GC31B-0470   Land Use Change Mapping from Multi-Temporal Earth Observation Data in the Siberian Kulunda Steppe

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Wednesday, December 17, 2014   08:00 AM - 12:20 PM
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Most of the temperate grassland of the Siberian Kulunda Steppe in the Altai Krai region of Russia was converted into intensely used farmland in the 1950`s following the directives of the 'virgin lands campaign' (russ. Zelina). The area under investigation comprises around 80.000 km² and belongs to the 'granary' of Russia, which is elementary for food supply of the increasing population. On the other hand inadequate and antiquated cultivation and agricultural management practices, e.g. acceptance of precipitation values of less than 250mm/year for farming, have caused ecological and socio-economic problems, e.g. degradation, desertification, and yield losses. The aim of the KULUNDA project is the development of sustainable land management policies and practices to stabilize agricultural yields and minimize the ongoing degradation and desertification processes.

The focus of the study is the quantification and assessment of land use and land cover change. Therefore multi-temporal and multi-sensor satellite images were used to classify the land cover and perform change detection on specific land cover classes. For the earliest acquisition Landsat 4/5 TM scenes from 1989 with a medium ground resolution of 30 m were chosen and mosaicked. The second time step is a Landsat 7 ETM+ mosaic from the years 1999 and 2000 with 30 m ground resolution. The third acquisition represents the actual situation, acquired in 2013/14 by the RapidEye satellites (mosaicked and resampled to 30 m pixel size). The three mosaics were classified with an object-based approach into six land cover classes: Cropland, Woody vegetation, Herbaceous vegetation, Water areas, Salinization & Clouds, and Settlements. Afterwards a post-classification change detection identified areas of change and no change especially for cropland and steppe regions. Final statistics were provided for districts (russ. Rajon) and steppe types quantifying the change within the past 25 years.

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