

# **A STUDY ON LAND COVER CLASSIFICATION BASED ON HJ-1 CCD IMAGE**

Yuhuan Ren<sup>1,2</sup>, Yalan Liu<sup>1</sup>, Junchuan Fan<sup>1,2</sup>, Hua Xu<sup>1,2</sup>, Ling Yi<sup>1</sup>

<sup>1</sup>Institute of Remote Sensing Applications, Chinese Academy of Sciences, P.O.BOX 9718, Beijing, 100101

<sup>2</sup>Graduate School of Chinese Academy of Science, 100049

Email:renyuhuan\_2001@163.com

## **1. INTRODUCTION**

Study on status and change of land cover is one of the important contents for research on change of global environment. With the development of remote sensor and computer technology, remote sensing technique has become one of the most effective means to acquire land cover information. The environment and disaster monitoring and forecasting satellite constellation (HJ-1 satellites) have multi-sensor onboard and the two optical satellites (HJ-1A and HJ-1B) have been launched on Sep. 6<sup>th</sup>, 2008. There are multi-spectral CCD cameras on both of these two satellites. The CCD camera has four bands whose wavelength ranges and spatial resolution are all similar to the first four bands of Thematic Mapper (TM), while its image coverage is 14 times that of TM image and its revisit frequency is 8 times that of TM image. Thus, a study on land cover classification utilizing HJ-1 CCD image can be quick and broad. Taking Zhongshan County in Guangxi province as study area, this paper studies on the best method of land cover classification based on HJ-1 CCD image.

## **2. DATE PREPARATION AND INTERPRETATION KEYS SETTING**

Data used in this paper include HJ-1 CCD image, China Brazil Earth Resources Satellite (CBERS) image and the topographic map. Before land cover classification, image pre-processing is needed. The pre-processing includes geometric correction, image masking using the boundary of study area and contours interpolation to obtain the Digital Elevation Model (DEM). Referring to the classification system of land resource remote sensing-based survey and the characteristics of study area, this paper establishes a land cover classification system, which has seven first-degree classes and eleven secondary classes, and sets the interpretation keys for each class on HJ-1 CCD image.

## **3. METHODOLOGY**

There are generally two kinds of classification method<sup>[1]</sup>, one of which is unsupervised classification while the other is supervised classification. Since precision of the former method is usually very low leaving a complicated post-classification behind, this study adopts supervised classification. Times of experiments and

compares with visual interpretation show that, among all traditional supervised classification methods, result of maximum likelihood classifier matches facts best, especially for the first-degree classes. Besides of maximum likelihood classification, this paper attempts hierarchical classification using threshold of NDVI and near-infrared band, and gets a satisfying result.

As the study area is located at the mountainous area, land cover classification is inevitably affected by the difference of topographic effect and sun elevation angle, and it is difficult to achieve high accuracy of classification just using spectral feature. This study adopts two approaches to eliminate the effect of topographic, the first of which is using NDVI as a new band to classifier as well as the original four bands and the second is using DEM as a new band<sup>[2]</sup>. The result of the first approach improved a little, but it's not good enough, while the second result improved distinctly, especially for the confusion of forest and farmland.

Furthermore, it is hard to extract linear objects, such as road and river, by automatic classification<sup>[3]</sup>. Hence, this paper presents a high pass filter algorithm and applies it to HJ-1 CCD image. Experimental result shows that the algorithm is effective to enhance the linear features and helpful to extract them.

In order to get a better result, it needs visual interpretation to modify the automatic classification result according to the feature of shape, size, texture, location and so on. It should be noted that the automatic classification result is closely related to the training samples.

#### **4. CONCLUSION**

Comparing the land cover classification result with visual interpretation and CBERS image, it shows that HJ-1 CCD image can be used to land cover classification while the most suitable classifiers are maximum likelihood classifier and hierarchical classifier. Simultaneously, classification aided by topographic data can, in a certain extent, improve the classification accuracy. In addition, linear feature, which is difficult to extract on medium spatial resolution image, can be extracted easily after process of high pass filter.

#### **REFERENCE**

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