LAND COVER CHANGES IN THE WESTERN SIBERIAN GRAIN BELT.

IMPLEMENTATION OF A REMOTE SENSING-BASED MONITORING SYSTEM.

ANDREAS VÖLKER[1], ALEXANDRA BICSAN[1], DMITRY PISLEGIN[2], ANDREJ SOROMOTIN[2], ANDREAS MÜTERTHIES[1]

[1] EFTAS Fernerkundung Technologietransfer GmbH, Oststr. 2-18, 48145 Münster, Germany, info@eftas.com
[2] Tyumen State University, Research Institute of Ecology and Natural Resources Management, Semakova ul. 10, 625003 Tyumen, Russia, info@niiecology.ru

Land cover monitoring is a key element for the regional implementation of management tools and adaptation strategies to climate change in the Western Siberian grain belt (Tyumen Oblast, Russia). Especially environmental and agricultural monitoring duties can be ideally supported by a remote sensing monitoring system for land use changes, that was developed, evaluated and implemented within the subproject "Analysis and monitoring of land cover and current land use change" of the joint project SASCHA - Sustainable land management and adaptation strategies to climate change for the Western Siberian Grain Belt.

A time series of Landsat images (~1990, ~2000 and 2011, 30 m / Pixel) was used for a supervised, object-based classification of three test sites within the Tyumen Oblast. The results show a noticeable change of agricultural landscape structures, in detail a decrease of cropland areas in two of the three test sites. These results are an important step in understanding landscape transformations and its relations to climate change within the SASCHA project. For the continuation of this time series, the above-mentioned remote sensing monitoring system was used for a supervised, pixel-based classification of RapidEye images from 2012 with a considerable higher resolution of 5 m / Pixel.

The SASCHA monitoring system is a software with a user-friendly interface to support local environmental monitoring duties. Reference data from different sources can be imported in order to support a supervised classification of satellite images or aerial photographs for agricultural, ecological or survey-specific monitoring tasks. A change detection module is directly integrated into the software, which enables the user to execute analyses of land cover changes, the increase or decrease of certain land use and land cover classes can be visualized and exported. For processing large-scale monitoring tasks, a batch processing module for calculating numerous satelite images in a row is implemented.

The final step within the project is the use-case-based evaluation of the monitoring system and its classification results at the Research Institute of Ecology and Natural Resources Management of Tyumen State University as a preparation for the final presentation to external stakeholders from agricultural business and administration.