



## **Land-Cover and Land-Use Change under Changing Climate in the Eurasian Arctic**

G. Gutman

NASA Headquarters, 300 E Street SW, Washington, DC 20546, USA (ggutman@nasa.gov)

An overview of the studies conducted in the framework of the NASA Land-Cover/Land- Use Change Program focused on the Eurasian Arctic will be presented. It includes discussion of vegetation changes under climate warming and implications to carbon cycle, changes in environmental pollution, hydrologic cycle, and impacts on society. Climate change can affect land cover in the Arctic through changes in the surface reflectivity and hydrology due to changes in snow melt timing; impacts of black carbon emitted by fires and settled on bright surfaces; changes in sea ice and the consequent change in ocean circulation affecting vegetation cover patterns indirectly; and changes in the amounts of greenhouse gases emission due to permafrost melting, especially in peatlands, as warming progresses. The Arctic Eurasia is being affected by global and regional external factors that are causing its change and the positive feedbacks to this forcing may further exaggerate the situation. If the warming trend continues it will have a tremendous impact on all aspects of land cover in the Arctic region with considerable consequences at the global scale. It will cause significant changes in the natural land cover, and perhaps even greater changes in the areas where the land cover has already been considerably modified by human activities. Major changes have already taken place in how land is used in the Arctic. In many regions, there has been a clear shift from the land use practiced by indigenous people to intensive exploitation of the land for commercial and industrial uses. Results on the climate/environment - land-cover interactions will be presented.