

NELDA: Monitoring and Validating the Distribution and Change in Land Cover across Northern Eurasia

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The proposed Northern Eurasia Land Dynamics Analysis (NELDA) project seeks to harness NASA remote sensing technology and local knowledge of land-cover conditions in order to validate and improve land cover / land-cover change products for Northern Eurasia. Given the importance of Northern Eurasia for global ecosystem and climate processes, improved characterization of land cover and land-cover change in the region is a scientific priority. While multiple moderate and coarse-resolution land-cover products have been developed, their validation remains a challenge, particularly for boreal and temperate Northern Eurasia where validation sites are sparse, several land-cover types are unique, and processes of ecosystem disturbance and land-cover change are widespread, including fire, timber harvest, insect outbreaks, agricultural conversion and abandonment, melting permafrost, and forest re-growth. Coarse-resolution sensors such as MODIS can track many forms of vegetation change, and the MODIS record is now long enough to support monitoring of ecosystem disturbance and recovery.

The NELDA project will establish a network of test sites for analyzing land cover, land-cover change, and disturbance captured with time series of Landsat-resolution imagery. Analyses at test sites will rely on recent or ongoing projects and strong regional collaborators with local experience in land cover mapping and change monitoring. The test sites will provide data for validation of existing coarse-resolution land-cover products and samples of important vegetation change and disturbance processes. We will use these samples to develop and test methods for continental mapping of disturbance that integrate MODIS datasets (e.g., active fires, burned areas, NDVI time series, changes in Vegetation Continuous Fields, phenology products) to produce a vegetation disturbance / change map for the period of 2000-2006. Finally, we will produce a new, updated land cover map for Northern Eurasia based on MODIS data for circa 2005 at 500-m spatial resolution. By improving the training data-base, exploiting the high quality spectral-temporal information from MODIS, and integrating information from the GLC-2000 map directly into the classification process, we will produce the "best possible" map of land cover for the Northern Eurasia region. This new map will include a confidence layer, which provides a measure of the classification quality for each pixel, and a disturbance layer, which shows if a pixel was disturbed since year 2000.

The project will develop tools, methods, data, and collaborations needed to better characterize land-cover dynamics across the Northern Eurasia

region and help consolidate a regional network of test sites and researchers dedicated to monitoring land-cover change.