



Permafrost Ecosystem Changes Across Eurasia and North America Using Multi-Satellite Measurements

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Climate-driven changes to permafrost across northern Eurasia and North America are evident. These changes pose far-reaching consequences for the livelihood of communities through changes in water, landscapes and shifts in ecosystems, i.e. resource changes. Among these, changes in energy and water are critical to permafrost ecosystem health. In this presentation we assess linked changes of atmosphere CO₂ concentration, land-surface temperature, snow water equivalent and total water storage on hemispheric and local scales. At the hemispheric scale are questions regarding changes of the Arctic Ocean and linkage to energy, mass and heat content changes to the permafrost watershed ecosystems. We will present assessment of these ongoing changes. On land regions we hypothesize that the changes of permafrost watershed ecosystems are being facilitated by climate-driven permafrost thawing and degradation, which have linkage with development of new and expansion of existing taliks that function as pathways of energy (heat) and water flows both below and on the land surface. The coupled changes of permafrost and talik have important linkage to thermokarst changes affecting terrain surfaces. We will present terrain surface changes as measured by the Ice, Cloud and land Elevation Satellite Geoscience Laser Altimeter mission from January 2003 through October 2009.