HIGHER RESOLUTION GLOBAL LAND COVER MAPPING

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ABSTRACT:

Global land cover data is fundamental for many application areas, especially for global sustainability studies. Several global land cover data products at 1 km spatial resolution have arisen from different national or international initiatives. With a focus on mapping different vegetation types worldwide, they were developed with coarse-resolution remote sensing data and using different mapping approaches. The inconsistencies and uncertainty of these data products have been studied and limited their utilization in global environmental change studies and earth system simulation. It is therefore necessary to develop new global land cover products with higher spatial resolution and standardized mapping approaches.

A new global land cover mapping project has been launched recently by the Ministry of Science and Technology of the Peoplefs Republic of China to meet with the needs of global environmental change studies and earth systems simulation. This project aims at developing higher resolution land cover data set with a combination of land resources and weather satellites. Its overall objectives are to develop a new land cover classification system that is more applicable to earth system simulation and global environmental change studies, to produce more accurate global land cover data products for the year 2000 and 2010, and to apply these products in change detection and earth system modeling efforts over typical regions in the world. Primary data sources will include Landsat data and MODIS data acquired around year 2000, and Landsat-class data primarily acquired around year 2010 with Chinafs own satellites including HJ and Beijing-1 satellites in combination with MODIS data and Chinese weather satellite data. While the minimum mapping unit is 30 m, the final products will include aggregated land cover types and cover proportion at the 250 m level of spatial scale. The period of this project is from Jan.1, 2010 to Dec.30, 2002.

This paper will present the overall design and major research issues of this project. Radiometric and geometric correction algorithms will be developed for large volume data handling of global images. A hierarchical land cover classification approach will be adopted with eco-region classification done first and more detailed land cover classification done within each eco-region. Both computer based image classification algorithms and manual image interpretation techniques will be assessed, selected and employed for different types of eco-regions. New algorithms that are suitable for mapping individual land cover categories such as human settlements, impervious

surfaces, and water bodies will be developed. Ensemble classifiers will be assessed and developed to classify certain land cover types that cannot be well differentiated by individual classifiers. An international research network will be established to support the development of a widely acceptable land cover classification system, the collection of ground samples from various parts of the world, and the accuracy assessment.