum discrepancy of the value was less than 4%. The following conclusions are: (1) from reviving to heading and flowering, due to the rapid rise of leaf area index and partly the impact of the soil background, albedo is ascending but in a little range and the maximum appears at booting and flowering period; from heading and flowering to maturity, albedo is descending and reaches the lowest before maturity; then, as the wheat becomes ripe, the leaf turns yellow and the albedo rises again. (2) the monitoring result above is also fit to the MODIS data. So, in this research, the applicability of MODIS products in monitoring the albedo changing of winter wheat crop canopy of North of China was validated. The results are also taken to explain the changing rules of winter wheat's albedo in its growing period with different spatial scales. It is very valuable to further application of remote sensing data in large-area crop research.

Key words Albedo　Spatial scale　Winter wheat　Growing period　MODIS albedo product

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