

## Analyses on Paddy Field Changes in Sangjiang Plain, Northeast China by Satellite Remote Sensing

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### 1. Introduction

The iron supplied by Amur River may keep productivity in Okhotsk Sea, however, recent land use/land cover changes (LUCC) in the Amur River Basin raise the concern to the reduction of iron content transported to the sea through the river. Land use/land cover changes in the Amur River Basin should be monitored, and we have to realize important changes and areas to maintain better relationship between human and nature. This paper first shows the basin scale land use/land cover changes by satellite imageries, and then try to demonstrate the land use/land cover changes among paddy crop field and wetland in Shangjiang plain, China, as important area of note. Significant changes were found at Chinese Shanjiang plain where approximately 10 thousand km<sup>2</sup> of wetland was reclaimed to paddy fields from 1980 to 2000.

### 2. Analysis on major landcover change -Changes in paddy field-

#### 1) Analyses of China 1km land use mesh maps

Currently, circa.1990 and circa.2000 maps are available to draw the land use over China. There are 25 classes including paddy field and crop land. Comparison between two maps reveals that paddy field was increased in Jiamusi and Baoqing areas.

#### 2) Verification of paddy area changes by Landsat-TM

By using Landsat TM imageries in 1990 and 2000, extraction of paddy field is attempted to verify the China 1km land use map.

In 114-27 scene, three images on 12/Apr./'90, 12/Jun./'89, and 16/Sep./'89. are available which correspond to before irrigation period, and after harvest. NDWI (normalized difference Wetness Index) is used to extract the region with high NDWI in June as paddy field. The delineated area well correspond to the circa.1990 land use map.

In 115-27 scene, images on 17/Jun./2000 and 21/Sep./2000 are available. The Jiamusi area with Luobei, Tangyuan, Suibin, and Huachuan area near the junction of Amur and Songhuajiang are recognized as intensive paddy area, which well agree with circa.2000 land use map.

These results show that the distributions of paddy field indicated on the China 1km mesh map are acceptable, and the area is increasing between circa. 1990 and circa.2000.

#### 3) paddy area change in latest years by SPOT/VEGETATION

Annual changes in NDVI and NDWI at paddy field is characterized by sharp increase in early summer. In 2000, NDWI had increased at 14th ten-days. NDWI had Decrease at 20th ten-days. NDVI had increased at 20th ten-days. This signal can be used to extract paddy field from sequence of NDVI imageries. Based on the rice phenology, the area of paddy field is extracted by SPOT/VEGETATION NDVI and NDWI imageries, and changes between 1998 and 2008 are examined.

Keywords: remote sensing, Sangjiang Plain, paddy field, wetland, LUCC, agriculture