THE METHOD ON GENERATING LAI PRODUCTION BY FUSING BJ-1 REMOTE SENSING DATA AND MODIS LAI PRODUCT

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1. INTRODUCTION

About 30% of the earth is covered by land and much of this is vegetated. Terrestrial vegetation impacts climate by playing a key role in various processes of energy, mass, and momentum exchanges. Remotely sensed hyperspectral data offer considerable potential for obtaining information about the earth surface. LAI(Leaf Area Index) is a biographic parameter determining vegetation photosynthesis, transpiration, and the energy balance of canopies[1]. LAI(Leaf Area Index) is defined as one-side green leaf are per unit ground area in broadleaf canopies and as the projected needle leaf area in coniferous canopies. LAI is a key environment variable controlling an exchange of fluxex of energy, mass(e.g., water and CO2) and momentum between the Earth's surface and the atmosphere[2, 3]. And LAI is also the important parameter to descript the vegetation canopy structure and growing statues.

In this paper, the main object is to study on the method of the leaf area index inversion for producing Beijing-1 LAI product. In this paper, the computer simulation model: Radiosity model is used, which can simulate the 3D realistic scenes of vegetation (such as crops and forest) in the whole growing period, and get their radiation regime. We can product the look up table of the vegetation structure parameters, sun direction, view geometry and the corresponding simulated spectrum. In addition, lots of measured data of structure parameters and spectrum for many types of vegetation is accumulated in China Typical Land Objects Spectral Database. So we use the look up table data and measured data as the input data by neuronal network for LAI inversion of Beijing-1 images. Based on the Beijing-1 LAI inversion, the second object of this paper is to generate the high spatial and high temporal resolution LAI product by fusing BJ-1 data and MODIS LAI products..

2. MATERIALS AND METHODS

2.1 Study sites and Data

In this study, the field experiment sites are Shun Yi, Beijing,China and Luan Cheng, Heibei province, China. And the dates of Beijing-1 images imaging are 16 March, 06; 14 May, 06 and 17 June, 06 respectively. In order to get the time serial LAI variation, MODIS products (MOD15A2 and MOD12Q1) are used. The MODIS land cover product (MOD12Q1) version 4 was used to investigate the biome assigned to the region of the study sites. The latest available MOD12Q1 product for our study period was 2004 and the product was used with the assumption that the biome distribution does not change with a year. And The eight-day composites of the LAI/fAPAR products(MOD15A2) version 5 pertaining to study sites were downloaded from the Land Processes-Distributed Achieve Center(LP-DAAC) Internet site [4].

2.2 Methods

we use the field measured data and the simulated data, such as LAI and spectrum of winter wheat, summer maize, grass and forest ,as the training data in the neuronal network to get the relationship between LAI and reflectance in green, red and NIR band. And the trained relationships for above four types of vegetation, are used to inverse LAI of BJ-1 data.

Based on the Beijing-1 LAI estimation, the second object of this paper is to generate the high spatial and high temporal resolution LAI product. One method is proposed to get high spatial and temporal resolution LAI product by fusing the time-series MODIS LAI product(1 km, 8-day product)and Beijing-1 LAI. In this method，the Beijing-1 classification image is used to register with MODIS data, then the percentage of classes of PFT classification in the MODIS pixel can be calculated, and the time series LAI at every land types can be obtained through linear unmixing. At last，the Beijing-1 LAI is used to adjust this curve of time series LAI, and to estimate the LAI at high spatial and temporal resolution.

3. RESULTS AND DISCUSSION

Because of the low spatial resolution, although MODIS LAI can give us time serial data, can't meet our study need. In this study, based on the BJ-1 LAI estimation, fusing on time series MODIS LAI products, and the BJ-1 LAI is used to adjust this curve of time-series LAI, we generate the high spatial and temporal resolution LAI product of Beijing-1 images. And this method is very useful for us to get high spatial and temporal resolution LAI product by fusing the data with low spatial resolution, but high temporal resolution and the data high spatial

resolution, but low temporal resolution, and taking its advantages, respectively. So we can get the right data for our study. Through this study, we can get the LAI products of Beijing-1 images, which is with the high spatial resolution and high time resolution (32m, 4-day product). This product will provide more information of vegetation for BJ-1 microsatellite data applications.

4. REFERENCES

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