

MODIS-NDVI-BASED CROP GROWTH MONITORING IN CHINA AGRICULTURE REMOTE SENSING MONITORING SYSTEM

HUANG Qing¹, TANG Huajun¹, QIN Xianlin², YANG Guixia¹, RENJianqiang¹

(1. Institute of Agricultural Resources and Regional Planning of Chinese Academy of Agricultural Sciences, Beijing, China 100081 2. Research Institution of Forest Resources Information Techniques of Chinese Academy of Forestry, Beijing, China 100081)

1. ABSTRACT

China Agriculture Remote Sensing Monitoring System (CHARMS) was established in 2001 by Key Laboratory of Resource Remote Sensing and Digital Agriculture, Ministry of Agriculture, China. The main purpose of CHARMS is to monitor agricultural condition using remote sensing techniques and to provide basis information for government decision-making and agricultural production management. It has realized operational crop acreage changes monitoring, crop growth monitoring, agriculture disasters (drought, floods, frost damage, pest etc.) monitoring and crop yield estimation since then. The monitoring and predicting results have played a great role in keeping abreast of the latest agriculture condition. CHARMS can monitor crop growth condition of spring wheat, winter wheat, spring maize, summer maize, cotton, soybean and paddy rice with MODIS data. MODIS-NDVI-Based basic principles, methods and regular operation of crop growth monitoring in CHARMS as well as the application of monitoring results are presented in detail in the paper.

As we all know that, vegetation index is an important parameter which carries abundant information of earth surface vegetation properties. NDVI(Normalized Difference Vegetation Index)which can be generated from the red and near-infrared bands of the MODIS data enhance the identify capacity to soil background and weaken the impact of atmosphere and terrain shadow, and NDVI values increase with the growth of the crops, and gradually decrease after reaching the maximum at a

certain growth stage of the crops. NDVI has more advantages in monitoring crop growing condition than other index.

An improved NDVI difference model was used in crop growth monitoring in CHARMS. Firstly, each day MODIS data covering the whole China are received and processed, and the fifteen-day, cloud-free NDVI maximum value image of main crop were composited, then, we use two methods to analyze the crop growth. The first method is to compare the NDVI of a certain period with the data of the period in the history (last five year, mostly), the difference between NDVI can indicate the spatial difference of crop growth at a certain period. We can also analyze the crop growth by grading NDVI values of a certain period. Then Meteorological data of temperature, precipitation and sunshine etc. as well as the field investigation data of 200 network counties were used to modify the models parameters. Usually three levels were used to assessment the crop growth condition, they are better than usual, usual and worse than usual, or well, general and bad, Lastly, crop growth condition was assessment at four different scales of county, zones, main producing areas and provinces, and spatial distribution maps of crop growth condition were also created. The results of crop growth monitoring in CHARMS are invaluable to farmers, decision makers, analyzers etc..

Keywords: Remote Sensing, Crop Growth Monitoring, China Agriculture Remote Sensing Monitoring System(CHARMS), NDVI, MODIS data, China

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