

GC31B-0473 Annual Changes of Paddy Rice Planting Areas in Northeastern Asia from MODIS images in 2000-2014

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Knowledge of the area and spatial distribution of paddy rice is important for assessment of food security, management of water resources, estimation of greenhouse gas (methane) emissions, and understanding avian influenza virus transmission. Over the past two decades, paddy rice cultivation has expanded northward in temperate and cold temperate zones, particularly in Northeastern China. There is a need to quantify and map changes in paddy rice planting areas in Northeastern Asia (Japan, North and South Korea, and northeast China) at annual interval. We developed a pixel- and phenology-based image analysis system, MODIS-RICE, to map the paddy rice in Northeastern Asia by using multi-temporal MODIS thermal and surface reflectance imagery. Paddy rice fields during the flooding and transplanting phases have unique physical and spectral characteristics, which make it possible for the development of an automated and robust algorithm to track flooding and transplanting phases of paddy rice fields over time. In this presentation, we will show the MODIS-based annual maps of paddy rice planting area in the Northeastern Asia from 2000-2014 (500-m spatial resolution). Accuracy assessments using high-resolution images show that the resultant paddy rice map of Northeastern Asia had a comparable accuracy to the existing products, including 2010 Landsat-based National Land Cover Dataset (NLCD) of China, the 2010 RapidEye-based paddy rice map in North Korea, and the 2010 AVNIR-2-based National Land Cover Dataset in Japan in terms of both area and spatial pattern of paddy rice. This study has demonstrated that our novel MODIS-Rice system, which use both thermal and optical MODIS data over a year, are simple and robust tools to identify and map paddy rice fields in temperate and cold temperate zones.

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