The "Reindeer Mapper" Project

Abstract

Full Title: Reindeer Mapper: A remote sensing and GIS-based system to bring together space technologies with indigenous knowledge for sustainable reindeer husbandry in the Russian Arctic

Short Title: Reindeer Mapper

The main objective of this project is to improve the understanding of and ability to adapt to changes in climate, environment and human activities and their consequences on the ecosystems, economic productivity and human health and well-being of indigenous reindeer herder communities in Northern Russia by providing usable, timely knowledge from detailed analyses of satellite data combined with traditional, local and other data and information. To accomplish this, we are building on progress from the first year of a pilot project on Reindeer Mapper. Specifically, we are continuing to obtain, analyze, and integrate remote sensing, ground measurements and information technologies together with indigenous traditional and local knowledge into a GIS-based information management and knowledge sharing system, called "Reindeer Mapper", to improve management of reindeer herds in Northern Russia. Together with our Russian reindeer herder and science team partners, we have initiated Reindeer Mapper Team Communications System, established several test sites for our initial studies, set priorities for data requirements, analyzed data sets from several areas, and implemented a collaborative summer education field camp for Russian reindeer herder children. The work we propose to do for these early test sites will be applicable throughout the Arctic.

This project consists of five main tasks: (1) Development of Reindeer Mapper Intranet System, (2) Data and Observations, (3) GIS Development, (4) Data Integration and Sharing System, (5) Education Program. A brief description of each task follows.

- Development of robust Reindeer Mapper Intranet System, building upon initial system established during first year of pilot project, which enables Reindeer Mapper team members in offices, laboratories, and field camps in the US, Russia, and Norway to work together electronically.
- Review, archive, and process current and historical NASA ESE (and other) remote sensing and ground-based data and observations useful for measuring and monitoring parameters of interest to reindeer herder communities (e.g., snow cover, ice conditions, vegetation, fires, infrastructure, land use, etc.) in selected geographic regions of interest. New applications of SAR are a high priority task.
- Development of a GIS-based system for sustainable reindeer husbandry, which provides a software platform that can integrate the scientific, technical, indigenous, and social data, giving answers to real-time interdisciplinary herd management questions in map format (e.g., suitability of migration routes, pastures for grazing, early ice melt).

- Develop a real-time, geo-referenced data integration and sharing system, based on existing NASA-state of Pennsylvania system (PAIRS) for real time interconnectivity among all participants, including remote sites in Northern Russia
- Develop flexible education programs for reindeer herder youth and families to enable participation in traditional herding activities as well as full access to schooling in contemporary scholastic knowledge programs (e.g., GLOBE Program; Native View). Team will build on summer science-indigenous field camp for children of reindeer herders in Yakutsia, implemented in first year.

The value of this project to NASA is in its utilization of a large number of EOS data sets and related US and Russian data sets in combination with indigenous and social science data to address impacts of climate, land use, anthropogenic activities, pollution and other human influences on a unique Arctic system - the reindeer ecosystem in Northern Russia - addressing the ESE questions, "What are consequences of change in the Earth system for human civilization?" and "What are the consequences of land cover and land use change for the sustainability of ecosystems and economic productivity.

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