25. Disturbance and Forest Cover Change Mapping in Siberia with Earth Observation

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Abstract

Land cover is fundamental for carbon cycle observation or assessment. In the SIBERIA-II project , the land cover product has two main objectives: 1) provide initial conditions for Dynamic Vegetation Model (DVM) calculations and 2) provide a land cover map to update the current information in the GIS database. The main objectives of the EC-project SIBERIA-II are the integration and combination of multi-sensor, spectrally and temporally diverse, remotely sensed data and ecological regional models in order to assess the impact of terrestrial biota on the budget of major greenhouse gases (GHGs) in Northern Eurasia. An operational, fully automated method for land cover classification has been implemented. The method has been developed based on MODIS data, but allows the explicit use of additional remote sensing data (e.g. MERIS and ASAR) and ancillary information (including discrete sources such as the tree line, vegetation zones, etc.). Following discussions with users of the DVM's and also with the GOFC-GOLD (Global Observation of Forest and Land Dynamics) panel, the classification scheme of the land cover product has been modified. After closer examination a new scheme has been defined based upon the GLC2000 classification allowing a direct comparison between the two products during the validation process. Extension of this work is planned e.g. in form of the SIB-ESS-C structure (Siberian-Earth System Science Cluster) and the disturbance mapping in the framework of the ALOS Kyoto & Carbon (K&C) Initiative. The objective of the high resolution forest change information product in SIBERIA-II is the development of a classification methodology for Afforestation, Reforestation and Deforestation mapping in Siberia according to the Kyoto Protocol. The change detection method proposed is based on image segmentation into object primitives and on attribution of object characteristics (spectral information, object shape, texture and relations to sub-objects in different scales). A complex landuse change and forest cover change class hierarchy is developed that uses postclassification features, object context information and object shape characteristics for classification.