Forest Monitoring in the Framework of a Regional Information System for Environmental Protection

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The Irkutsk Regional Information System for Environmental Protection (IRIS) will assess the current status and dynamics of the Irkutsk Region's forestry environment, influenced by man-made changes and anthropogenic impact arising from pollution sources and other negative anthropogenic drivers located in the region and in adjacent areas. It will investigate the responsiveness and vulnerability of forestry environment within the Region under different scenarios of industrial development and nature-preserving measures. The output of the project is the adaptation of the existing GIS layers, completion and transfer into operative testing and exploitation a simplified version of the Regional Information System that serve as a prototype for other regions of Northern Eurasia. One of essential components of IRIS will be an Open Source GIS. The use of common languages such as XML or GML enables easy integration between systems. OpenGIS supports the easy retrieval of geospatial information in a distributed environment, regardless of physical location of the data.

The GSE Forest Monitoring service provides another powerful tool for effective forest monitoring and inventory at regional scale. Reliable and up-to-date information on forest characteristics and changes therein are required by the State Forest Service of Irkutsk General Survey of Natural Resources (FS of GSNR) in order to fulfil several international and national treaties, for its own forest policy as well as to perform the task of delivering data to the federal level. Forest area maps will be generated using high-resolution, cross-polarized Envisat ASAR precision images acquired at large incidence angles (swath 7). Main processing steps include image preprocessing, image segmentation, computation of object statistics, image classification and accuracy assessment. Change detection analysis will be performed by comparing the derived forest area map with existing land cover maps. For quality control and product verification archived Landsat TM5 and Landsat ETM 7 as well as ground reference data will be used. The approach includes a documentation of the applied methodology as well as the assessment of product quality and accuracy. The acceptability threshold of the thematic mapping accuracy is 90% for forest areas and 85% for forest area changes, respectively.